CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

'The construction industry has a long history of problems with its definition of objectives, procurement strategies and their implementation and ultimately its efficiency. Despite extensive efforts to address these issues, the fundamental process and function of procurement together with the selection of optimum procurement systems remains contentious and fraught with difficulty for both clients and contractors within the industry'.

(Hardcastle C. & J.E. Tookey, 1998)

Refurbishment project development involves numerous parties, various processes, different phases and stages of work and a great deal of input from both public and private sectors – with the major aim being to bring the project to a successful conclusion. The level of success in carrying out construction project development activities substantially depends heavily on the quality of the managerial, financial, technical and organizational performance of the respective parties, while taking into consideration the associated risk management, the business environment, and economic and political stability. As refurbishment becomes more complex and uncertain, a more sophisticated approach is necessary to deal with initiating, planning, financing, designing, approving, implementing and completing a project (Wang, 1994).

The fundamental client objectives generated seem to crucially hinge on three factors for successful project – quality, cost and time (Walker, 1994, 1996) and the common assessment of a success construction project is that they are delivered on time, to budget, to technical specification and meet client's satisfaction (Baker et al., 1983; Slevin & Pinto, 1986; Morris & Hough, 1987; Turner, 1993).

However, in the current Malaysia refurbishment industry, contractors are still encounter difficulties in handling the fundamental process and function of procurements although extensive efforts have been taken. Some major causes that affect project performance were ineffective and inefficient communication practices in which inadvertently inhibit the decision making process (Love et al., 1997), frequent order changes, escalation of material prices, insufficient or discrepancies of contract documents, lack of skill, expertise and experience workers, and cash flows and financial problems. These problems had caused poor productivity, cost overruns, declining construction quality, and decreasing customer's satisfaction, conflicts, and late completion of the prospective project (Egan, 1998; Yasamis et al., 2002).

Therefore, identifying the most suitable and procurement system for procuring refurbishment projects may be a significant contributor to improve overall performance of the refurbishment industry. This study commenced with the identification of the problem, objectives, research methodology, limitations and the significance of the study. At the end of this chapter, a research structure is provided and all chapters in these studies are previewed.

1.1 PROBLEM STATEMENT

A review of current practices in Malaysia shows different approaches to the refurbishment procurement systems. The classifications of these approaches are extremely complex because there are no clear and universally accepted definitions of procurement systems. This raises a major issue whereby if there is no accepted definition of what comprises a particular procurement route, the possibility of establishing criteria to achieve specific objectives is problematic, if not remote. Compared to new build project, the refurbishment projects are more risky and complex, in which makes it more difficult to manage (Egbu, 1988, & Ali, 2008). Moreover, the introduction of different types of procurement systems has contributed to higher difficulties in managing refurbishment project under various circumstances (Ali et al., 2011).

Hardcastle and Tookey (1998) highlighted that the refurbishment industry has been heavily criticized for its inefficient and ineffective procurement strategies and processes. The inefficient and ineffective procurement strategies and processes have been considered as a factor that has affected the industry's performance. The different types of procurement system have different methods and process of designs and constructions. It described a different systems and a different organization structure in term of roles, responsibility and the authority of each members in the team. However, it's still uncertain on how far do the different types of procurement system have different methods, process and organization structure and how it can affect the performance of a refurbishment project in term of cost, time and quality. These problems and impacts have to be measured so that it can be used as a guide in selecting a better procurement system.

Moreover, constraint that's existing within the process of construction was among various facetof problems in which still faced by construction industries (Turin, 1973; Ofori, 1980; Edmonds & Miles, 1984; World Bank, 1984; Wells, 1986; Wang, 1987, 1991; Sharif & Morledge, 1996; Morledge, 1996; and Sharif, 1996). Contractor is heavily burdened with the problems during construction periods due to the factors of cash flows and financial difficulties, slow decision making by the owner, communication problems between parties, escalation of material prices, insufficient contract documents, frequent order changesand others (Nuhu and Issaka, 2008; Mohd Danuri et al., 2006; Abdul, Ayub and Janidah, 2006; Sharif & Morledge, 1996; Mansfeild et al., 1994; Wellington & Mpendulo, 2008).

Problems faced by the contractor during construction period may restrict or limit the effectiveness of the procurement process. As a result, ineffective construction procurement use would affect the output and subsequently inhibit growth in the refurbishment industries (Turin, 1973; Ofori, 1980; Edmonds and Miles, 1984; and Wells, 1986), as well as affecting the project performance.

In another word, different types of procurement methods selected will give impact – either positive or negative, to the contractor during construction period. Therefore, it isessential to understand today's practice procurement method and to identify problems face by the contractor in using different types of procurement systems, and the impact of the problems towards project performance in term of cost, time and quality.

1.2 RATIONALE FOR IMPROVING PROCURMENT SYSTEM FOR REFURBISMENT PROJECT

Refurbishment project is risky, complex and less predictable task within the construction industry (Egbu, 1994; Rahmat, 1997; Rayers and Mansfield, 2001; McLennan et al., 1998). Refurbishment is defined by Young and Egbu (1993), Quah (1988), Ashworth (1999), and Marsh (1983) as an upgrading works, major repair works, renovations, rehabilitations, alterations, conversions, extensions and modernization of existing building to a new and updated version. Managing refurbishment projects is difficult and challenging for most of the contractors as the project has to be managed under various circumstances such as insufficient and incomplete information as well as constantly changing conditions.

The complexity of managing refurbishment projects and its implications on the refurbishment projects performance observed by Boyd and Weaver (1994), and Quah (1992) whereby when the buildings to be refurbished are occupied during the design stage, complete survey of structural work is difficult to undertake because of the limited access to the building, in which results in lack of complete drawings to guide the designer and builder in the refurbishment work. Okoroh (1992) pointed out that the inadequacy of specifications from the architects makes it difficult for contractors to define the exact scope of work in advance. As a result, the planning and control of refurbishment works tend to be difficult, for instance, in determining the actual time and cost of the works (Okoroh, 1992), and in producing method statements and programmes (CIOB, 1987).

The evidence provided by Quah (1992) in her study titled "Comparative variability in tender bids for refurbishment and new build work", found that regardless of project size, refurbishment tenders had a higher bid variance than new build tenders. The higher variability in tender bids reflects the inadequacy of specifications and unfamiliarity with the technical problems of refurbishment work. On the other hand, inexperience contractor may tend to submit lower bids as they are not aware and does not take into consideration on the technical problems and other uncertain works.

The variability of the tender bids is very much depend on the types of procurement system opted for the project. As discussed earlier, the different types of procurement system have different method and process of design and construction. It's not only described different systems and different organization structures, responsibility, and the authority of each members in the team, but also different in the contract documents in terms of drawings, bill of quantities, specification and design brief.

The BRE (1990) cited that because the condition of the existing building is uncertain, the responsibilities of the organizations and individuals on site cannot be clear-cut. Refurbishment work proceeds as a succession of technical problems requiring quick solutions. Frequently, techniques and methods of repair have to be uniquely developed for each building, even for similar buildings built in the same period. Consequently, to plan and incorporate all uncertainties would be extremely difficult.

In addition, there're also problems of incorporating statutory legislation, such as fire protection and thermal performance (Boyd and Jankovich, 1993), and problems of

matching new works with old (CIOB,1987, and Fiedler, 1987). The complexity and uncertainty of refurbishment projects are often cited as one of the main reasons for refurbishment projects' unsatisfactory performance. The BRE (1990) informs us that the problems in refurbishment projects are often underestimated and the final account frequently rises unacceptably beyond original estimates.

Thus, it is crucial to identify the variables that arecontributed to the difficulties of contractor in managing refurbishment projects using different types of procurement. Therefore, the following aims and objectives have been formulated to identify the problem faced by the contractor and the impact of these problems towards performance.

1.3 RESEARCH AIM AND OBJECTIVES

Refurbishment projects required a better way to build and manage the development of a project. Therefore, a suitable procurement system is crucial to meet the demands within budgetary and time restrains. The research aim to investigate, evaluate and analyses the most suitable procurement method to be implemented in refurbishment project. In order to achieve this goal, three research objectives have been formulated.

They're stated as following:

1. To identify types of procurement methods used in the Malaysian refurbishment projects.

2. To identify problems and difficulties encountered by contractor using different types of procurement systems in refurbishment projects.

3. To establish relationship between problem and difficulties encountered by contractor using different types of procurements towards performance of refurbishment projects

1.4 SCOPE OF RESEARCH

The scope and limitations are crucial in determining the coverage and extend of the research that's required to be completed within anticipated time. This research study essentially focused on identifying types of procurement method that will be used in Malaysia as well as identifying constraint or problem encountered by using different types of procurement systems. The research also extended to establish relationship between constraints or problem encountered towards performances of project. This research study limited to the following area:

a. Refurbishment projects in Malaysia that areconsist of renovation, rehabilitation, restoration, adaption, alteration, extension, conversion, modernization, upgrading works, and retrofitting works. Routine maintenance and repairing works will not be focused in this study;

b. The respondents must have knowledge and experiences working in contractor construction companies.Such as project manager, project engineer, quantity

surveyor or contract administrator, and others professional staff who has knowledge in procurement system and refurbishment project;

c. The selected refurbishment projects should be commenced after 31st December 1999 in order to ensure that the selected project will not be affected by recession in 1998;

d. The research will be limited to post construction (during and after construction);

e. The contract amount of the refurbishment project is more than RM500,000; and

f. The project selected must be completed in 2007 onwards.

1.5 THE SIGNIFICANCE OF RESEARCH

An effective and efficient process of construction procurement is crucial in determining successfulproject in terms of meet targeted time, within budget, high quality and good record in safety and health. This research intends to produce enormous benefits to construction industry players such as client, consultant, and contractor as well as sub-contractor in the following aspects:

1. **Provide clearer understanding on different types of procurement systems**

Identification of types of procurement systems opted in refurbishment projects are able to provide better and clearer information to client, consultant and contractor, who increasingly insisting for 'better value of money' for the projects in term of cost, time and quality. The different project procurement systems present different methods, process, and procedure of designing and construction of projects.

2. **Provide knowledge and guidance to an appropriate measure**

Different types of procurement system have its disadvantages. This researchindicates problem or constraint encountered by contractors in using different types of construction procurement and examine relationship between these problems towards project performance. These findings and resultsprovide awareness and guidance to provide appropriate measures for client and contractor in managing construction procurement.

3. **Future references**

Knowledge and understanding the problem faces by Malaysia contractor in refurbishment project in using different types of procurement approaches and their relationship towards project performance are very important. In addition, this research study was yet done widely by other researchers in Malaysia refurbishment projects. Therefore, results and research findings in this study can be used as a reference by other researchers in their future research.

1.6 RESEARCH METHODOLOGY

In order to achieve formulated aims and objectives, triangulation method was adopted in this study. Quantitative research refers to the research that is based on principle of methodology that's employs quantitative measurement and the use of statistical analysis (Sarantakos, 1988) whereas qualitative research refers to a number of methodological approaches that's employs non-quantitative data collection whereby describes reality as experienced by the respondents.

Generally, the methodology involves consisted two method of data collection – primary data and secondary data. Primary data are sources that were obtained from questionnaire survey and semi-structured interview while secondary data are information of published materials such as text reports, books, journal, magazines, newspaper, and internet resources.

Research methodology that has been formulated in this study involved four stages consisting of preliminary study and topic selection, literature review, data collection, data analysis, and conclusion and recommendations. These stages are described and explained as follows:

Stage 1: Preliminary
study and topic
selection

Identify area of study

Problem identification and topic selection

Literature review

Formation of aim, objective and scope of research

Determination of research methodology

Stage 2: Research
proposal

Formation of data-gathering techniques

Data Collection

Primary data

-Questionnaire survey
-Semi-Structured
Interview

Secondary data

-Articles –Journals
-Books -Websites

Data analysis and Findings

Stage 3: Data
collection and
processing

Validation

Stage 4:
Conclusion

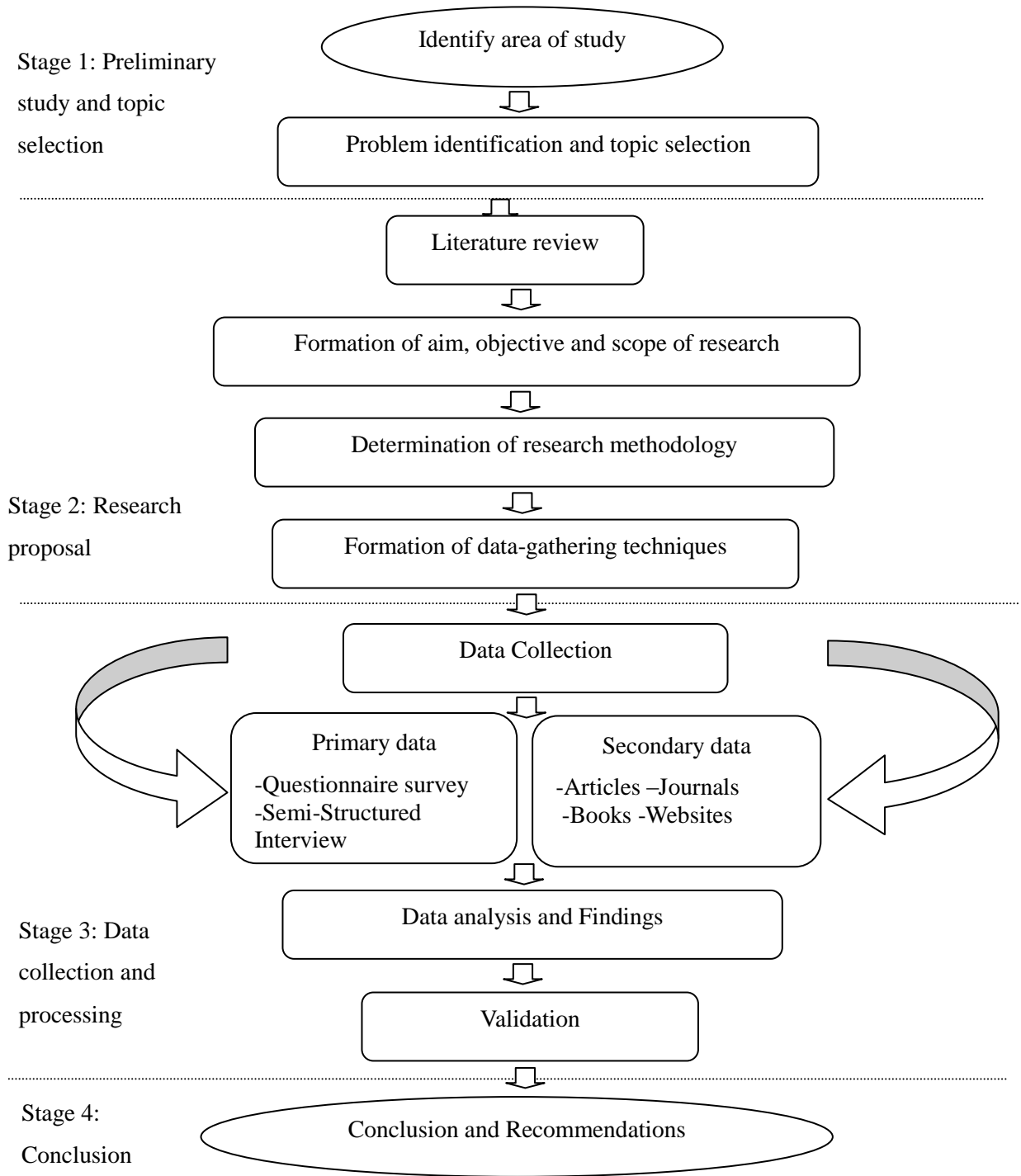Conclusion and Recommendations

Figure 1.1: Research methodology flow

Figure 1.1 show research methodology flow from initial stage to the completion of this

research. The research is conducted in 4 stages and these stages are described follow:

1.6.1 Stage 1: Preliminary study and topic selection

A broad scope of study was studied in the first stage. This information obtained from the secondary data such as text reports, books, journal, magazines, newspapers, articles, and internet resources. The problem occurred due to several issue or problem arisen from several country was analyzed as well. The resources for the problem or issues mostly obtained from the Journal of Engineering, Construction and Architectural Management; Journal of Benchmarking; an international journal of politic and laws; The Royal Institution of Chartered Surveyors (RICS) Journal; journal of facilities, newspapers, books, articles, and magazines that were highlighted the problem faced by contractor in construction industry.

Research topic was formulated based on the interest of researcher and the problem identified from the preliminaries study. From the problem statement, aims and objectives wasformulated. Three objectives were targeted whereby to focus on types of procurement systems used in Malaysia refurbishment projects; to identify difficulties face by Malaysia construction industry and to establish the relationship between these difficulties towards refurbishment project performance.

1.6.2 Stage 2: Research proposal

In this study, literature search was carried out after the idea of the broad area of interest and problem are identified in initial stage to set the parameters of this research. The relevant data was collected from literature surveys, and aims as well as objectives and the scope of

study was formulated at these stages. The purpose of this literature survey is to include all the relevant variables, give a good basic framework to further proceed and to provide a theoretical background in this study. The literature review thus provides guides towards the preparation of research methodology and data gathering techniques. Data gathering techniques included the questionnaire survey that was formulated as there was a framework and summary of the important information. In this study, the first, second and third objectives were achieved by literature survey, questionnaire survey and semi-structured interview.
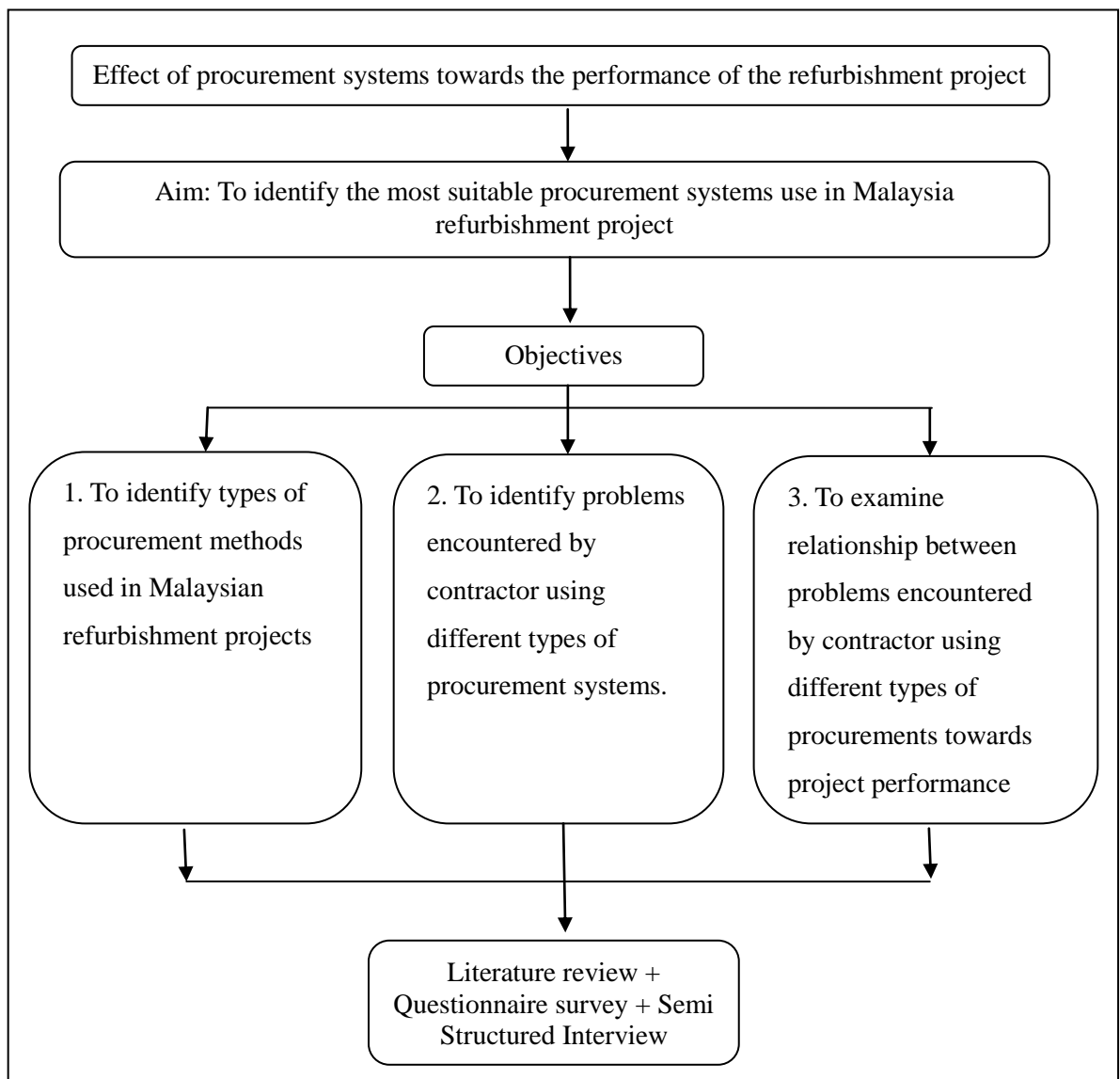

Figure 1.2: Research methodology and data collection techniques

1.6.3 Stage 3: Method of data collection and processing

Triangulation method was opted in this research whereby combined both quantitative and qualitative methods. The background and relevant issues on procurement system were identified though primary data and secondary data. Research design and sample design were determined based on research aims and objectives shown in Figure 1.1. Pilot study was done before the questionnaire survey distributed to the site agent, engineer, quantity surveyor / contract administrator, construction manager, project manager and others parties whom work in contractor Construction Company. Total of thirty five (35) questionnaires were distributed in order to ensure that the respondents are clear and understand the questions designed. One thousand five hundred (1500) questionnaires were then distributed through email, post and fax. The data collected was analyzed by using computer software's SPSS. Among the method used was Statistical Analysis using SPSS (Pearson's Correlation, percentage distribution, mean and descriptive statistical technique). From the results of the questionnaires obtained, researcher was then carried out semi-structured interview in order to ensure the result is reliable.

1.6.4 Stage 4: Conclusion and recommendation

Conclusion and recommendation are the final stage of this research. This includes the process of documentation together with summaries, conclusion, and future recommendation relevant to this research topic.

1.7 RESEARCH STRUCTURES

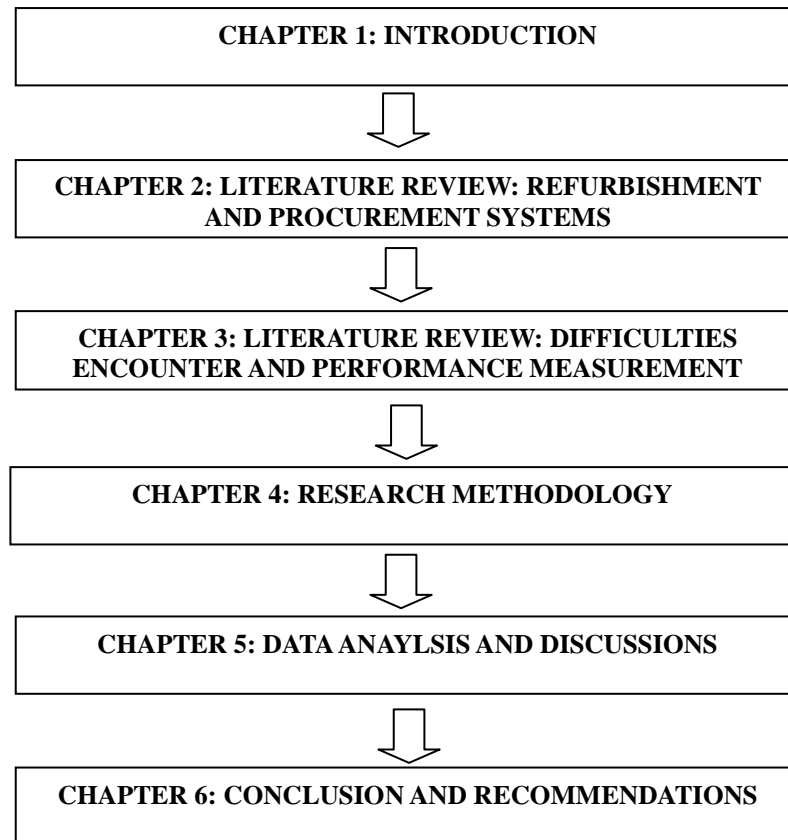The structures of this research were divided into each six (6) chapters as follows:

CHAPTER 1: INTRODUCTION

⬇

CHAPTER 2: LITERATURE REVIEW: REFURBISHMENT AND PROCUREMENT SYSTEMS

⬇

CHAPTER 3: LITERATURE REVIEW: DIFFICULTIES ENCOUNTER AND PERFORMANCE MEASUREMENT

⬇

CHAPTER 4: RESEARCH METHODOLOGY

⬇

CHAPTER 5: DATA ANAYLSIS AND DISCUSSIONS

⬇

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

Figure 1.3 Research Structures

Chapter 1: Introduction

This chapter describes and explains on the summary of overall content of the research. It comprise of background of research, problem statement, aims, formulated objectives, scope of research, significance of research, research methodology and research structure as well.

Chapter 2: Literature review: Refurbishment and Procurement Systems

Refurbishment works are clearly defined and the characteristics of the refurbishment project are explained in detail in this chapter. Besides, this chapter also presents and focus on the types of procurement systems, characteristics of the systems as well as the advantages and disadvantages of the procurement systems.

Chapter 3: Literature review: Challenging encounter and Performance Measurement

In this chapter, problems and difficulties face by contractor using different type's construction procurement are presented and explained in detail. Key Performance Indicators (KPI) use to measure project performance is presented and explained in this chapter. A performance indicator was used as a yardstick to judge whether a project has achieved the expectations.

Chapter 4: Research methodology

This chapter concentrates on the methodology used in conducting the research whereby outlines the research design in which opted triangulation method that's consists of both quantitative and qualitative methods, research methodology flow, literature review, data collection techniques such as parameters used in questionnaire design, questionnaire design, data analysis of this study, the selection of respondents, the limitation of the study and the statistical analysis tools that were used during the analysis of the final data.

Chapter 5: Data Analysis and Discussion

In this stage, it is able to determine whether the stated objectives have been achieved. Different types of analysis were carried out to the requirements of the objectives. Computer software such as Microsoft Office Excel and Statistical Package of the Social Sciences (SPSS) are used as analysing tools. The analysis method is depends on the suitability of the variables. There are several popular method were used such as Likert scale, Numerical scale, indexing descriptive and others. The results are presented in graphical form such as graphs, charts, tables and schedules for a better understanding.

Chapter 6: Conclusion and Recommendation

Chapter six (6) outlines the summary of the objectives and the problem statement of the research. The chapter also includes the conclusions and recommendations of the study that are derived from the results of the final data analysis. This chapter also suggests some potential research, which could be conducted in the futurefrom the results of the study.

1.8 SUMMARY OF THE CHAPTER

This chapter had discussed on the issues and problems in refurbishment project using different types of procurement systems, whereby uncertainty and different types of procurement systems serve different processes during construction stages. Besides, the rationales of improving procurement systems for refurbishment project also have been discussed in this chapter. The aim and objectives has been formulated based on the issues

and problems found for this study. Furthermore, scope of research, significance, research methodology and research structured have been highlighted in this chapter. Refurbishment works definition and characteristics are discussed together with the different types of procurement systems in the next chapter.

CHAPTER 2

LITERATURE REIVIEW: REFURBISHMENT WORKS AND PROCUREMENT SYSTEMS

2.0 INTRODUCTION

Refurbishment is an important sector in the Malaysian construction industry. Growth for refurbishment projects has been increasing over the last five years. CIDB (2007) recorded growth for refurbishment projects at only two percent in 2002, but increased to 16 percent in 2006. However, very little research had been conducted on the refurbishment growth and the factors that contribute to it. Even though these factors contribute to the growth of refurbishment projects, the performance of the projects is mostly unsatisfactory. Quah (1988), Rahmat (1997), and Rayers and Mansfield (2001) pointed out that refurbishment projects are generally more uncertain than other construction projects. Moreover, refurbishment projects are mostly completed with high cost and time variances.

Constraints in the refurbishment procurement restrict or limit the effectiveness of the procurement process (Turin, 1973; Ofori, 1980; Edmonds and Miles, 1984; World Bank, 1984; Wells, 1986; Wang, 1987, 1991; Master Builders, 1989, 1990; Miles and Neale,1991;

Morledge, 1996). However, research on performance of refurbishment projects is still lacking. This chapter therefore identifies types of procurement method and difficulties facing by contractor in handling different types of procurement systems in refurbishment project. Therefore, the objectives of this chapter are to assess the growth of refurbishment projects in Malaysia, to identify factors that contribute to refurbishment projects growth, to determine types of procurement methods used in refurbishment projects, and to identify advantages and disadvantages in using different types of procurement systems.

2.1 DEFINITION OF REFURBISHMENT WORKS

The life of a building may be considered to be cyclical with a sequence of discrete work parcels from maintenance, repair, replacement, refurbishment and redevelopment. Refurbishment is part of this continuum, initially appearing toward the end of this cycle. However, external, mainly macro-economic influences have the effect of realigning investment values and may position refurbishment earlier in the cycle (John, 2001). Refurbishment can be defined in several ways by the authors in their academic research such as journals and articles, practitioner reports and statements from leading built environment institutions.

Seeley (1987) believes that "rehabilitation", whereby in many texts is used synonymously with "refurbishment", has supplanted the terms "conversion" and "modernization", implying an approach that embraces the wider localized environment as well as individual structures. Markus (1979) pointed out that the overall purpose of refurbishment is to extend the beneficial use of an existing building by providing a cost-effective alternative to

redevelopment. It is implicit within this definition that the building's present economic life is over, or at least drawing to a close, and that a better and longer life is possible.

Aikivuori (1996) suggests that a refurbishment project may be initiated suddenly because profound damage has occurred to the physical structure, or alternatively may be found in advance for a chosen time according to the expected rate of deterioration. Aikivuori, in her research study, added that the range of refurbishment types can be identified as following:

- Corrective refurbishment;

- Altering refurbishment;

- Optimizing refurbishment

- Pleasure refurbishment; and

- Opportunity refurbishment

Lee (1987) considers the broader refurbishment process to be described by a number of names such as adaption, conversion, retrofitting, renovation and modernization. Egbu (1996) on the other hand, supports Lee (1987) by considering "refurbishment" to encompass rehabilitation, alteration, adaption, extension, improvement, modernization and repair work carried out to an existing building to permit its re-use for various specific reasons. Apart from that, Hardcastle et al. (1997) commented that the refurbishment of buildings to renovate re-equip or restore is a process which reflects the ethos of urban regeneration.

Industrial Market Research (1987) defined "refurbishment" as a work in which involves the structural alteration of buildings, the substantial replacement of main services or finishes

and/or substantial improvement of floor space while at the same time including associated redecoration and repair work on the one hand and related new building work on the other. Refurbishment can be defined as work carried out an existing building in an attempt to improve and to update it to modern standards while retaining its current use in order to improve the facilities, rearrange internal areas and/or increase the structural life span (CIOB, 1987). Young and Egbu (1993) define refurbishment as to cover a wider scope not limited to alteration and adaptation as defined by the CIOB (1987).

Jones Lang Wootton, Estates Gazette, and South Bank Polytechnic (1989) consider that "refurbishment" is improvement and modernization of a building falling short of rebuilding or redevelopment and thus not normally requiring planning permission other than for alterations to the external appearance, except in the case of listed buildings. RICS Building Conversation Practice Panel defined refurbishment as the extensive repair, renewal and modification of building to meet economic and/or functional criteria equivalent to those required of a new building for the same purpose which may involve the installation of current standards of building services, access, natural lighting, equipment and finishes, using historic fabric as the carcass of what is, effectively, a new building (RICS, 1988).

Connaught Report (RICS, 1997)commissioned by the RICS to report on office refurbishment, considered "refurbishment" to be any building work that enhances the exterior and/or interior structure or aesthetic appearance of an office building. One of the major characteristics of refurbishment projects according to Kingdon (1973) is a high degree of complexity, whereby inputs such as raw materials may be diverse and non-uniform and in which a large number of specialist contributors are required to perform the

tasks and production processes, lacking in standardization and routine where feedback loops within the production systems itself may be extensive. Under these conditions, task boundaries are not well defined. Kingdon (1973) then argued that the greater needs for self-regulation and material adjustments, the wider the spread of discretionary authority and the greater the need for direct interaction between subgroups. When the need for self-regulation is great, the effectiveness of bureaucratic organization is limited.

Most of the researchers defined "refurbishment" in different perspective in terms of technical, functional, economic, regulatory, and philosophical viewpoints. Furthermore, there is a consensus among many construction management researchers that refurbishment projects are among the most complex and uncertain of all construction projects. Therefore, the most appropriate definition for a refurbishment project would be a refurbishment undertaking of varying degree of complexity and uncertainty that involves the integration across organizational boundaries of groups, departments and organizational.

2.2 THE GROWTH OF REFURBISHMENT PROJECTS

Figure 2.1 shows Total Construction Project Output in Malaysia starting from year 2004 to middle of the month (June) of year 2011.
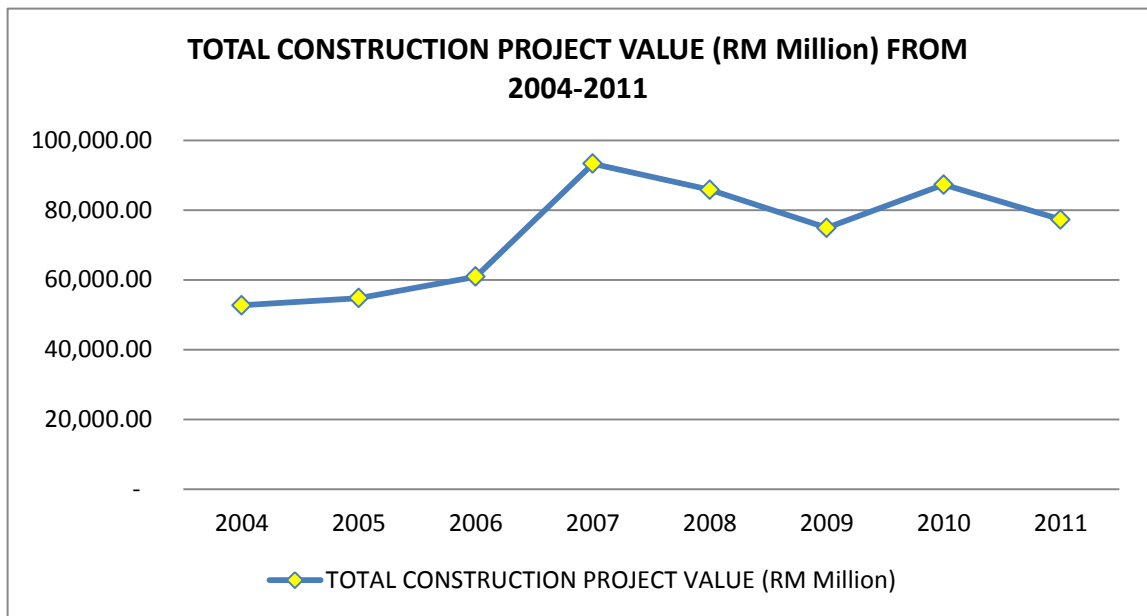
Figure 2.1: Total Construction Projects Value from 2004-2011

(CIDB Statistic, 2006 - 2011)

Total construction projects value in the year of 2004 achieved RM52, 694.36 million and increased to RM54, 761.38 million in 2005 and RM60, 926.99 million in 2006 respectively. As shown in the line chart, total construction output in Malaysia increased dramatically to 7,358 numbers of construction projects with project value amounting RM93,294.21 million in the year of 2007, which indicated as the highest record from 2004 to 2011 (January to June). However, the output of construction project started to decrease in the year of 2008, 2009, 2010 and 2011 with record of RM85, 837.07 million, RM74, 913.64 million, RM87, 286.44, and RM77, 270.08

Total Construction Output might change not only depending new project but also Refurbishment works such as Upgrading, Expansion, Maintenance, Repair and Renovation. Figure 2.2 shows Total Project Value for Refurbishment projects in Malaysia from year 2004 to year 2011.

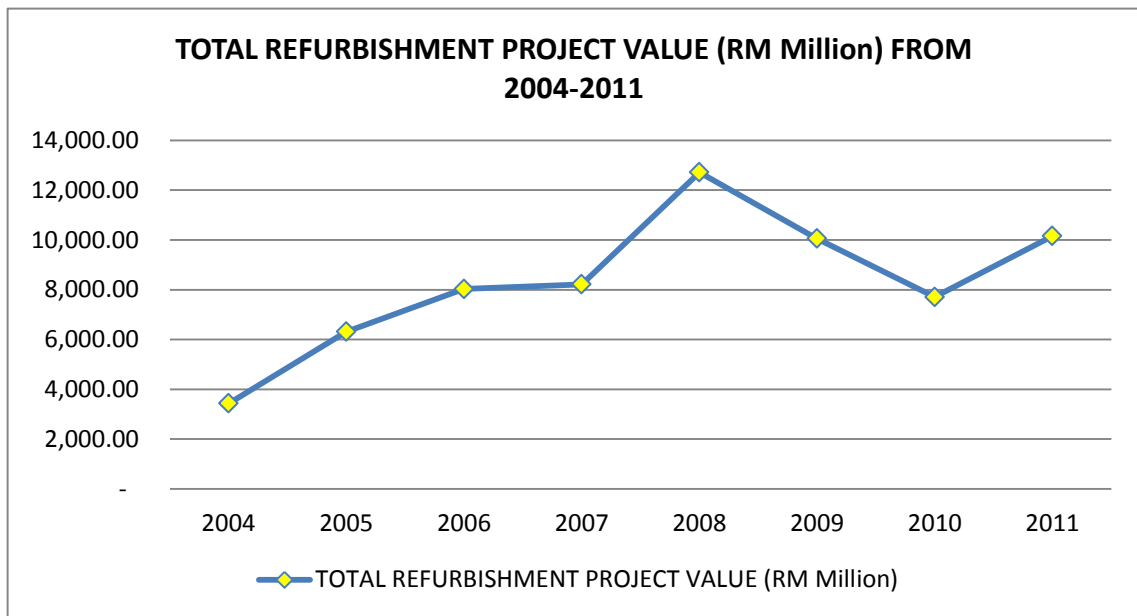**TOTAL REFURBISHMENT PROJECT VALUE (RM Million) FROM 2004-2011**

Figure 2.2: Total Value for Refurbishment project from 2004-2011

(CIDB Statistic, 2006 - 2011)

Refurbishment output was steadily increased from the year of 2004 to 2008 with project value amounting RM3, 436.49 million (2004), RM6, 312.68 million (2005), RM8, 030.76 million (2006), and RM8, 212.57 million (2007) respectively. As shown in the line Chart, Total Refurbishment project output achieved the highest record in the year of 2008 with value of RM12,712.60 million with contribution of 14.81% from Total Construction Output. CIDB Statistic (2008-2011) reported that Total Refurbishment output decreased in the year of 2009 to year 2011 if compares to the year of 2008. However, the project output for these years were still remained if compare to the year of 2004 to year 2007 with project values amounting RM10, 052.92 million (2009), RM7, 704.82 million (2010) and RM 10,156.33 million respectively.

Refurbishment Works are still demanded in Malaysian Construction Industry due to several factors and it is anticipated to be one of the crucial sectors in Malaysia in the near future.

2.3 FACTOR AFFECT GROWTH OF REFURBISHMENT SECTOR

Refurbishment sector is one of the most important sectors in many developed countries such as Hong Kong, US and Australia. In Malaysia, refurbishment is contemplates as a new phenomenon in the local industries. This sector is becoming an important economic driver in the Malaysian construction industry due to the existence of high number of ageing buildings.

In addition, rapid changes of technology used, change in building used, economic change and limited vacant land for new development shall be factors that induce to development of refurbishment project (Rahmat et al., 2003; Aikivuori, 1996; Ali et al., 2009). Similarly, Flanagan et al. (1989) noted that building refurbishment is initiated by physical deterioration and obsolescence, which includes change in technology, social, image, legal and environment. Details on such factors affecting growth of the refurbishment projects will be explained as follow:

2.3.1   Ageing buildings

Building deterioration is generally associated with one of the causes like dampness, bio-decay and movement (Addleson and Rice, 1991). Unfortunately, all buildings are exposed to these effects (Douglas, 2004). Dampness causes condensation. Dry rot causes bio-decay and subsidence causes movement. Exposure to the environment causes carbonation and corrosion of the reinforcement bars.

In addition, moisture content could cause dampness in the building which may lead to series of chain effects. As the elaboration of it, vegetation grows in damp floors, especially on the building aprons will cause parameter drain tends to become clogged in few months' time. Consequently, it will lead to movement that could cause cracks in walls. These processes normally affect the exterior facade of building, followed by the interior. Cracks in walls could lead to the occurrence of dampness inside the building (Hollis and Gibson, 2004).

2.3.2 Rapid Changes of Technology used

Obsolescence is the process of an asset going out of use, which indicates the tendency for the objects and operations to become out-of-date or old-fashioned (Douglas, 2004). Old buildings that were completed in the 1960s and 1970s generally have no extra space for additional new communication systems. Technological change makes the existing building system become obsolete faster. The needs for the building to accommodate the latest automation and electronic systems require the building owners to refurbish their buildings. The complexity of modern building automation systems requires sensitive design, particularly on their services layout. This is important for business organizations to provide better building equipment, quality workspace for their staff and a high standard of building appearance to enhance the building's position in the city (Watkins, 1996).

Refurbishment is an option to meet the change of demand of a building necessitated by the installation of modern facilities (CIRIA, 1994). Furthermore, information technology has changed the demand of new premises and the working environment of many people

(Kincaid, 2003). The ability of IT to communicate from a long distance effectively and to gather information instantly means that there is no need for people to meet in person (Kartam, 1999). Hence, working from a premise has become more common. Thus, the complete IT facilities with later technology installed in the premises to accommodate the function required create a greater demand for refurbishment.

2.3.3   Economic change

Economic recession, such as that experienced from in the year of 1997 to year 1999, may force the building owners to conserve their building (Ali et al., 2009). Financial crisis during the recession forces the government to cut expenditure on new construction, which reduces the total output of new work during that period. This encourages building owners to give priority to improve their existing building stock rather than undertake new developments.

2.3.4   Limited vacant land for new development

Besides that, limited land for development in strategic areas coupled with high land prices makes new construction expensive. As a result, many building owners realize that refurbishment is the best option. However, Aikivuori (1996) has emphasized that the major reasons for refurbishment are not due to the economic cycle, but rather are due to deterioration and obsolescence.

2.3.5 Change in Building Used

Hamilton (2003) pointed out that apparently there are several buildings in Malaysia that are under-or wrongly used. Lack of maintenance coupled with social problems, which can lead to vandalism and abuse increase the rate of wear and tear of buildings. This subsequently would induce the building to become dilapidated. Lastly, building owners have to make decision whether to move from the premise and build a new one on a different location, rebuild the building on the same lot or refurbish the existing building (Ali et al., 2009).

2.3.6 Demanding for better or modern Living

In Malaysia, the increase in of family size coupled with increasing household income has encouraged many house owners to upgrade their houses by adding more rooms or having bigger living. Some owners might demand to have a modern house design. Moreover, modern lifestyle will prompted building owners to refurbish their existing facilities in order to provide and serve a better and comfort working environment.

2.3.7 Government Policy

Government Policy is one of the factors that affect growth of refurbishment sector, mainly through the various authorities' by-laws such as planning, fire and building. In addition, change to some of the by-laws can also enhance the amount of refurbishment work carried out especially on old buildings. Aikivuori (1996) in his point of view indicated that it will be possible for an owner to refurbish building in order to meet with new the requirements

imposed by the government. In addition, requirements imposed by insurance companies to ensure on building safety are also one of the factors that may increase the growth of refurbishment projects (Marsh, 1983).

Even though these factors contribute to the growth of refurbishment projects, the performance of the projects is mostly unsatisfactory because refurbishment projects are generally more uncertain than other construction projects (Quah, 1988; Rayers and Mansfield, 2001). Moreover, refurbishment projects are mostly completed with high cost and time variances. Some of the main factors contributing to this problem are late discovery of design information, improper selection of types of procurement method for different project size and inconsistence client's brief throughout the projects period (Rahmat, 1997). Therefore, it is crucial for main contractors to have knowledge and skills in managing and handling refurbishment works to ensure excellent performance.

2.4 CHARACTERISTICS OF REFURBISHMENT PROJECTS IN MALAYSIA

Each refurbishment projects has its own characteristic depending on its project size and value, types of building, project location, and types of procurement system. These characteristics were explained in detail as followed:

2.4.1   Project Size ad Value

Difficulties in managing and handling refurbishment projects are depending of project size and value (Rahmat, 1997). In Malaysia, refurbishment projects tend to be carried in small

scale. This has been proven by the research carried out by Ali et al., (2009) from the years of 2002 to 2006.

Table 2.1 Size of refurbishment projects

Size of project (RM)	Percentage ($N = 354$)
< 500,000	39.0
500,001 to 2,000,000	36.7
2,000,001 to 5,000,000	16.0
> 5,000,000	14.3

(Ali et al., 2009; CIDB, 2008)

From the results of the survey as shown in Table 2.1, it shows that refurbishment projects size less than Two (2) million is the highest with contribution more than 50 percent. Contrarily, refurbishment projects with the size project more that Two (2) million is less implemented in Malaysia with record less than 31 percent. Therefore, it can be concluded that majority refurbishment project in Malaysia carried out is less than Two (2) million.

2.4.2 Type of Building

Ali et al., (2009) identified that residential and office is the most frequent buildings that carried out refurbishment activities in Malaysia. As shown in Table 2.2, Hospital has less demand in Refurbishment works if compared to other types of building.

Table 2.2 Types of Refurbishment projects carried out

Types of building	Percentage ($N = 354$)
Residential	62.7
Office	61.6
Factory	20.9
Hotel	15.5
Hospital	10.7
Education Institution	18.1
Shops	32.2
Others	15.0

(Ali et al., 2009; CIDB, 2008)

Different types of building would determine the degree of difficulties of the refurbishment projects. Rahmat (1997) pointed out that type of buildings is one of the factors that contribute to difficulties in handling refurbishment projects. For instance, hospital is perceived to be the most complex and uncertain to be refurbished due to the high services contents compared with other types of buildings (Egbu, 1994; Ali et al., 2009). Similarly, in other types of building, if the scope of work includes more services parts, the project would be more difficult (Ali et al., 2009).

2.4.3 Project Location

Ali et al., (2009) identified that majority of the refurbishment projects were carried out in Kuala Lumpur with 47.2 percent, followed by Selangor and Pulau Pinang with 31.6 and 13.7 percent respectively.

Table 2.3: Location of Previous Refurbishment Projects in Malaysia

Types of building	Percentage ($N = 354$)
Kuala Lumpur	47.2
Selangor	31.6
Pulau Pinang	13.6
Johor	11.6
Sarawak	9.9
Sabah	7.9
Perak	7.6
Kedah	6.8
Negri Sembilan	6.5
Melaka	4.5
Pahang	4.5
Terengganu	4.2
Kelantan	3.1
Perlis	2.5

(Ali et al., 2009; CIDB, 2008)

The trends could be influenced a busy hub and modern lifestyle in Kuala Lumpur and Selangor which indirectly increased the demand of the renovation and modernization.

2.4.4 Types of Procurement System

The results in Table 2.4 indicated that the traditional procurement system is the most preferred in Malaysia with record of 79.1 percent, followed by design-and-build system, 23.7 percent. Other types of procurement systems, including construction management and management contracting are minimal, constituting only about 10 percent of the total.

Table 2.4: Types of Procurement System used in Malaysia Refurbishment Projects

Procurement methods	Percentage ($N = 354$)
Traditional	79.1
Design and build	23.7
Construction management	6.8
Management contracting	3.1
Others	1.1

(Ali et al., 2009; CIDB, 2008)

2.5 INTRODUCTION TO PROCUREMENT SYSTEMS

'A procurement system (or sometimes known as delivery system) "is an organizational System that assigns specific responsibilities and authorities to people and organizations, and defines the various elements in the refurbishment of a project"

(Love et al. 1998:p.222)

The procurement of refurbishment project is vast in scope as it involves the gathering and organizing of myriads of separate individuals, firms and companies to design, manage, handle, construct and complete different types of building such as houses, office buildings, shopping complex, road, bridges, theme park and others for specific clients or customers (Rosli et al., 2006). The term procurement, in its modern context has been described and defined in various ways by different researcher and authors.

Procurement comes from the word procure which literally means "to obtain by care or effort"; "to bring about" and "to acquire". System is about "organized method, approach, technique, process or procedure". In this context, project procurement is very much

concerned with the organized methods or process and procedure of obtaining or acquiring a refurbishment product such as a house, shopping complex or road and jetty. It also involves arranging and coordinating people to achieve prescribed goals or objectives (Rosli et al., 2006).

The Aqua Group (2001) described procurement as the process of obtaining or acquiring goods and services from another for some consideration. However, Masterman (1996) described project procurement as the organizational structure needed to design and build refurbishment projects for a specific client. In other words procurement system can be described as a process of "obtaining" a building by a client and it involves a group of people who are brought together and organized systematically in term of their roles, duties, responsibilities and interrelationship between them (Rosli et al., 2006).

There are numerous types or variations of project procurement systems being widely used in the refurbishment industry from the range from the traditional system to the many variations of "fast-tracking" systems such as turnkey, design and build, novated design and build, build-operate-transfer, management contracting, cost-plus contracting, construction management, Package deals, etc (Rosli et al., 2006; OBD, 1997; Masterman, 1996; Huges et al., 2006). The introduction of variations of project procurement system was induced by the quest for more efficient and speedier project delivery system and better project performance. New introduced procurement systems are alternative to the traditional delivery method and aimed to meet the changing demand of clients or customers. The different procurement systems present have brought changes not only to the process and procedure of project delivery but also the aspects of management and organization.

The decision as to what procurement system to use should be made as early as possible and underpinned by the client's business case for the project. The risks associated with each procurement system and how they can affect the client and contractor should also be considered. Figure 2.4 provides an overview of the 'risk and challenges' (i.e. risk that can be apportioned in advance as decided by parties in a contract) to a client and contractor for specific procurement methods (Peter D. et al. 2006).

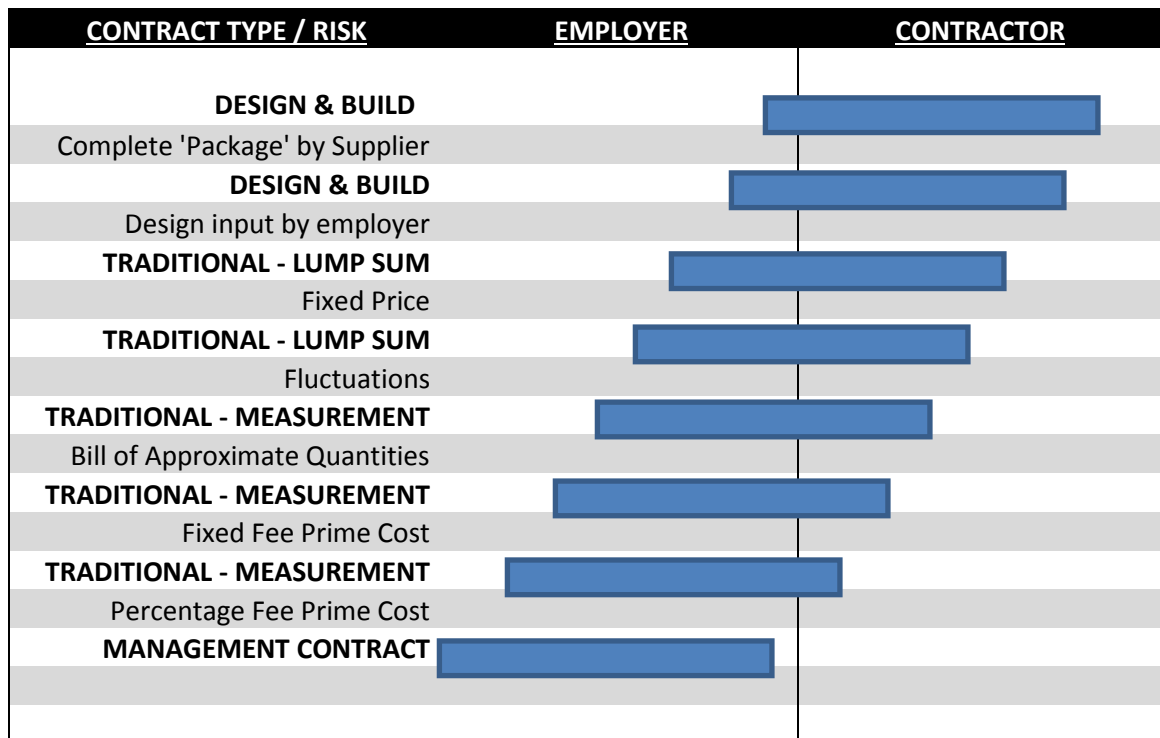| CONTRACT TYPE / RISK	EMPLOYER	CONTRACTOR
DESIGN & BUILD		
Complete 'Package' by Supplier		
DESIGN & BUILD		
Design input by employer		
TRADITIONAL - LUMP SUM		
Fixed Price		
TRADITIONAL - LUMP SUM		
Fluctuations		
TRADITIONAL - MEASUREMENT		
Bill of Approximate Quantities		
TRADITIONAL - MEASUREMENT		
Fixed Fee Prime Cost		
TRADITIONAL - MEASUREMENT		
Percentage Fee Prime Cost		
MANAGEMENT CONTRACT		

Figure 2.3: Risk apportionment between Client and Contractor using different types of procurement methods (Peter D. et al. 2006)

In designing and constructing forms of procurement, the contractor predominately assumes the risk for design and construction of the project. Design and construct variations exist where the level of design risk can be apportioned more evenly, for example, novation. With traditional lump sum contracts the intention is that there should usually be a fair and balance of risk between parties. The balance can be adjusted as required, but the greater the risk to be assumed by the contractor, the higher the tender figure is likely to be. With

management forms of procurement the balance of risk is most onerous for the client as the contractor is providing only 'management expertise' to a project. However, under a design and manage method a high of risk can be placed on the contractor for design integration.

2. 6 TYPES OF PROCUREMENT SYSTEMS

Different types of project procurement system used in construction industry can be illustrated in Figure 2.3:
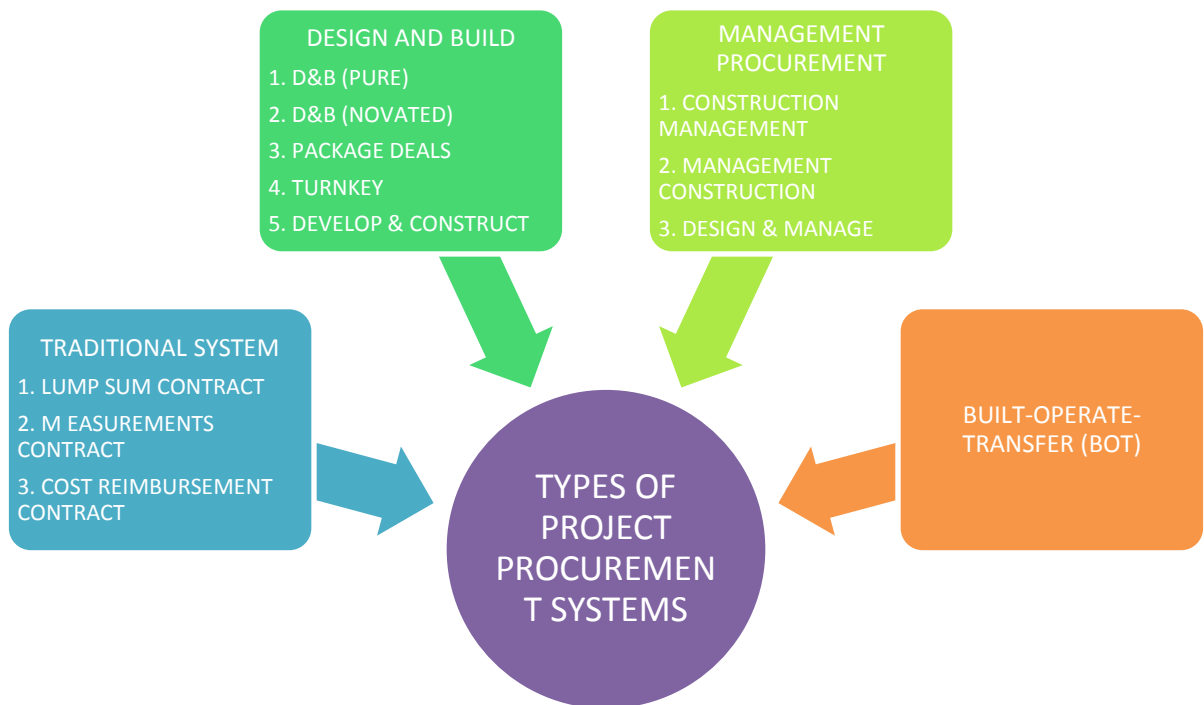

Figure 2.4: Types of Project Procurement Systems in Construction Industry

(Rosli et al., 2006; OBD., 1997; Masterman, 1996)

2.6.1   TRADITIONAL SYSTEM

The traditional procurement system is predominant in the Malaysian construction industry and, until 1992 at least, able to satisfy its requirements (Masterman, 1992). It is characterized by the contractor not being responsible for the design or the documentation work (Goldfayl, 1999; Rwelamila and Meyer 1999) and with a clear division between the design and construction process responsibilities (Rowlinson, 1999; Martin, 2000). The complete working drawings or design has to be prepared by the designers before tender and construction activities can take place (Rosli et al., 2006). The building owner will appoint a team of consultants to act on his behalf to produce construction drawings, specification and tender document and to administer the tendering processes to select a contractor. Once selected and awarded the contract, the contractor will carry out based on the drawings and specification prepared by the client's consultants.

Each phase in the traditional system is separate (Tenah, 2001; Walker and Hampson, 2003), with the different process in design and construction (Wearne, 1997). Each phase also contains different stages. The design development phase, for example, comprises project briefing, feasibility studies, outline proposals, scheme design and detail design (Smith, 1998). The reasons for the system's continuance are still selected by the client/customers Kong and Gray, J. (2006):

- It exploits the economic potential of the free market by enabling contractors to be selected either by open or select competition among an unlimited number of prequalified competitors (Rowlinson, 1999).

- The separation of design and construction appointment and service provision effectively restricts the amount of opportunistic business behaviour of those involved until the design is completed.

- Considerable flexibility is allowed for unforeseen events occurring during the construction phase, e.g., ground conditions, changes in scope and design, and errors in documentation (Turner, 1990; Goldfayl, 1999; Walker and Hampson, 2003).

- It is a 'value for money' delivery system which employs participants with different talents and combines these talents into a business relationship to produce the desired results with greater certainty (Rowlinson, 1999).

Sufficient time is needed for the preparation of full documentation by all consultants and for the quantity surveyors to complete a final estimate prior to calling tenders (Neighbour, 2000). It is also common for a period of several months to elapse from the first initiation of a project and appointment of architects to contractor selection and commencement on site (Hovet, 1994). In particular, the traditional procurement requires a sufficiently lengthy tendering period, to allow for the complexity of the work and for the tenderer to read the documentation, visit the site, and prepare for the tender (Neighbour, 2000).

The traditional system is therefore often recommended for fairly simple small to medium sized projects where time is not a critical factor (Masterman, 1992; Taylor et al., 1999). The traditional method, using two-stage tendering or negotiated tendering, is sometimes referred to as the 'Accelerated Traditional Method' – this is where the design and construction can

run in parallel to a limited extent. Whilst this allows an early start on site, it also entails less certainty about cost. There are three types of traditional procurement method and it will be described in detail as follow (Peter et al., 2008) :

2.6.1.1. Lump sum contracts – where the contract sum is determined before construction starts, and the amount is entered in the final contractual agreement.

2.6.1.2. Measurement contracts – where the contract sum is accurately known on completion and after re-measurement in accordance with a predetermined method.

2.6.1.3. Cost reimbursement – where the contract sum is arrived at on the basis of the actual costs of labour, plant and materials, to which is added a fee to cover overheads and profit.

2.6.1.1 Traditional - Lump Sum

The contractor undertakes to carry out a defined amount of work in return for an agreed sum. This can be a fixed amount not subject to recalculation, in which case there would be no opportunity for the employer to make changes. In actuality, the sum is likely to be subject to limited variation. The sum may also be subject to fluctuations in the cost of labour, plant and materials – the so called fluctuations [rise and fall] provision. Recovery of this may be with the use of a predetermined formula, or by checking actual invoices against a predetermined basic price list.

Lump sum contracts 'with quantities' are priced on the basis of drawings and a firm bill of quantities (BOQ). Items which cannot be accurately quantified can be recovered by an approximate quantity or a provisional sum, but these should be kept to a minimum. Tenders can be prepared on the basis of notional quantities, but they should be replaced by firm quantities if it is intended to enter into a 'with quantities' lump sum contract. Lump sum contracts 'without quantities' are priced on the basis of drawings and specification.The lump sum may not be itemized, then a supporting 'Schedule of Rates' will be required. An itemized breakdown of the lump sum will be a useful basis for valuing additional work.

2.6.1.2. Traditional - Measurement

Measurement contracts are also referred to as 're-measurement contracts'. This is where the work the contractor undertakes to do cannot for some good reason be accurately measured before tendering. The presumption is that a reasonably accurate picture of the amount and quality of what is required is given to tenderer. Probably the most effective measurement contracts are those based on drawings and approximate quantities. Measurement contracts can also be based on drawings and a 'Schedule of Rates' or prices prepared by the employer for the tenderer to complete.

This type of contract might be appropriate where there is not enough time to prepare even approximate quantities or where the quantity of work is particularly uncertain. Obviously the employer has to accept the risk involved in starting work with no accurate idea of the total cost, and generally this type of contract is best confined to small jobs.

2.6.1.3. Traditional - Cost Reimbursement (Cost Plus)

The contractor undertakes to carry out an indeterminate amount of work on the basis that they are paid the actual cost of labour, plant, and materials. In addition, the contractor receives an agreed fee to cover management, overheads and profit. Hybrids of the cost reimbursement contracts include (Frederick E. Gould & Nancy E. Joyce, 2003; Peter D. et al., 2008):

- Cost-plus percentage fee – the fee charged is directly related to the prime cost. It is usually a flat rate percentage, but it can also be on a sliding scale. However, the contractor has no real incentive to work at maximum efficiency, and this variant is only likely to be considered where the requirements are particularly indeterminate pre-contract.

- Cost-plus fixed fee – the fee to be charged is tendered by the contractor. This is appropriate provided that the amount and type of work is largely foreseeable. The contractor has an incentive to work efficiently so as to remain within the agreed fee.

- Cost-plus fluctuating fee – the fee varies in proportion to the difference between the estimated cost and the actual prime cost. The assumption is that as the latter cost increases, the contractor's supposed inefficiency will result in a fee which decreases. This approach depends upon there being a realistic chance of ascertaining the amount and type of work at tender stage.

However traditional system has been declining noticeably in popularity in Malaysia in recent years (Tan, 2001). The same has also been noted in many countries (Mo and Ng, 1997) – a particular criticism being that it is unable to cope with the complexity and dynamic nature of the current construction industry (Rwelamila and Meyer, 1999).

2.6.2   DESIGN AND BUILD

The term "Design and Build" refers to the procurement strategy that entails the contractor carrying out the work; the design works as well as the construction and completion of the work. It is a form of building procurement whereby the contractor will design and construct the project. A Design and Build contract is one in which a single entity, usually a contractor assumes responsibility for the design in whole or in part and for the construction and completion of a refurbishment project (Ng, Aminah and Mohd Yusof, 2006). In addition to the above, Turner (1990) supported that Design and Build contractor is supplying the procurement option of "buying" a finished building.

While according to Masterman (1992) the term Design and Build has almost been unanimously interpreted and defined as being an arrangement where one contracting organization takes sole responsibility, normally on a lump sum fixed price basis, for the bespoke design and construction of a client's project. This contains three main elements: the responsibility for design and construction, contractor's reimbursement is generally by means of a fixed price lump sum and the project is designed and built specifically to meet the clients' needs.

In addition, according to Ng, Aminah and Mohd Yusof (2006), Design and Build contracts place responsibility for both design and erection in the hands of the contractor one point of responsibility for everything. In this system, contractor will carry out two functions: design and construct. In other definition, Design and Build is an arrangement where one organization design and construct to the firm order of the client for a single financial transaction. The Chartered Institute of Building (CIOB-1987) defines Design and Build as the process where the client deals directly with the contractor for the complete building and it is the contractor who is not only responsible for but also coordinates the separate design and construction process, including engagement of the design team who are, therefore contractually linked with the contractor and not the client.

With design and construct procurement a contractor accepts responsibility for some or all of the design. There should be express reference to this in the contract, and the extent of design liability should always be set out as clearly as possible. Unless the contract states otherwise, it seems that the liability for design is an absolute liability under which the contractor warrants fitness for the purpose intended.

Some design and construct forms limit the design liability of the contractor to the normal professional duty to exercise reasonable care and skill. Independent consultants engaged by the contractor are therefore under a liability no greater than normal. An indemnity or acceptance of liability is likely to be worthless unless backed by adequate indemnity insurance, and this is something that should be checked before a contractor is appointed. If the contractor does not have in-house designers, which is often the case, and the contractor uses external consultants, their identity should be established before a tender is accepted.

The client's requirements might be stated briefly and simply, perhaps little more than a site plan and schedule of accommodation. On the other hand, they may be a document of several hundred pages with precise specifications. The contractor's input might be restricted to take a scheme design supplied by the client and developing details and production information. It is however better to specify in terms of the performance requirement rather than to prescribe in detail, because this leaves the responsibility for design and selection firmly with the contractor.

Design and construct methods offer certainty on the contract sum and bring cost benefits. The close integration of design and construction methods and the relative freedom of the contractor to use their purchasing power and market knowledge most effectively can provide a client with a competitive price.

With a design and construct method, it is possible ensure a quicker start on site, and the close integration of design and construction can result in more effective programming. Time, however, is needed by the client's consultants to prepare an adequate set of requirements, and time is needed to compare and evaluate the schemes from competing tenderers. Once a contract is signed, any changes by the client can be costly (Peter D. et al., 2008).

A number of variations of D&C exist, which includes:

2.6.2.1 Design and Build (Pure)

2.6.2.2 Design and Build (Novated)

2.6.2.3 Package Deals

2.6.2.4 Turnkey Construct

2.6.2.5 Design & Construct

2.6.2.1 Design and Build (Pure)

Design and Build (D&B) is a procurement system where a single organization undertakes the responsibilities and risks for both the design and construction phases. There may be various levels of employer involvement in the design: in the "pure" form of D&B, the client engages a building contractor at the outset (after competition or otherwise) who is then responsible both for the design and the construction of the work. The typical payment method for D&B is a lump sum, payable in monthly instalments, based on a cost document that forms part of the "Contractor's Proposals" which is itself a tendered or negotiated response to the "Employer's Requirements", documents that form the basis of the contract.

In general, it can be summarized that Design and Build provides single point responsibility for the whole design and construction. Contractors, who are responsible for the implementation of the project, have power to control all over the projects. This nonetheless does not deter the involvement of the client. The client's need and requirements are always been taken into consideration, which this consequently presents uniqueness of the system.

2.6.2.2 Design and Build (Novated)

A widely used variation of Design and Build occurs when the client initially employs a design team for the early stages of the project (typically up to the planning permission stage) to prepare the outline design and an "Employer's Requirements" document to the extent that the client's needs and intentions are clearly identified and documented (Siddiqui, 1996; Huges et al., 2006). A building contractor is selected by tender or other means and the design team is then transferred to this builder, and it is this transfer of contracts from the client to the builder that is called novation. The design team then continues to prepare a detailed design.

The effect is that much of the employer's traditional design control is retained in the early stages, while passing ultimate responsibility for the design to the contractor. Novated D&B has been criticized for restricting the commercial position of building contractors, and for creating conflicts of interest for designers, though both groups appear to tolerate the system because of its appeal to clients, and it seems to be very widespread in the UK, more so than pure D&B (Huges et al., 2006).

2.6.2.3 Package Deals

Design and build procurement system can be synonymously known as 'package deal' or 'turnkey' in France as 'cle en mains', 'ensemblier' or 'product en mains' ; or as 'schlusselfertig', 'totalunternehemr' or 'objektvertrag' in Germany ; or simply as "EPC" (Engineering Procurement Construction) or 'EPIC' (Engineering Procurement Installation

Construction) in heavy/offshore engineering projects, these design and build arrangements are generally characterized by its straightforward and singular contractual interface the employer and the contractor (Syed A., 2001).

Package deal or commonly called the "all in" contracting is a type of procurement method where a contractor is given the responsibility for everything that is required and necessary for the design, construction and completion of the project (IrHarbans Singh KS, 2007; Rosli et al., 2006). Under this system, the services of the contractor will include the preparation of project brief, sketch and final working drawings, getting all the approval from authorities, project financing, construction, furnishing and commissioning of all equipments and accessories and handing over the project to the client (Rosli et al., 2006).

In terms of allocating risks and responsibilities to contractors, there are many ways of increasing the scope of a contractor's work. For example, many large engineering projects are structured as Engineer, Procure and Construction, an arrangement typically used for large projects, such as oil rigs, harbours and docks. Under this kind of arrangement, the EPC contractor takes on the responsibility for carrying out all of the design, constructing and commissioning work, such that the client only has to pay (Huges et al., 2006).

2.6.2.4 Turnkey Contract

Turnkey contract is an American term for "all in" or package contract. Under this arrangement, a contractor is commissioned to undertake the responsibilities for everything necessary and required for the construction, completion, commissioning and hand over the

project. The word "turnkey" means that, upon completion, the client is given the key and he can then enter the project by "turning the key". The contractor will have to do everything from preparing project brief, getting approval, designing, financing, construction, furnishing and decorating to commissioning and handing over completed, cleaned and ready for use project (Rosli et al., 2006).

The contractor responds to the employer with an offer called the 'contractor's proposals' which will include production as well as design work, contract price and the manner in which the contract price has been calculated. For instance, the contract price analysis, etc. bills of quantities are strictly not applicable in a 'Turnkey' contract and if something akin to these are used, they are merely for the purposes of the contract sum analysis or for making payment to the contractor.

Though 'turnkey' contracts can be on fixed price or cost reimbursement basis, the accepted practice in this country favours the fixed price approach. The norm is for the contractor to contract on the basic of a predetermined estimate of the cost of the complete work. This is in line with the selling point of such an arrangement, whereby the contractor bears all risks, inclusive of costs and pricing risks subject to adjustments occasioned by variations ordered by the employer, extended preliminaries, etc. another feature sometimes encountered in such contracts is a guaranteed maximum sum, a sum offering assurance to the employer on his maximum price exposure.

2.6.2.5 Design and Construct

In this case, the contractor is still given the responsibility for both the design and construction of the project. The difference is that, under this method the client's design consultants prepare the concept sketches or designs and passed them to the contractor who will develop them and produced the detailed working drawings. The contractor will then construct and complete the project based on what it has developed and produced (Rosli et al., 2006; Peter et al., 2008).

The Design and Build construction process has been part of the construction industry. Today, the process is growing rapidly in this industry. As it has been grown in popularity, Design and Build has evolved all manner of hybrids. In theory, Design and Build puts the contractors in charge of the whole project. Nevertheless, clients are demanding more and more say in the design. Then, this will put more risks to contractor. In view of the risk sharing factors, the Design and Build contractors must be able to identify the success factors in order to further ensure meeting of their ultimate mission.

2.6.3   MANAGEMENT PROCUREMENT

Several variants of management procurement forms exist, which include; management contracting, construction management and design and manage. There are some subtle differences between these procurement methods. In the case of management contracting, the contractor has direct contractual links with all the works and a contractor is responsible for all construction work. In construction management, a contractor is paid a fee to

professionally manage, develop a programme and coordinate the design and construction activities, and to facilitate collaboration to improve the project's constructability (Peter et al., 2008).

2.6.3.1 Management Contracting

Huges et al. (2006) pointed out that management contracting emerged as a response to the need of developers to take more of the commercial risk on refurbishment projects than would be the case in general contracting. Coupled with the growing trend for building contractors to sub-let all of the work, this resulted in the need to procure only a project's management and co-ordination input in conjunction with a close relationship between client and contractor.

Since the aim is to ensure that a management contractor faces little financial risk for the performance of others, the management contract is usually let on a cost-reimbursable (cost plus or target-cost) basis, with a fee bid for managing the project together with an agreement for reimbursement of expenses incurred. Typically the management contractor will sub-let all of the actual construction work to "Works Contractors".

IrHarbans Singh KS (2007) and Rosli et al. (2006) described Management contracting as a forms of "fast-tracking" procurement approach whereby a contractor is contracted and paid a fee to manage, procure and supervise the construction of a project rather than to build the project. The actual construction works are contracted out to many package or specialist contractors. Under this arrangement the management contractor is employed as a

construction consultant to be part of the client's team (Rosli et al., 2006). Depending on the nature of the contracts entered between the employer, the management contractor and the 'trade' contractors, the management contractor may not carry liability for the defaults and/or omissions of the latter, delay inclusive (IrHarbans Singh KS, 2007).

2.6.3.2 Construction Management

The contractual arrangement and services rendered by a Construction Management firm are not dissimilar from those under Management Contracting. But relieving such an organization of contractual risk for the performance of sub-contractors is much more effective if they are not contractual intermediaries. Thus, the most significant characteristic of CM is that there is no general contractor; instead there is a series of direct contractual links between the Client and the Trade Contractors, making the role of the CM more like a consultant than a contractor. The arrangement is used particularly by experienced clients on projects with short lead-times (Huges et al., 2006).

2.6.3.3 Design & Construct

A design and manage strategy is similar to management contracting. Under a design and manage contract, the contractor is paid a fee and assumes responsibility, not only for works contractors, but also for the design team. The common variations of design and manage are (Turner, 1990):

- Contractor – a project design and management organization designs and manages the work, generally for a fee and delivers the project by employing works contractors as its subcontractors to design/or construct.

- Consultant – a project designer/manager is the client's agent, who designs and manages the work, obtains subcontract tenders from works contractors who then each enter into a direct contract with the client.

2.6.4   BUILT-OWN-OPERATE-TRANSFER (BOOT)

Developers use their own funding sources to build a public facility in return for the right to operate it and charge a fee for its use. At the end of an agreed period the facility may revert to the landholder, which would often be the Crown. This type of contract focuses on final service delivery and relies upon the required performance standards being properly documented. Building contractors involved in this type of development are usually part of a consortium. The consortium has responsibility for the design, construction and delivery of the project. Government and its agencies, as either direct or indirect purchasers of services from BOOT projects, bear some level of financial and viability risk. The BOOT process can be modified to suit particular needs (Office of Building and Development, 1997).

2.7 ADVANTAGES AND DISADVANTAGES IN USING DIFFERENT TYPES OFPROCUREMENT SYSTEMS

Different types of procurement system serve different characteristics. Advantages and disadvantages for Traditional system, Design and build, Construction management and Built-Own-Operate-Transfer (BOOT) are as following:

2.7.1 TRADITIONAL SYSTEM

The main advantages of using a traditional approach to procurement are (Emma K., 2010; Peter et al., 2008):

2.7.1.1 Produces lowest bid

In this system of procurement, the lowest bid is normally the winner basing on the kind of rules placed in the tendering process by the owners. Traditional procurement also known as design bid build systems give chance to competing for bidding for contract unlike the design-build which deals through negotiation of contract.

2.7.1.2 Assuring quality control

Traditional procurement deals more with quality control, meaning that quality in project can be controlled in a form of working drawings and specifications, which deals with the basis of the contract between both the organization and the contractors. In other words, the

client is able to have a direct influence which can facilitate a high level of functionality and improve the quality in the overall design. This on the other hand opens ways for the organization to compare the different materials and workmanship of the project under the construction with that of the requirement.

2.7.1.3 Familiar in the industry

There is a lot of experience with this type of procurement method in refurbishment projects. Construction industry has been very familiar with the approach as well as any concomitant constructability problems. Moreover, the designs can be fully worked up and tested (Bower, 2003). The completed or largely completed designs would help contractors in forecasting workloads and allocation of resources.

The main disadvantages of using a traditional approach to procurement are:

2.7.1.4 Builders not involved in design process

With traditional procurement, the builder does not able to start for the refurbishment works until after the design aspect of the work is completed and bid submitted not only that but also after the awarding of contracts. Meaning the design part of the project cannot blend with any input by the contractor on the refurbishment material which may cause delay and reduce cost.

2.7.1.5 Speed

This system is normally known to be very slower than that of the design-build procurement system and it is mainly because of the nature of the work. Traditional procurement system takes lots of time on it working process unlike the design-build which is known to be the fast-track method. This is because usually in the traditional procurement method the project cannot start or proceed until after the contract of the document has been signed. In other words, overall project duration may be longer than other procurement methods as the strategy is sequential and refurbishment work cannot be commenced prior to the completion of the design

2.7.1.6 Potential adversarial

Another disadvantage of the traditional procurement consists of a potential for adversarial relationships between the contractors and the architect. Mostly, there can be cases that, the architect and the contractor will not agree with each other. In traditional procurement, there are lack of team work that sometimes brings about communication problem which on the other hand cause delays and cost overrun. In other words, poor design coordination and quality at subsequent stages may result in costly design changes (Walker and Hampson, 2003).

2.7.2 DESIGN AND BUILD

The main advantages of using a design and construct approach to procurement are (Natasa, 2007; Emma, 2010; Peter et al., 2008):

2.7.2.1 Single point of Responsibility

Design and build procurement is well known to provide a single entity responsibility which means that it is carried out without any middleman or an mediator like a consultant. Not only that but also, the single point of the contact is between the client and the contractor, in this case; the client has the responsibility in dealing with one single organization who will have the responsibility of all the other aspect of the project. Besides, the need of dealing with the designers and the contractors separately is definitely going to be reduce; again, it also helps by allocating all the design responsibility and liabilities to the contractor alone.

2.7.2.2 Price Certainty:

The burden of the owners may reduce due to the fact that, the design and construction procurement service is put into the hands of a single selection process. Whiles (Emma, 2010) gave a confirmation that, the process does require the owner to provide prudent oversight of the design and construction process, this responsibility is considerable less time consuming and exposes the owner to far fewer risks than the traditional approach.

2.7.2.3 Effective communication

Effective communication is one of the important factors in terms of design-build procurement system. There is the need for direct linked between the client and the contractor which can create a room for a good communication in the design-build procurement system. If the client and the contractor are able to communicate well during the project stage it will enable the contractor to respond quickly to the need of the client. The use of integrated procurement systems enables design and construction to be overlapped and should result in improved communications being established between client and contractor. These two characteristics enable shorter overall project periods to be achieved and project management efficiency to be improved.

2.7.2.4 Multi-disciplinary approach

The strategy enables an integrated contractor contribution to the design and project planning. Traditional procurement has often been criticized for its inability to integrate the separate design and construction functions and impossibility of the contractor becoming involved sufficiently early in the procurement process to make any significant contribution. Design and build provides the necessary multi-disciplinary approach and integration because it forms designer-contractor team at early stage in the process, bringing all the participants onto the same side.

The main disadvantages of using a design and construct approach to procurement are (Natasa, 2007; Emma, 2010; Peter et al., 2008):

2.7.2.5 Higher costs:

Design-build procurement system is known to be less expensive than that of traditional procurement on a given contract but there is still some uncertainty in the mind of contractors. On the other hand, design-build focus on given a design flexibility and efficiencies which means that most builders reflect more in reducing cost but rather turn to increase risk which sometimes result in a higher contract prices. Also, in this type of procurement it is not possible for the client to get the lowest price expected of the project because design-build contract is normally done through negotiation rather than bidding for a competitive price or the lowest price.

2.7.2.6 Team works

Design-build procurement system is aim at working as a team but there are times when problems or error may occur in the drawings, there will not be no one to blame due to the fact that design-build work as a team. In this case, this could result in losses. According to Emma (2010), the single source approach of Design and Build consists of a firm or team of architect, engineer, and contractor professionals who are at risk for the cost, schedule, quality and management of the project. Therefore, a though study on the risk must be identified, examined and analyzed to ensure the success of the project procurement method.

2.7.2.7 Limited access

Design-build contract, deal mostly with awarding contract based on qualification and experiences. These systems have the tendency to work against the newly established contractors who do not have the experience, the qualification and can reduce the likelihood of the contract. This can however, lead to the limitation of competition in the public section in refurbishment aspect of contracts.

2.7.2.8 Difficulties in preparing an adequate and sufficiently comprehensive brief

Difficulties can be experienced by clients in preparing an adequate and sufficiently comprehensive brief. As a result of insufficiently defined clients brief which does not communicate his precise wishes to the contractor, great difficulty can be experienced inevaluating proposals and tender submissions (Masterman, 2002).

2.7.2.9 Concept design

The client is required to commit to a concept design at an early stage and often before the detailed designs is completed.

2.7.2.10 Absence of a bill of quantities

The absence of a bill of quantities makes the valuations of variations extremely difficult and restricts the freedom of clients to make changes to the design of the project during the

post-contract period. Bids are difficult to compare since each design will be different, the project programme will vary between bidders and prices for the project will be different for each different design.

2.7.3 CONSTRUCTION MANAGEMENT

The main advantages of using a management approach to procurement are (Peter et al., 2008):

(a) The client deals with only one firm, which enables improved coordination and collaboration between designers and constructors;

(b) Potential for time savings for the overall project as design and construction activities is overlapped;

(c) Under a design and manage form, the contractor assumes risk and responsibility for the integration of the design with construction;

(d) Improved constructability through constructor input into the design;

(e) Roles, risks and responsibilities for all parties are clear; and

(f) Flexibility for changes in design.

The main disadvantages of using a management approach to procurement are (Peter et al., 2008):

(a) Price certainty is not achieved until the final works package has been let

(b) Informed and proactive client is required.

(c) Poor price certainty

(d) Close time and information control required

2.7.3.11 Client must provide a good quality brief to the design team as the design will not be complete until resources have been committed to the project; and

2.7.3.12 Client loses direct

2.7.4 BUILT-OWN-OPERATE-TRANSFER

The main advantages of using a management approach to procurement are:

2.7.4.1 Time and Cost Savings

It saves time because the service provider is presumably more expert at assembling the infrastructure and obtaining local regulatory consents; money (and maybe market share)

because the benefits of the new infrastructure can be enjoyed; effort because the service provider is performing the effort, presumably at lower salaries.

The main disadvantages of using a management approach to procurement are:

2.7.4.2 Additional Cost

Additional costs are incurred to pay a profit to the service provider for the value of its know-how and time in assembling the service delivery infrastructure.

2.7.4.3 Inflexibility

Inflexibility results from the enterprise customer's commitment to purchase the infrastructure, whether up front, by imputed self-amortizing "mortgage" payments or at the end. This ties up the enterprise customer's capital and credit, unless the enterprise customer can structure the financial risk so that the service provider retains ownership until the customer exercises, in effect, a call option to acquire the service centre infrastructure.

2.8 SUMMARY OF THE CHAPTER

This chapter has reviewed the literature related to the importance of refurbishment projects in the Malaysian construction industry. In developed countries especially in the UK, refurbishment projects contribute almost half of the total construction output. In the local Malaysian construction industry, the demand for refurbishment projects has been reported

as steadily increase from the year of 2004 to 2008. However, refurbishment project slightly decrease in the year of 2009 to 2010 and starting to increase in the year of 2011.

The high demand for refurbishment projects was initiated by physical building deterioration and obsolescence of the existing buildings brought about by factors such as economic demand, change in use and historical value. Four types of procurement systems were found to be used in refurbishment industry. Different types of procurement systems have different advantages and disadvantages and these will indirectly give an impact to the project performance in terms of cost, time, and quality. The following chapter will investigate the difficulties face by the contractor and key performance indicator used to measure project performance.

CHAPTER 3

LITERATURE REIVIEW: PROBLEMS ENCOUNTER BY CONTRACTOR AND PERFORMANCE MEASUREMENT

3.0 INTRODUCTION

In the context of the construction industry, many of us would acknowledge that successful construction projects are often attributed to those that achieve the client's requirements and project objectives set out at the outset of the project. Such objectives may include delivery within the stipulated time period, construct within the budgeted cost and meet the quality standard set. Typically, demands are being made upon the construction process not just in terms of time, cost and quality, but also in those of project organization, management and procurement. Other objectives, equally important, may include meeting functional requirements and satisfaction of the clients and/or end users. Notwithstanding such requirements and objectives, the construction industries around the world still suffer from numerous setbacks and problems, In particular those associated with the construction process.

The common issues and problems associated with the construction process often lie in the ill-considered lack of integration/organization of the project members and poor communication channels, uncertainties in design and construction, changing internal and external environment, project complexity and characteristics, as well as contractual and commercial matters. In order to overcome these issues and problems so as to achieve project success, it is crucial to identify challenging and problem encounter by contractor during construction stage in using different types of procurement methods. Apart from that, it's pertinent to examine relationship between problems encountered by contractor in using different types of procurements towards performance of projects.

3.1 CONTRACTOR DEFINITIONS

New Mexico Statutes, (2009) defined "contractor" as a means any person who undertakes, offers to undertake by bid or other means or purports to have the capacity to undertake by himself or through others, contracting. Contracting includes constructing, altering, repairing, installing or demolishing any:

- road, highway, bridge, parking area or related project;

- building, stadium or other structure;

- airport, subway or similar facility;

- park, trail, bridle path, athletic field, golf course or similar facility;

- dam, reservoir, canal, ditch or similar facility;

- sewerage or water treatment facility, power generating plant, pump station, natural gas compressing station or similar facility;

- sewerage, water, gas or other pipeline;

- transmission line;

- radio, television or other tower;

- water, oil or other storage tank;

- shaft, tunnel or mining appurtenance;

- levelling or clearing land;

- excavating earth;

- air conditioning, conduit, heating or other similar mechanical works; and

- electrical wiring, plumbing or plumbing fixture, consumers' gas piping, gas appliances or water conditioners.

Besides above mentioned works, New Mexico Statutes, (2009) also highlighted that "contractor" also includes subcontractor and specialty contractor, and a construction manager who coordinates and manages the building process, member of the construction team with the owner, architect, engineer and other consultants required for the building project; and who utilizes his skill and knowledge of general contracting to develop schedules, prepare project construction estimates, study labour conditions and advise concerning construction.

However, the words "contractor" does not include for the following scopes:

- any person who merely furnishes materials or supplies at the site without fabricating them into, or consuming them in the performance of, the work of a contractor;

- any person who drills, completes, tests, abandons or operates any petroleum, gas or water well; or services equipment and structures used in the production and handling of any product incident to the production of any petroleum, gas or water wells, excluding any person performing duties normally performed by electrical, mechanical or general contractors; or who performs geophysical or similar exploration for oil, gas or water;

- a public utility or rural electric cooperative that constructs, reconstructs, operates or maintains its plant or renders authorized service by the installation, alteration or repair of facilities, up to and including the meters, which facilities are an integral part of the operational system of the public utility or rural electric cooperative;

provided that the construction of a building by a public utility or rural electric cooperative or the installation or repair of any consumer gas or electrical appliance not an integral part of the operational system makes a public utility or rural electric cooperative a contractor for that purpose;

- a utility department of any municipality or local public body rendering authorized service by the installation, alteration or repair of facilities, up to and including the meters, which facilities are an integral part of the operational system of the utility department of the municipality;

- a pipeline company that installs, alters or repairs electrical equipment and devices for the operation of signals or the transmission of intelligence where that service is an integral part of the operation of the communication system of that pipeline company and is not for hire or for the use of the general public, or any pipeline company which installs, alters or repairs plumbing fixtures or gas piping

- any mining company, gas company or oil company that installs, alters or repairs its facilities, including plumbing fixtures or gas piping, where the work is an integral part of the installing or operating of a system owned or operated by the mining company, gas company or oil company; provided the construction of a building by a mining company;

- a radio or television broadcaster who installs, alters or repairs electrical equipment used for radio or television broadcasting;

- with the orders, rules, regulations, standards and codes adopted pursuant to that act; and provided further that he does not engage in commercial construction;

- any person, firm or corporation that installs fuel containers, appliances, furnaces and other appurtenant apparatus as an incident to its primary business of distributing liquefied petroleum fuel; and

- a cable television or community antenna television company that constructs, installs, alters or repairs facilities, equipment, cables or lines for the provision of television service or the carriage and transmission of television or radio broadcast signals.

In Malaysia, the classification for contractor used by awarding the work or project to the contractor is according to the capital and experience. According to Unit Pendaftaran Kontraktor Negeri (UPK), contractor are categorised into six (6) categories which are illustrated as follow:

Table 3.1: Contractor Class and Financial Limit

CLASS	FINANCIAL LIMIT (RM)
A	10,000,000 and above
B	5,000,001 to 10,000,000
C	2,000,001 to 5,000,000
D	500,001 to 2000,000
E	200,001 to 500,000
F	200,000 and below

Pusat Khidmat Contractor (PKK,2007)

The classification of contractor under Pusat Khidmat Kontrktor (PKK) is similar to Unit Pendaftaran Kontraktor Negeri (UPK).

3.2 DIFFICULTIES ENCOUNTER BY CONTRACTOR

Over-due, over cost and poor quality construction today is frequently blamed on the procurement route selected. In reality serious problems can be attributed to the interaction of a whole series of smaller problems acting at once. Several researches and studies have been done by numerous researchers to identify challenges encounter by the contractor in managing construction works in design and build, traditional, contract management procurement and others. Primary amongst these problems is what Rwelamila and Hall (1994) refer to as 'human aspects'. This is exemplified in construction today as a lack of common, shared purpose in a project leading towards a confrontational management style (Latham, 1994).

A further problem identified today is the inability of the construction industry to manage effectively design information caused by a lack of understanding between the construction and design teams (Gidado and Barter, 1996). This inability to transfer effectively design information is the source of current manufacturing industry interest in the concepts of concurrent engineering which seeks a more co-operative method of working together - solutions which have led to similar concepts to that of design and build and partnering.

A further problem as far as design information is concerned, it has been argued, is that current practice in construction is actually too flexible to design changes. Major

improvements in terms of cost and time can be generated through the limiting of specification choice during design.

Figure 3.1 shows the common challenges encounter by Contractor in using different types of procurement method.

Figure 3.1: Difficulties and Problems Encounter by Contractor

(Nuhu and Issaka, 2008; MohdDanuri et al, 2006; Abdul, Ayub and Janidah, 2006; Sharif and Morledge, 1996; Mansfeildet al., 1994; Wellington and Mpendulo, 2008)

3.2.1 Cash Flow Problem and Financial Difficulties

Cash flow and financial difficulties faced by contractor is one of the most significant causes of delay as what has been found by Assaf and Al-Hejji (2006), Odeh and Battaineh (2002), and Sweiset al.(2007). Later issuance of payment by client will cause a huge cash flow problem and financial difficulty to contractor. In construction contract, there are two types of payments – one is the Interim Payment and the other is the Final Payment which is disbursed upon certification by the Architect, Superintending Officer, Engineer or Contract Administrator.

Most of the Contractors do not have sound financial standing or backing and they outsource (sub-contracting) most of the works. The speed of work depends largely to the efficiency and availability of workers. Therefore, in the event there is a difficulty in paying or non-payment to the suppliers and sub-contractor, this indirectly will give an implication in stoppage of material delivery on site and sub-contractors tend to reduce speed and stop works at site (Abdul K. et al., 2005; Bartholomew, 1998).

In other words, the sub-contractors have limited resource to work with and subsequently reduce the number of workers or stop work until they get payment from the contractors. Although there are abundant of workers especially foreign workers in this sector, the reluctant of the contractors or sub-contractors to hire more workers contribute to shortage of site workers and eventually delay the projects.

3.2.2 Lack of Expertise and Experience

Commonly cited difficulties of small contractors relate mainly to inadequate of the owners, and include lack of technical and managerial expertise necessary for running a construction business, lack of entrepreneurship, inability or unwillingness to employ qualified personnel, limitations in terms of variety of projects they can undertake, short horizon and limited plans for expanding the firm; lack of commitment to construction (Ofori, 1991). Owing to their generally poor technical background, the formal documentation, practices and procedures underlying the administration of construction contracts adopted by most public clients in these countries are also often alien to the small contractors.

The UNCHS (1981) identified several problems face by contractors such as inefficiency in planning, design and construction, difficulty in obtaining vital resources such as materials, equipment and skilled personnel, poor estimating and financial planning, inappropriate tendering and contractual procedures, inefficient on-site construction and confinement of operations of small projects. In addition, the ILO (1987) found that contractors in developing countries had the following difficulties; lack of understanding of drawings and contractual documents, deficiency in estimating and tendering skis exacerbated by lack of data, lack of knowledge of contract law which mean inability to negotiate reasonable terms and receive all payment due, information and others. An adequate contractor experience is very crucial in executing work efficiently and forecasting the potential problems that may arise during construction work. The failure in managing and attending the daily routine and problems at the project site contribute to the delay significantly.

3.2.3 Communication problems between parties involve

Since the early 1940s, literature on communication in construction has appeared, mainly based on the situation in the UK (Emmitt and Gorse, 2003). Many problems concerning communication have been reported, with a focus on intra-supplier communication within the construction sector; demand-supply communication during the design phase; and communication between and within single demand and supply side parties, during whole the construction process. In this division the demand side contains (representatives of) principals, users, investors, etc. and the supply side architects, (sub) contractors, advisors, and others.

The efficiency and effectiveness of the refurbishment process strongly depend on the quality of communication. For instance, Improvement in the communication within the building team (Higgin and Jessop, 1965), in project teams (Thomas et al., 1998) and between project manager and contractors (Franks, 1998; Somogyi, 1999) could reduce failure. In addition, more open communication at all levels could lead to innovations (Lenard and Eckersley, 1997) and better technical solutions (Atkin et al., 2003). Furthermore, communication improvements in early phases of projects would positively influence the quality as perceived by all stakeholders involved (Emmit and Gorse, 2003; Brown, 2001; Usmaniand Winch, 1993). Finally, improved communication during the briefing might lead to better decision making, for example less haste in moving to solutions and better ways of looking at the requirements first (Nutt, 1988; Barrett, 1995; Salisbury, 1998).

Communication is influenced by several factors; an overview can be derived from literature. The first type of factors is related to the organization of the construction process. Main aspects are the difference between formal and informal communication routes during the design phase (Mackinder and Marvin, 1982) as well as during the phases of development (Pietroforte, 1992; Higgin and Jessop, 1965) and the divorce of design and production (Hill,1995; Emmerson, 1962). The second type of factors is related to the stakeholders themselves. Opposing interests could lead to hidden agendas, often leading to restricted communication (Richardson, 1996; Brown, 2001; Cuff, 1996; Preiser, 1993; CIB, 1997; DETR, 1998), and all stakeholders' (assumed) frames of reference are found of great influence on communication as well (Moore and Dainty, 2001; Salisbury and White, 1980; Gray et al., 1994; Usmani and Winch, 1993).

Although there is no clear cut division of communication system within the industry, the general of communication are classified as follows:

- Communication between client and the consultants

- Communication between the consultants

- Communication between the consultants and the contractor

- Communication on site

Communication is said to be effective within the working group in the industry only when the transmitted ideas achieve their desired action or reaction, as the operation involved in the construction industry is a team effort, embracing the client, quantity surveyor, architect, consulting, engineer, specialists and the contractor's organization with the main objective

of getting things done through human beings. The operational procedures and other management activities associated with the design, construction and subsequent performance of a building rely a great deal on how information is being transmitted between the various participants of the building team and for this reason.

3.2.4 Slow Decision Making by Owner

Decision making is a process of first diverging to explore the possibilities and then converging on a solution(s). Ogunlana, et al. (1996), and Assaf et al. (1995) highlighted that slow decision making by clients is one of the challenges faced by contractors. Slow decision making by clients may cause an additional time and cost impact to the contractor. For instance, late confirmation and approval on the types of ironmongery use for the project will cause the contractor not able to proceed to fabricate the door frame and door. Ironmongery accessories such as hinges size and lockset types must be firstly identified before the fabrication for door frame can be done. Delay in installation of door frame consequently will lead to the delay in brick works, plastering works, wall and floor finishes, painting and ceiling works. Therefore, a right and fast decision making are crucial in preventing delay in a refurbishment project especially in fast track project (Ahuja et al., 1994).

3.2.5 Material Price Escalation

Abdul R., Ayub & Janidah (2006) pointed out that some of the contractors are facing difficulties in financial due to material price escalation. These usually will occur when a

contractor's price in lower rate for the materials during tender and the price steadily increase due to higher demand. Some contractors might hold the purchasing until the price is decrease and this indirectly will lead to stop work and delay in the construction works.

3.2.6 Frequently change order by clients

Changes made in refurbishment project are one of the difficulties faced by the contractors. The problem come when contractor have start with the procurement such as awarding and purchasing and it come to the works when the contractor have proceeded the construction works on site. Frequent change order by clients will caused disruptions in the progress and lead to additional cost and time for the projects as contractors have to do hacking works, dismantle and reinstallation on project site.

3.2.7 Insufficient/Discrepancies Instruction and Information in Contract Document

Contract Documents is an agreement between both clients and contractor with supplementary conditions, bill of quantities (BQ), drawings, specifications, and other documents such as design brief, preambles, and schedule of rates and others relevant documents attached . Contractor may face difficulties in proceeding to the works when there are discrepancies found between BQ − specifications and drawings. Insufficient information and the discrepancies may cause delay as contractors have to raise 'Request for Info' (RFI) from client and client might require time to provide the information. Besides, discrepancies in the contract documents will give a cost impact as contractor may argue that the items was not price during tendering stage.

3.3 PROJECT PERFORMANCE

The success of a project depends on a numbers of factors, such as project complexity, contractual arrangements, and relationships between project participants, the competency of project managers, and the abilities of key project members (Bakers, 1983). Undisputedly, the key members including the quantity surveyors and the engineers are the central figures throughout the duration of a contract in terms of executing and supervising construction processes and related activities. However, project manager has been identified as the most important person in a project team (Chua, 1999).

Successful project delivery requires the concerted effort of the project team to carry out the various project activities, but it is the project manager who act as the leader of the project and responsible to orchestrating the whole construction process. A part of his responsibilities include project goals setting, overall project coordination, planning and management, and the resolution of disputes. In fact, his duties cover a wide range area, such as dealing with social, technical, legal, and political issues. Therefore, the input of the project manager is paramount with respect to successful delivery of the project (Walker, 2002). The project manager has maintained the project network and monitor against slippages in cost, time and quality for the duration of the project.

Project performance defined as the organizations compliance with the predetermined criteria on time, cost and quality (Proverbs and Holt, 2000). Project performance improvement was then regarded as a change of action that minimizes the deviations between actual and predetermined standards (Al-Jibouri, 2003). Crawford and the Bryce

(2003) argued that the above definition merely described performance in terms the project efficiency, without due regard to the importance of project effectiveness. They adopted the classical work of Drucker (1974) who defined project performance in terms of efficiency (doing the right way) and effectiveness (doing the right things).

Mintzberg (1978) further described efficiency as how well resources are optimized to achieve the measureable benefits, and effectiveness as 'consistency between the situational factors and the design parameters'. As such, construction project performance should be gauged by both efficiency and effectiveness. Either failure in achieving project efficiency or effectiveness would hamper organizations' ability of performance improvement (Drucker, 1974; Mintzberg, 1978).

3.4 PERFORMANCE INDICATORS AND MEASUREMENT

Project performance remains a prominent issue in project delivery because projects involve defined objectives which must be achieved and numerous resources which need to be efficiently utilized. Robinson et al. (2005) emphasizes the need to develop and use tools for performance measurement and Naoum (1999), Ling and Chan (2002), Mbugua et al. (1999), and Love et al. (1998) have identified a distinction between performance indicators, performance measures and performance measurement. According to Mbugua et al. (1999), performance indicators specify the measurable evidence necessary to prove that a planned effort has achieved the desired result. In other words, when indicators can be measured with some degree of precision and without ambiguity they are called measures.

However, when it is not possible to obtain a precise measurement, it is usual to refer to performance indicators. Performance measures are the numerical or quantitative indicators (Sinclair and Zairi, 1995). On the other hand, performance measurement is a systematic way of evaluating the inputs and outputs in manufacturing operations or construction activity and acts as a tool for continuous improvements (Sinclair and Zairi, 1995; Mbugua et al., 1999).

In response to calls for continuous improvement in performance, many performance measurements have emerged in management literature. Some examples include: the financial measures (Kangari et al., 1992; Kay, 1993; Brown and Lavenrick, 1994), client satisfaction measures (Walker, 1984; Bititci, 1994; Kometa, 1995; Harvey and Ashworth, 1997; Chinyio et al., 1998), employee measures (Bititci, 1994; Shah and Murphy, 1995; Abdel-Razek, 1997), project performance measures (Belassi and Tukel, 1996) and industry measures (Latham, 1994; Egan, 1998; Construction Productivity Network, 1998; Construction Industry Board, 1998 as cited in Mbugua et al., 1999).

Cordero (1990) classifies performance measurement based on the method of measurement and area of measurement. The methods of measurement of performance can be in terms of the technical performance, the commercial performance and the overall performance. The areas of measurement are at the planning & design level, the marketing level and manufacturing level etc., and for the overall performance are at the level of a firm or strategic business unit.

3.4.1 Key Performance Indicators for Project Performance

Thomas et al. (2002) and Josephson and Lindstrom (2007) developed numerous parameters for measuring project performance. Josephson and Lindstrom (2007) identified 250 parameters while Ling (2004) evaluated 70 potential factors for measuring project performance. These parameters can be classified into two broad categories namely: subjective and objective parameters. Ling (2004) stated that the performance of a project is multifaceted and may include unit cost, refurbishment and delivery speeds and the level of clients' satisfaction.

Pinto and Slevin (1998) classified project performance parameters into (1) internal factors which are project variables namely: schedule, cost and quality and (2) external factors which are concerned with stakeholders' satisfaction with the performance of a project and the perceived impact on organization's effectiveness. Ling et al. (2004) identified two categories of indicators of project success namely: product success which consists of measures of achievement of quality standards and process success which is made up of variables that measure the achievement of time and cost.

On stakeholders' satisfaction, clients remain the most important stakeholder when considering project performance. Neto et al. (2007) stated that matching or exceeding the client's expectations result in a satisfied client. They opined further that this can reflect on how loyal a client becomes to a provider or a brand and result in higher sales volumes, lower levels of sensitivity to price and generates positive comments about the provider and the brand. Clients' satisfaction can be measured from several perspectives (Idoro, 2008)

However time, cost and quality have remained the most prominent in research studies. Josephson and Lindstrom (2007) maintained that project goal which considers clients' goals, is measured from several perspectives but the main aim is to stimulate clients to identify and clearly present their goals and to stimulate all managers involved to inform and remind all individuals of the goals. Hatush and Skitmore (1997) maintained that success in a project is generally operationalized into time, cost and quality. In addition, research conducted by Atkinson, et al., (1997) reveals that clients will not be satisfied if the end product (project) fails to meet their price, quality, time frame, functionality and delivery performance standard.

Figure 3.2 shows key performance indicators to measure performance of refurbishment project.
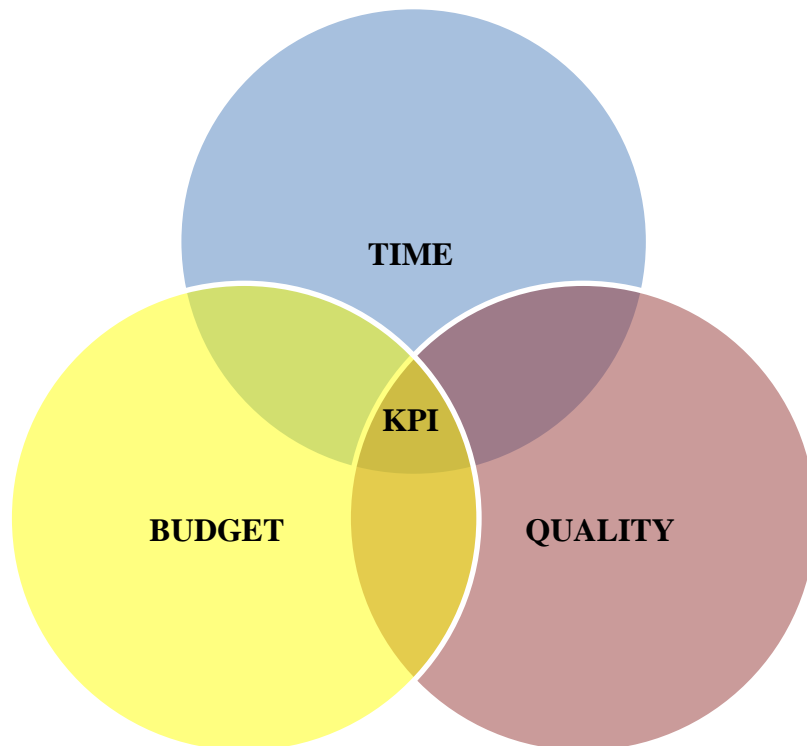

Figure 3.2: Performance Key Performance Indicators (KPI),

(Kangari et al., 1992; Kay, 1993; Brown and Lavenrick, 1994)
; Adjustment of model Bracketz, 2006)

The three performance measure categories form a basis for designing the performance indicators, which are the elements of performance within the ambit of each measure category (Cheung, 2004).

3.4.1.1 Meets Budget

Cost is one of the key performance indicators (KPI) uses to measure performance of a project. There are four areas that are highly related to the project cost control which are Interim Payments, Variation Orders, Cost and Prolongation Claims, and Budget versus Actual cost Forecast. Project cost performance is used to show the effectiveness of the project adheres to the budgeted cost. Proper selection of procurement system and good management by the project manager can ensure the project to be completed within the budgeted cost as different types of procurement systems serve different effect in financial plan. On the other hand, wrong selection of the procurement systems will prompt to a high variation order that will indirectly distribute the risk to client and contractor.

3.4.1.2 Meets Time

According to Hatush and Skitmore (1997), time refers to the duration for completing the project. It is scheduled to enable the building to be used by a date determined by the client's future plans. A success project able to perform by completes the project within the time frame given.

3.4.1.3 Meets Quality

The quality of the project can be measured by determining numbers of defects and customers complaints, number of non-conformance report, work rejection rates and sample rejection for the project. Different types of procurements system might serve different impact of quality of the project.

The detail of theoretical framework used in this study is illustrated in Figure 3.3.
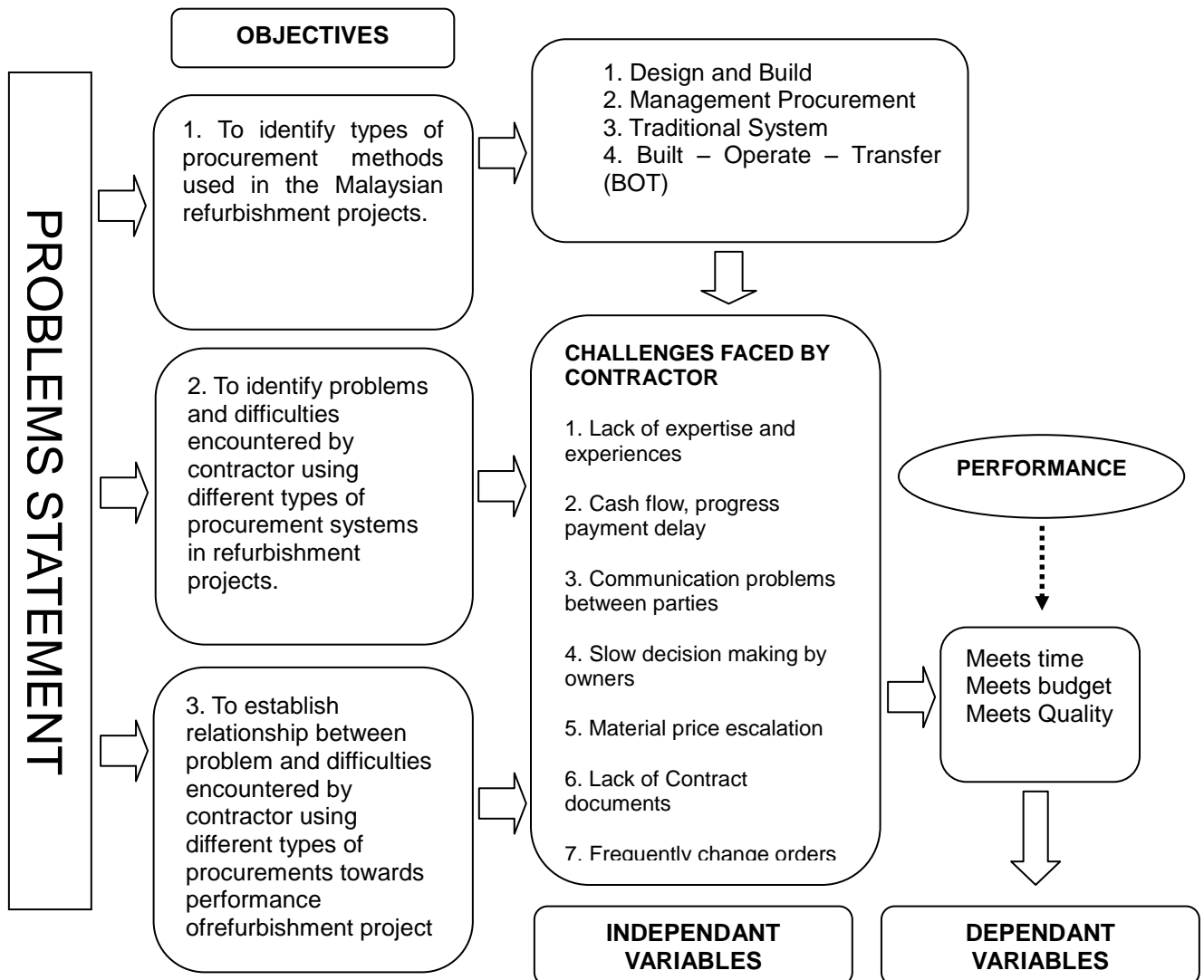
Figure 3.3: Theoretical Framework

3.5 SUMMARY OF THE CHAPTER

This chapter has reviewed the literature relating to difficulties encounter by the contractor during the construction project which is cash flow and financial difficulties, lack of skill, expertise and experience, slow decision making and insufficient and discrepancies in contract documents. These difficulties are categorized as independent variables for this study. From the literature review, researcher has found that these difficulties may affect performance of the refurbishment project. Contractor may encounter different types of difficulties in using different type procurement systems (Traditional System, Design and Build, Management Contract, and Built-Own-Transfer (BOT)). The project performance can be measured with three types of dependent variables which are time, cost and quality. A successful refurbishment project is able to deliver the project within time frame, within budget allocated and completed within client and customers satisfaction. Research methodologies for this study were discussed in next chapter.

CHAPTER 4

RESEARCH METHODOLOGY

4.0 INTRODUCTION

In the preceding chapter, it's dealing with theoretical foundation of the research. This chapter outlines the research methodology includes the design selected for the study, research methodology flow, literature review, data collection techniques, questionnaire design, research instruments, interpretation and analysis. An outline of the plan of research methodology is provided in order to give structure to this research. Methodology used to conduct this study is described in detail in this chapter. The selection of the research methodology as described in this chapter was based on the aim and objectives of the study as discussed in Chapter 1.

Research is a process of gathering information and answering unanswered questions or a process of finding solutions to a problem after through study and analysis of the situational factors (Goddard and Melville, 2004; Sekaran 2005). Methodology can be described as an operational framework within which the facts are placed so that their meaning may be seen more clearly (Leedy, 1993). Research methodology is a plan or design with the view to

finding solution arising from the problem of the research (Grinnell, 1993). Mouton and Marais (1988) defined research methodology as an exposition of a plan of how to execute the formulated research problem. These definitions described that the research methodology is about planning the steps or sequence of work involved from the initial stage of study until completion of the final report to give a solution to the problem of research. The main objectives of this chapter are to explain the data collection process, to explain limitations governing the sample survey and to describe the statistical techniques used for data analysis.

4.1 RESEARCH DESIGN

A research design is the arrangement of conditions for collecting and analysing of data in a manner that for the purpose to combine relevance to the research purpose with economy in procedure (Mouton and Marais, 1988). Churchill and Iacobucci (2004) stated that research design helps to align the planned methodology to the research problems. An appropriate research design is essential as it determines all the research variables such as the sampling procedures used, research instruments, data collection techniques, type of data and others.

The study approach incorporated triangulation techniques that combined both qualitative and quantitative approaches. Hammersley and Atkinson (1983) described a triangulation technique as one in which the information about the study issue is obtained from three different sources, which are normally a combination of quantitative and qualitative methods. The quantitative approach is more on the detailed description of a phenomenon. It basically gives a generalization of the gathered data with tentative synthesized interpretations.

Quantitative data collection methods are centered on the quantification of relationship between variables. As pointed out by Sarantakos (1988), quantitative research refer to research that is based on principles of methodology that employ quantitative measurement and the use of statistical analysis whereas qualitative research refers to a number of methodological approaches that employs non-quantitative data collection that describes reality as experienced by the respondents.

The objective of employing a quantitative method is to minimize personal prejudice or bias and to ensure that the social reality would be presented as it is. It is expected to have true value, applicability, consistency and conformability (Guba and Lincoln, 1989). In addition to that, quantitative data collection procedures create epistemological postulations that reality is objective and unitary.On the other hand, qualitative data refer to information gathered in a narrative through interviews, experience and observations (Sekaran, 2005).

The combination of both research methods in a social science study could produce robust and valid findings at the end of the study. This is because the qualitative approach could complement results obtained from a quantitative approach, which would make it more realistic and reliable (Ali et al, 2009).

The two major sources of data collected in the present study were primary and secondary data. The primary sources were obtained from the questionnaire survey, and semi-structured interviews while   secondary data collection was obtained from textbooks, referred journals, web sites, seminar and conference papers and official census reports.

Three stages of data collection were employed to achieve the above objectives as illustrated below:

Stage 1

LITERATURE REVIEW

Stage 2

PILOT STUDY

Stage 3

QUESTIONNAIRE SURVEY

Stage 4

SEMI-STRUCTURED INTERVIEW
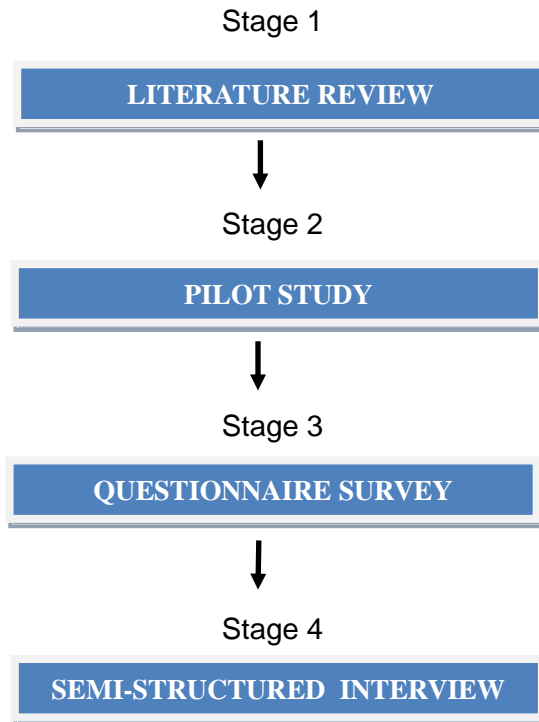
Figure 4.1 Flow of Data Collection Method

The researcher has started with the identification of secondary data collected through the extensive literature review. Literature review is very important to provide information in the research. The literature review provides several definition and information based on the aims, objectives and scope of study that had been developed in this study. The literature review in this study is divided into two chapters.

The first chapter is mainly focus on the refurbishment and its characteristics as well as types of procurement system uses in project including the advantages and disadvantages. It includes the definition such as 'refurbishment' and 'procurement'. The second chapters are

to identify problems face by contractor in construction projects and key performance indicators (KPI) uses to measure its performance which are cost, time and quality.

The literature review written and formulated from secondary resources includes books, journal, newspapers, government publications, articles, master thesis, online data and others (Lynn, 2004; Du Plooy, 1995;Leedy, 1997). The books that had been referred are publication from WILEY while journals are available through online database which are Emerald Intelligent, Springer Link, Science Direct and others. Besides, there are several types of newspapers that had been referred such as Utusan Malaysia online, The Star online, The News Straits Times online and others. One of the government publications that are used in this study is CIDB Statistics 2006-2011.

From the literature search, the research problem and dominant variables were identified. The variables were rigorously examined before the researcher developed the theoretical framework of the study. It shows difficulties encounter by contractor in using different types of procurement system and effects of these problem towards refurbishment project performance (problems identified and effects among the group of variables). Pilot study has been carried out before the final questionnaire distributed to all the contractor companies to ensure that the wording and sentences design are clear.

The third stage of the data collection was distributing the questionnaire survey. All the data obtained were analyzed using quantitative statistical analysis package software (SPSS). The final stage of the data collection involved semi-structured interview to clarify with variables and problems faced by contractor in refurbishment project. This stage is crucial in

determining the data obtained from the questionnaire survey is reliable. The conclusion of the study was derived on the result achieved from the data analysis and result from the semi-structured interview.

Figure 4.2 illustrated the research design used in this study.

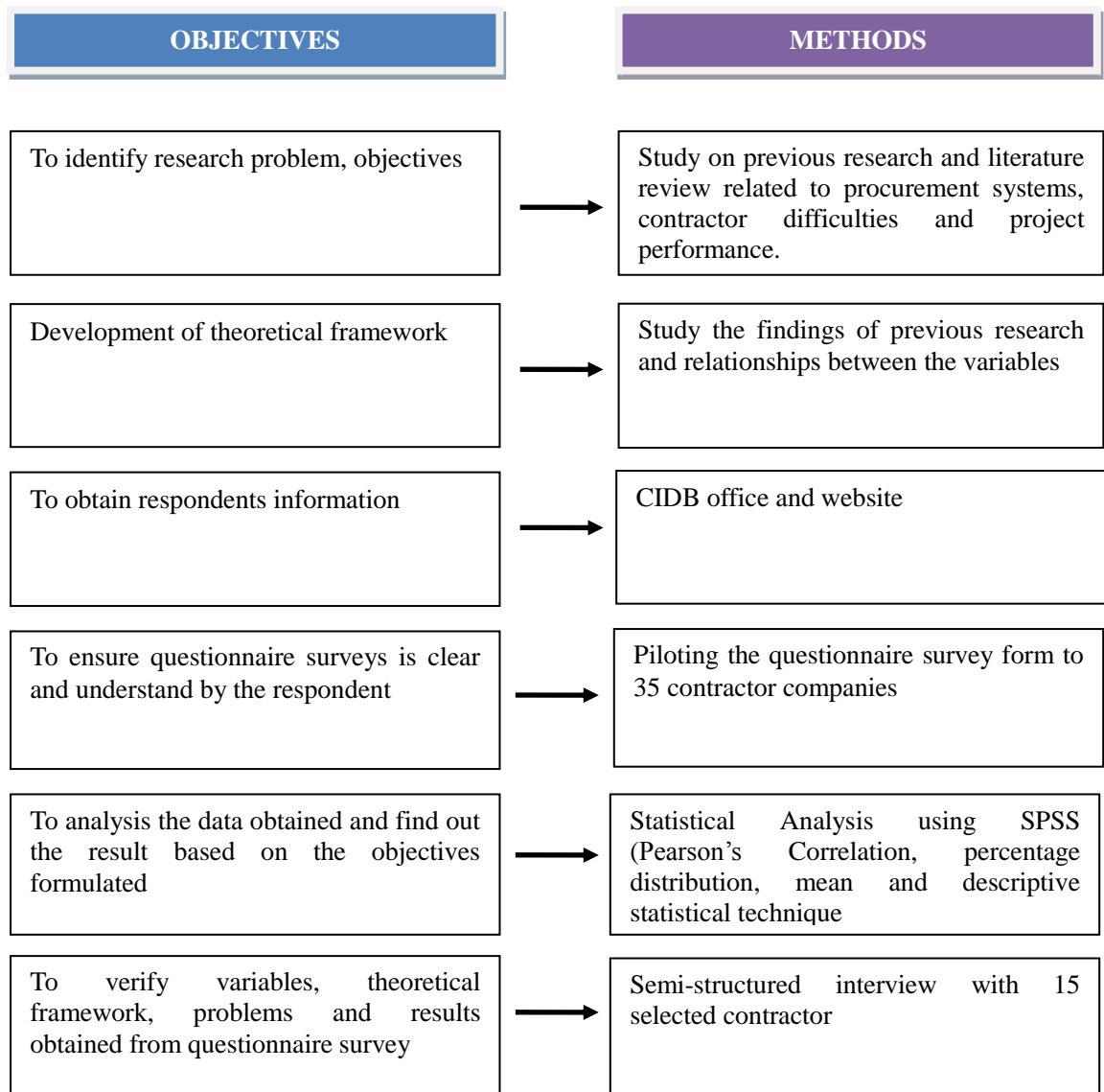| OBJECTIVES	METHODS
To identify research problem, objectives	Study on previous research and literature review related to procurement systems, contractor difficulties and project performance.
Development of theoretical framework	Study the findings of previous research and relationships between the variables
To obtain respondents information	CIDB office and website
To ensure questionnaire surveys is clear and understand by the respondent	Piloting the questionnaire survey form to 35 contractor companies
To analysis the data obtained and find out the result based on the objectives formulated	Statistical Analysis using SPSS (Pearson's Correlation, percentage distribution, mean and descriptive statistical technique
To verify variables, theoretical framework, problems and results obtained from questionnaire survey	Semi-structured interview with 15 selected contractor

Figure 4.2 Flow of Research Methodology

4.2. IDENTIFICATION OF RESEARCH POPULATION

Sampling is the process of selecting a sufficient number of elements from the population, so that a study of the sample and an understanding of its properties or characteristics would make it possible to generalize such properties or characteristics to the population elements. The Characteristics of the population such as μ (the population mean), σ (the population standard deviation), and σ^2 (the population variance) are referred to as its parameters. The central tendencies, the dispersions, and other statistics in the sample of interest to the research are treated as approximations of the central tendencies, dispersions, and other parameters of the population.

As such, all conclusions drawn about the sample under study are generalized to the population. In other words, the sample statistics - $\ddot{X}$ (the sample mean), S (standard deviation), and S^2 (the variation in the sample)- are used as estimates of the population parameters μ, σ and σ^2. Figure 4.3 shows the relationship between the sample and the population (Sekaran, 2005).

```
┌──────────┐              ┌──────────────┐
│  Sample  │◄─────────────│  Population   │
└──────────┘              └──────────────┘
     │                          │

  Statistics                 Parameters

 (Ẍ, S, S²)                 (μ, σ, σ²)
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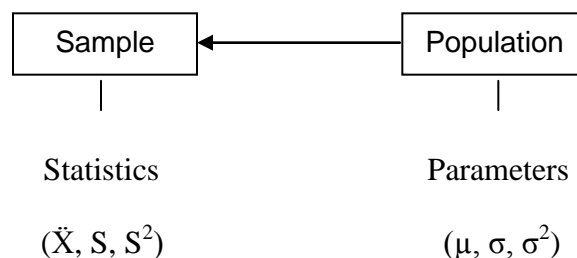
Figure 4.3: Relationship between sample and population

Sekaran (2005) has determined the sample size for a given population size as per following table (Table 4.1):

Table 4.1: Sample size for a given population size

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	100000	384

CIDB has reported that there were total numbers of five thousand four hundred forty eight (5448) refurbishment project; upgrading, extension and refurbishment registered from 2007

to 2012. The total numbers of these projects does not include maintenance and repairing works as this research will not focus on all types of refurbishment works except maintenance and repairing works. In this study, the total numbers of refurbishment works are categorized as Population. From the Table 4.1; sample size for a given population determined by Sekaran (2005) listed that minimum numbers of three hundred fifty seven (357) samples size are required to ensure the result is stable and saturated. Roscoe (1975) propose rules of thumb for determining the sample sizes larger than thirty (30) and less than five hundred (500) are appropriate for most of the research; which mean that the sample sizes determined for this study is suitable and appropriate.

4.3. DATA COLLECTION TECHNIQUE

For the purpose of this study, only primary data collection is utilized. Researcher used self-constructed closed ended questions survey and semi-structured interview was carried out to ensure the result from the questionnaire survey is realistic and reliable.

4.3.1   Questionnaire Surveys

The closed-ended questions have a limited set of response categories so that it is easier for the respondents to answer the questions. In addition, it is also easier for the researcher to code the data. The questions are designed in such a way that the respondents select the most accurate answer from a choice designed by the researcher. The researcher received answers only to the specific questions that have been asked (Leedy, 1997). This was done with the intention of reducing answering effort on the respondent's part and to also to aid

the respondents in making decision without confusing them. In other words, the closed-ended questionnaire survey is more stable, uniform and standard (Sarantakos, 1988).

Before the questionnaires were sent out to the respondents, it was piloted on thirty five, 35 potential respondents. Some of the comments and suggestions from the pilot survey were taken into consideration before the actual distribution of the questionnaires was made. In this study, the research was designed to determine types of procurement system used in Malaysia refurbishment projects, problem face by contractor and relationship between the problems face by contractor using different types of procurement systems toward project performance. Total numbers of one thousand five hundred (1500) questionnaire survey forms was distributed to the targeted respondent's contractor construction company in Malaysia; Klang Valley, Sabah, Sarawak, Johor, Kelantan, Terengganu, Perak, Kedah, and others in order to achieve the research objectives. A period of two months was allocated to receive replies.

Four hundred and ten, 410 closed-ended questionnaires were obtained and received and the targeted respondents included site agents, project engineer, contract administrator, contract manager, project manager and other parties who are working in Construction Company; which three hundred sixty eight, 368 questionnaires were found to be useful for data analysis, giving a final response percentage of approximately 24.53 %. 42 returned questionnaires were rejected due to the respondents did not involve directly with refurbishment designs, the project involve by their company before year of 2007 and incomplete questionnaire returned.

The summary of the questionnaires obtained are illustrated in detail in Table 4.2.

Table 4.2: Questionnaires obtained and returned by the respondents

Description	Frequencies
Number of questionnaire sent out	1500
Total returned questionnaires	410
Questionnaire sets returned unopened	18
Questionnaire returned without answers	15
Questionnaires answered, but incomplete	9
Percentage returned	27.33%
Valid percentage returned	24.53%

The valid response rate recorded is 24.53%, which is acceptable for a social science study in Malaysia and it achieve minimum numbers of samples size determined by Sekaran(2005) as illustrated in Table 4.1. This data will be analysed by using Software Package of Social Science (SPSS) version 17.0. Based on the derived results, conclusion and recommendations were drawn. In order to obtained reliable and realistic results, semi-structured interview has been conducted.

Findings from the questionnaire survey shows that almost 60% of the respondents were manager and director level and 63.3% of them had more than 10 years' experience in construction industries. The result indicated that the data collected from this survey are reliable. The detail of the results is presented in Chapter 6 of this study.

4.3.1.1. Parameters in questionnaire design

Three parameters have been set up as limitation in this study. Limitations are important in order to ensure the scope of the study is not too broad and to ensure it could be covered

within the time of the study. Sekaran (2005) pointed out that limitation for the study may produce different result and findings. The limitations for this study in are stated as follow:

- The respondents must have knowledge and experience working in contractor construction company;
- The project selected must be classified in refurbishment works;
- The project selected must be completed in 2007 onwards;
- Contract sum more than RM 500,000.00;
- The selected refurbishment projects should be commenced after 31st December 1999 in order to ensure that the selected project will not be affected by recession in 1998; and
- The research will be limited to post construction (during and after construction).

First objective is to get the correct respondents during survey is conducted because not all parties involve have knowledge and awareness on the problem face by the contractor during construction period. Second objective is to secure accurate results and findings as contractor not only involved in refurbishment project but also newly project and new project results may differs from the refurbishment project. Third limitation is formulated to ensure the results obtained are within the sample size (2007 years onward) determined earlier. Final limitations are considered in this study as the outcome for the smaller contract sum of may lead to inaccurate findings.

4.3.1.2. Questionnaire design

According to Sharp and Howard (1996), questionnaires have 'over the past century, becomes a common method of gathering information'. It can be defined as 'a pre-formulated written set of questions to which participants record their answers, usually within largely closely defined alternatives' (Sekaran, 2005). In USA, the term 'Survey' is used for this data collection method (Frankfort-Nachmias, C. and Nachmias D., 1996). Creswell (1994) informs us that a survey design − through the data collection process of asking questions, provides a quantitative or numeric description of some fraction of the population. For example, a sample which can be in turn generalized to the population from which the sample drawn. The questionnaire is designed based on information obtained from the literature review and the objectives of this study. For the purpose of this study, the questionnaire survey was designed according to the guidelines provided by Sarantakos (1988) and Sekaran (2005).

The questionnaire survey for this study is divided into five sections (Section A-E) with the total numbers of 21 questions. First section (Section A) is related to the respondents' particular; getting information about respondent's job position and year of experience. Second section (Section B) is about the project characteristics, which include year of the project and contract amount of the project as well as the year of the refurbishment project while the third section (Section C) is relating to the characteristics of the procurement system such as types of the procurement system used in the refurbishment project. Fourth section (Section D) is to measure degree of frequencies for the problem face by the contractor using different types of procurement system, and last section (Section E) is the

project outcomes which indicated the level of the performance of the refurbishment project. The division of the section is important in order to avoid any confusion on the part of the respondents and to provide systematic flow to the questions.

The questions asked in the questionnaire survey were designed in the form of closed-ended questions. As mentioned previously, it was intended to reduce answering effort on the respondent's part, and also to aid the respondents in making decisions without confusing them. However, the use of closed ended questions would require the anticipation of a whole range of possible answers which could be given. There were three types of scaling included multiple choice, numerical scale, Likert and ratio scale that's used to design the questionnaire survey. Multiple choice questions consisted of three or more exhaustive, mutually exclusive categories. Multiple choice questions can ask for single or multiple answers.

The design for multiple choice questions are shown as follow:

What is your role?

[ ] Site Agent   [ ] Project Engineer   [ ] Contract Administrator

[ ] Project Manager   [ ] Others, please specify_____

Figure 4.4: Multiple choice questions

Sources: Questionpro, (2009)

The design for numerical scale questions are shown as follow:

Please indicate the degree of frequencies for the problems face by the contractor using different types of procurement system

Least Frequent   1   2   3   4   5   Most Frequent

Figure4.5: Numerical scale used in questionnaire design

Sources: Sekaran(2005)

The numerical scale is similar to the schematic differential scale, with the different that numbers on a 5-point or 7-point are provided, with bipolar adjectives at both ends (Sekaran, 2005). This is also an interval scales. In this study, number of 5-point was used to design the questionnaire survey. The design for the questionnaire survey using numerical scale is illustrated at Figure 4.4. Section four of the questionnaire is measured by using numerical scale and a sample of questionnaire design used in this study is shown in Appendix D. Sekaran (2005) stated that Likert scale is designed to examine level of strongly subjects agree or disagree with the statements on a 5-point scale as shown follow:

Interval scale 1 to 5 ascending order

        1   2   3   4   5

Increasing Degree of Agreement

1= strongly disagree   2=Disagree   3= Fair   4=Agree   5=Strongly Agree

Figure 4.6: Five ordinal Measure of Likert scale used in questionnaire design

Sources: Sekaran, (2005)

The design for ratio scale questions are shown as follow:

What is the ratio of actual project cost to target project cost for the selected project?

E.g. If actual contract value spend to complete the project was RM300, 000 and original contract value target was RM200, 000, divide RM300, 000 by RM200, 000; so the ratio is 1.5

[ ] 0 to 0.8   [ ] 0.81 to 0.9   [ ] 0.91 to 1.00
[ ] 1.01 to 1.1   [ ] 1.11 to 1.20   [ ] More than 1.20

Figure 4.7: Numerical scale used in questionnaire design

Sources: Sekaran, (2005)

The questionnaire survey was designed clearly with an appropriate margin, font size, and spacing where necessary. The proper way of questionnaire survey design is very important as it is a factor that could influence the response rate of the survey (Beger et al., 1989). Sarantakos (1988) points out the importance of the questionnaire survey length on the response rate of survey. Longer questionnaire will result the lower response rate (Jobber, 1996). Therefore, the length of the questionnaire survey was considered in the process of the design the questionnaire survey. In this study, all of the questions were arranged systematically in order to minimize the length of the questionnaire survey.

4.3.2. Semi-Structured Interview

Face-to-face semi-structured interviews were employed in the second stage of data collection of the study. A semi-structured interview is defined as an interview that had no strict procedure or guideline to follow. Some of the questions are structured and some are unstructured, depending on purpose of the study (Sarantakos, 1988). Following some of the

advantages of semi-structured interviews is: (Beger et al., 1989;Sarantakos, 1988; Sekaran, 2005):

1. Interviews can attract a high response rate.

2. Complete answers for all the questions set are guaranteed.

3. There is flexibility and the question can be adjusted based on the objectives.

4. Interviews can involve more complex questions that are difficult to express using a mail questionnaire.

The reason to carry out the interview for this study is to obtain the results on the most suitable procurement systems that shall be opted for refurbishment project. Besides, researcher also able to have a better understanding on the problem face by the contractor in using different types of procurement system during the refurbishment/construction works carry out. In addition to that, understanding on the relationship between the problems face by the contractor using different types of procurement systems and the project outcomes are also obtained from the interview. The findings from the interview are crucial to ensure the questionnaires result is reliable and realistic.

Before interview carried out, the list of questions was design to ensure the question pointed to the interviewees are structured and in manner. A sample of interview guideline is attached in 'Appendix B'. The questions design was expected to take less than one hour for the respondents to answer. From the Twenty eight contractors who had replied the pilot questionnaire survey, potential interviewees were identified through selection criteria as following:

1. Experience in the refurbishment project, based on years of involvement

2. The size of refurbishment project based on the contract value

After the potential interviewees have been identified, a letter acceptance for the interview was sent and a follow-up call was made to confirm the date and venue of the interview.From the pilot study carried out, twenty eight, 28 out of thirty five, 35 questionnaires are responded. From the twenty eight, 28 responded, only twenty two, 22 contractors accepted the interview. However, researcher has only carried out fifteen, 15 contractors as the answers received from the selected contractors mostly are similar and predictable.

On top of that, the answers given by the respondents reached saturation point with no new information after fifteen, 15 interviews. Similarly to Rahmat (1997) and Hashim (2004) research, there were only interviewed fifteen, 15 and fourteen, 14 respondents respectively in their studies when the result reached saturation. Therefore, fifteen, 15 respondents in this study can be considerably sufficient to obtain an adequate range of views and opinions in the area of study.

The interviews were carried out to fifteen, 15 contractor in Klang Valley, Johor, Penang, Melaka and Sarawak for two, 2 months from April 2012. The minimum duration of the interview recorded was approximately 35 minutes and the maximum was 55 minutes with the average record of 45 minutes. During the interview, the researcher is able to refer on the record of the completion of the refurbishment projects in terms of cost, time and quality as well as contract documents (Drawings and Bill of quantities). This would provide a clear

and better understanding on the research carried out. The findings from the semi-structured interview are presented as a supporting to the result from the questionnaire survey in Chapter five, 5.

4.4 DATA ANALYSIS

Data analysis is the phase that's important in interpreting the findings. In order to achieve the objectives for this study, the data were analysed by using the Statistical Package for the social science (SPSS) software, version 17.0. There were three types of data obtained during questionnaire survey, namely nominal, interval and ratio data. The techniques used for data analysis in this study were descriptive statistic; frequency distribution, inferential analysis and reliability test. These techniques are described in detail as follow:

4.4.1 Descriptive statistics: Frequency distribution

Frequency distributions were obtained for all the personal data or classification variables. The data can be visually displayed in charts, table and graphic forms which completely provide a complete profile view of the findings. It will show the percentage of the responses given. Liaw and Goh (2002), and Naoum (1998) stated that descriptive analysis could provide general overview on what is happening in research finding. Frequency distributions in this study were obtained for all the questions for particulars, project characteristics, and characteristics of the procurement system, variables and outcome.

Based on the studies carried out by Egbu (1994), Hashim (2004), and Rahmat (1997), calculation of central tendency using the mean were carried out in order to rank some of the variables. Five-point scale used in the questionnaires was transformed to mean readings to determine the ranks of each variable.

4.4.2 Bi-variate Analysis

Bi-variate analysis refers to the correlation test of two variables in the present study. Three correlation tests were employed as follows:

4.4.2.1Pearson's Product Moment Correlation Coefficient Technique.

Pearson's product moment correlation coefficient is comparable to Spearmans rank but it is used to measure the relationship for variables that are normally distributed (Lind et al., 2003). It is a parametric method, which measures linear association between two variables that been measured on interval or ratio scaled variables. For example, this coefficient was used to detect significant correlation between problem face by the contractor and the project outcome variables.

4.4.3 Normality Test

Normality test was employed to establish whether the distribution of data is normal or is skewed to one-sided (Kellar and Warrack, 2004). Skewness is the extent to which the data points lack symmetry. This test is applicable to interval or ratio type of data where the

decision must be made to use either parametric or non-parametric methods. The allowable skewness used to determine the normality of the data in the present study was plus or minus 2 (Lind et al., 2003). This test was useful for the questions that represent continuous type of data in the final survey.

4.4.4 Reliability Scale test

Pallant (2001) pointed out that the reliability test is the consistency of the measurement to which an instrument measures the same way each time it is used under similar conditions with the same subjects. The reasons to have a reliability test are to check for the consistency of the scale and linkage of the answers (Ali et al., 2009). The higher of the internal consistency in scale indicated that the greater reliability of the data. Cronbach's Alpha coefficient test is the most common method of checking on the instrument used, which it only allows a reading of more than 0.70 (will be accepted as reliable) (Pallant, 2001; Nunnly, 1978). This number is basically been as a rule of thumb by some professionals. In this study the reading of the test is 0.75 which indicates that the scale and data obtained is reliable.

The result of the test is shown as follow:

Table 4.3:Reliability Statistics

Cronbach's Alpha	N of Items
.753	12

Table 4.3 shows that the reliability statistics for 12 variables is 0.753 with 7 independent variables and 5 dependents variables.

4.4.5 Analysis of Qualitative

Data Semi-structured interview was analysed in the present study to obtain qualitative data. The data were analysed together with the results in the descriptive analysis section such as percentage, to complement the answers. This is crucial in order to ensure the results of the analysis more realistic.

4.5 SUMMARY OF THE CHAPTER

The formulation of research design is very important in order to conduct a research. The present study used triangulation techniques in the research methodology, which combined both qualitative and quantitative approaches. The triangulation technique used was sufficient to obtain the required information that could be used to validate the theoretical framework using statistical analysis. It involved four stages of data collection which are literature review, pilot study with a response of 28 (80%), questionnaire survey with the response of 410 (27.33) recorded and followed by semi-structured interview carried out to fifteen, 15 contractor companies. Limitation of the study designing the research was discussed. Finally, various statistical analysis techniques, which covered both qualitative and quantitative analysis, were described. The analysis and findings of the result will be described in detail in next chapter.

CHAPTER 5

ANALYSIS AND DISCUSSION

5.0 INTRODUCTION

The techniques of data collection and processing have been discussed in previous chapter. This chapter presents the results of the analysis of both the quantitative and the qualitative data obtained in the present study. The results obtained are presented according to the research objectives which are stated as follow:

1. To identify types of procurement methods used in Malaysian Refurbishment Projects.

2. To identify problems and difficulties encountered by contractor using different types of procurement systems in refurbishment projects.

3. To establish relationship between problem and difficulties encountered by contractor using different types of procurements towards delivery of performance of Refurbishment Projects.

The results are presented based on descriptive statistic such as frequency distribution, mean and bi-variate which is presented the correlation of two independent and dependent variables.

The overall findings and analysis are discussed in this chapter. Figure 6.1 illustrated overall structure of the discussion.
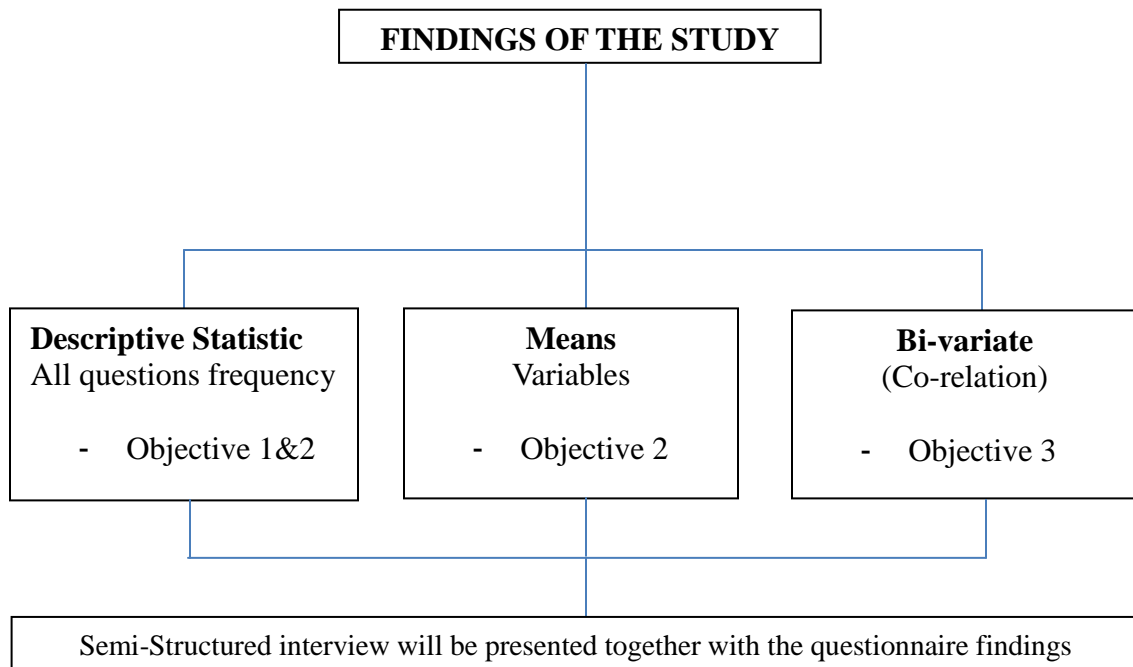
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                    ┌─────────────────────────────┐
                    │    FINDINGS OF THE STUDY    │
                    └─────────────────────────────┘
```

Descriptive Statistic All questions frequency - Objective 1&2	**Means** Variables - Objective 2	**Bi-variate** (Co-relation) - Objective 3

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┌──────────────────────────────────────────────────────────────────┐
│  Semi-Structured interview will be presented together with the    │
│  questionnaire findings                                            │
└──────────────────────────────────────────────────────────────────┘
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Figure 5.1 Chapter 5 overall structures

5.1 DESCRIPTIVE STATISTIC: FREQUENCY DISTRIBUTION

Frequency distribution obtained all the personal data and classification variables for particulars, Refurbishment Project characteristics, types of procurement system, difficulties and problems face by contractor (independent variables) and project outcome (dependant variables). All of the data obtained are described as follow:

5.1.1 Personal particulars

Respondents particulars such as job title, years of experience, and their department will be discussed as following:

5.1.1.1 Job Title

Table 5.1 shows that majority of the respondents from the contractor company are managers which weighted at 44.0%, follow by Executive with 16.6%, Director at 16.0%, Senior Executive at 15.5% and Non-Executive that contributes 7.3% respectively.The lowest percentage of the respondents is others, 0.6% which is Senior Manager.

Table 5.1: Job Title

Job Title	Percentage (N=368)
Non-Executive	7.3
Executive	16.6
Senior Executive	15.5
Manager	44.0
Director	16.0
Others	0.6
Total	100.0

Non-Executive is personnel with lower education level, had completed their highest education at PMR, SPM or STPM level, and with working experience less than five (5) years. A non-executive position in a company or organization gives advice in the task assigned but is not responsible ondecisions making or to ensure that decisions are carried out. Executive is the appointed personnel with higher education whereby they can be a

diploma holder, bachelor degree holder, master degree holder or PhD (Doctor of Philosophy) holder. The executive will handle tasks pertaining with the decisions making and ensuring that those decisions are carried out.

Senior Executive is a person who has a higher position compares to Non-Executive and Executive. Senior Executive has a longer and plenty experience compares to Executive level. Their tasks substantially concerned on monitoring, decision making, and finding solution to the problems.

Majority of the respondents are in the position of Manager Level with total numbers of 162 which is 44.0% from overall questionnaire received. Manager is a person who has been appointed for managing organisation of their department or project and ensuring proper decisions are carried out, proper solutions to the problem are selected, and other relevant works to ensure their organisation is well structured. The personnel only will be appointed as a manager if they have a good qualification in terms of leadership, experience and thinking as well as decision making.

The directors of a company are the most senior, whom meet regularly to make an important decision. Directors' responsibilities are not only to organize one department and project but to manage overall department and the project. Therefore, directors must have the knowledge, experience and be able to make decision in overall refurbishment works such as cost, time, quality, safety and others.

As discussed, majority of the respondents are in the position of managerial level with the numbers of 162 which is 44.0% from overall questionnaire obtained while 16.0% of the respondents are directors. This implies that the results obtained are more reliable as managers and directors have good qualification in terms of experience, leadership, knowledge, thinking and decision making. In order to obtain saturated and realistic results, semi structured interview has been conducted to fifteen (15) contractor companies whereby8 numbers of the interviewee were Managers, 4 numbers of the interviewee were Directors,and 3 numbers of interviewee were Senior Executives.

5.1.1.2 Department Reporting

Table 5.2 Department

Department	Percentage (N=368)
Contract	29.6
Operation	27.2
Technical	14.4
Surveyor	0.3
Safety	1.1
Finance	3.8
Others	23.6
Total	100.0

Table 5.2 shows findings for the department that respondents reported to their company. The result shows in table 5.2 indicated that 29.6% which is 109 numbers of the respondents are reporting to contract department. Contract personnel in contractor company can be involved either in pre-contract (tendering stage), post-contract (project based) or both. In post-contract, the personnel have to take responsibilities in awarding, cost controlling and

monitoring, handling progress claim, measurement, involve in variation order (costing) and most importantly responsible to prepare and present contractual issues in the event that a dispute is arisen.

Operation personnel are responsible to supervise the works on site, ensuring the progress is smooth and they have to be more familiar with the method of construction and able to solve any difficulties occurring as the construction is in progress. Figure 5.2 shows that 29.6% of the respondents are from operation department while 23.6% of the respondents are from others or combination of department such as quality assurance and control (QA& QC). Most of the respondents that have been categorised 'others' consists of managers and directors that are involve and responsible to manage all of the departments.

As indicated in table 5.2, 14.4% of the respondents are technical personnel, follows by finance personnel which are 3.8%. 1.1% of the questionnaire survey form is replied by the safety personnel whereby 0.3% is from surveyor personnel (land surveyor). Technical personnel are responsible to coordinate on the construction drawing while finance personnel are responsible to monitor the project budget and processing the payments. Besides that, Safety personnel are responsible to minimize incident to zero at project site and surveyor play their roles in provide the setting out during construction in progress.

In order to ensure data obtained is reliable, semi-structured interviews have been conducted to contract department, technical department, operation department, finance department.

5.1.1.3 Years of working experience

Table 5.3 indicated years of working experience of the respondents in Construction Company. The data obtained will be more reliable and realistic if the respondents have longer working experience. As illustrated in the table, the highest respondents have working experience more than 15 years with percentage of 45.9%, follow by less than 5 years with 23.4%, 10 to 15 years 17.4% and 5 to 10 years 13.3%.

Table 5.3 Experience in Construction Industry

Year of experiences	Percentage (N=368)
Less Than 5 years	23.4
5 to 10 years	13.3
10 to 15 years	17.4
More than 15 years	45.9
Total	100.0

The respondents that have working experience in construction industry more than 15 years, mostly are in the position of managers and directors level while majority of non- executive and executive have a working experience less than 5 years.

5.1.2 Project Characteristics

Findings for project duration, project value and size, types of refurbishment building, types of Refurbishment Project and factor affecting growth of refurbishment will be discussed in detail as following:

5.1.2.1 Project Duration

From the findings and analysis shows in Table 5.4, majority of the refurbishment works carried out were completed less than 2 years; with a percentage of 55.4. Then, it follows by the project completion within 2-3 years; with percentage of 35.6 and project completion within 3-4 years with percentage of 7.6. From the data obtained, there are only 1.4% of the Refurbishment Projects completed in duration more than 4 years.

Table 5.4 Project Duration

Project Duration	Percentage (N=368)
Less than 2 years	55.4
2-3 years	35.6
3-4 years	7.6
More than 4 years	1.4
Total	100.0

The result implies that, the normal practise in Malaysian Refurbishment Projects required duration less than three, 3 years for completion.

5.1.2.2 Project Sum Value

Table 5.5 Project Contract Value

Project Contract Value/RM	Percentage (N=368)
500,000-1,000,000	14.4
1,000,001-2,000,000	25.5
2,000,001-3,00,000	13.6
More than 3,000,000	46.5
Total	100.0

Project contract sum is referred to the total amount contract value awarded by the client to the contractor. Table 5.5 shows that 46.5% of the Refurbishment Project values are exceeding RM3,000,000 while the project value within RM1,000,000-RM2,000,000 are indicated second highest; which is 25.5% from overall data obtained. Then, it is follow by the project values within 500,000-1,000,000 with percentage of 14.4 and the lowest percentage is the project contract values are within RM2, 000,000-RM3, 000,000 with 13.6% from overall data obtained.

Rahmat (1997) pointed out that difficulty in managing and handling Refurbishment Projects are depending on the project size and value. Ali et al., (2009) has proven that Malaysian Refurbishment Projects tend to be carried in small scale from the years of 2002-2006 with projects size less than RM2, 000,000 is the highest with contribution more than 50%. Contrarily, Refurbishment Projects with the size project more than RM2, 000,000 are less implemented with record less than 31%. However, this research has proven that Malaysian Refurbishment Projects are tends to be carried out in large scale from the years of 2007-present with the records of 60% project value exceeding RM2, 000,000. This shows that the project size and value has been increased from the years of 2002-present.

5.1.2.3 Types of building

Table 5.6 indicated type of refurbishment building analysis and findings.There are total numbers of 60 residential projects; which is 16.3% recorded for present study while 11.7% are offices, 6.8% are factories, 14.4% are hotels, 12.5% are hospitals, 5.7% are educational institutions, 15.8% are shops and majority of the data obtained are others which contribute

16.8%. Other types of project recorded are petrochemical plant, sewerage treatment plant, mosque, airport, shopping complex, marine civil and gas facilities, public utilities system, banks and toll expressway.

Table 5.6 Types of Building

Types of Building	Percentage (N=368)
Residential	**16.3**
Office	**11.7**
Factory	**6.8**
Hotel	**14.4**
Hospital	**12.5**
Education Institution	**5.7**
Shop	**15.8**
Others	**16.8**
Total	**100.0**

Rahmat (1997) again pointed out that type of buildings is one of the factors that contribute to difficulties in handling Refurbishment Projects. Ali et al., (2009) identified that residential and offices are the buildings that tend to carry out refurbishment activities in Malaysia from the years of 2002 to 2006. However, based on the findings for the present study, residential still recorded higher percentages but hotel, hospital and shop shows increasing pattern of having refurbishment works from 2002-present.

The trends could be influenced by the economic activities of the refurbished building such as changing corporate image or business sectors for the office type, whereas for residential refurbishment could be due to change of owners preference.

5.1.2.4 Types of refurbishment

Aikivuori (1996) and Lee (1987) have categorized refurbishment to Corrective, Altering, Optimizing, Pleasure, Opportunity, Adaption, Conversion, Retrofitting, Renovation and Modernization. Table 5.7 shows percentage on the types of Refurbishment Project carried out in Malaysia.

Table 5.7 Types of Refurbishment Works

Types of Refurbishment Works	Percentage (N=368)
Corrective	4.3
Altering	9.2
Optimizing	12.8
Pleasure	6.0
Opportunity	1.4
Adaption	1.6
Conversion	12.5
Retrofitting	3.5
Renovation	29.3
Modernization	19.3
Total	100.0

Renovation is the most popular types of refurbishment carried out in Malaysia construction industry with a record of 29.3%. Then, it is follow by modernization with the percentage of 19.3, optimizing with the percentage of 12.8, conversion with the percentage of 12.5, altering with the percentage of 9.2, pleasure with the percentage of 6.0, corrective with the percentage of 4.3, retrofitting with the percentage of 3.5, Adaption with the percentage of 1.6 and the lowest is the opportunity with the percentage of 1.4.

5.1.2.5 Factors affecting growth of refurbishment works

Table 5.8 shows factors that affect growth of Refurbishment Project in Malaysia construction Industry.

Table 5.8 Reason to carry out Refurbishment Works

Factor affecting growth of refurbishment	Percentage (N=368)
Ageing Building	20.7
Changes of Technology Use	4.6
Economic Change	3.8
Limited vacant for new development	17.9
Demand for modern living	25.8
Government policy	9.8
Change in Building used	14.9
Others	2.4
Total	100.0

From the findings, demand for modern living contribute to the highest records which is 25.8% from overall data obtained, then follow by ageing building with 20.7%, limited vacant for new development with 17.9%, change in building used with 14.9%, government policy with 9.8%, changes of technology use with 4.6%, economic change with 3.8% and others with 2.4%.

In the semi-structured interview conducted to 15 Contractor Companies, all of the interviewees agreed that most of the vacant nowadays are demanding for modern living and this has induced them to refurbish the buildings. In addition to the above, 11 interviewees mentioned that certain owners have no choice but to refurbish the buildings due to building deterioration as it may cause failure of the buildings if there is no refurbishment works carry out to rectify the defects.

5.1.3 Types of procurement system

Table 5.9 illustrated types of procurement systems used in Malaysian Refurbishment Projects. The result indicated that traditional systems is the most preferred system used in Malaysia with record of 54.3%, followed by design and build with record of 39.9%, Management procurement, 4.3%, Turnkey System with record of 1.1% and Built-Operate-Transfer BOT with record of 0.3%.

Table 5.9 Types of Procurement Systems

Types of Procurement Systems	Percentage (N=368)
Design and Build	39.9
Traditional	54.3
Turnkey System	1.1
Management Procurement	4.3
Built-Operate-Transfer BOT	0.3
Total	100.0

This result is proven by the finding of Rahmat (1997) in UK who discovered an almost similar result. In addition to this, Ali et al. (2009) in his findings in Malaysia refurbishment also has proven the similar result. Based on the findings from semi-structured interview, 12 out of 15 interviewees highlighted that traditional is the most suitable procurement system for Malaysian Refurbishment Projects. As pointed out by Peter et al., (2008), there are three types of traditional procurement method which is consist of lump sum contract, measurement contract and cost reimbursement/cost plus contract.

Ten, 10 interviewees emphasized that cost reimbursement/cost plus are the best option opted for Refurbishment Project due to the activities carried out are uncertain. This means that contractors were being paid for an agreed fee to cover management, overheads and

profits. Another two, 2 interviewees preferred lump sum- traditional contract. For this type of contract, the contractors must be experienced in refurbishment works and the Bill of quantities must be priced carefully due to its uncertainty. Both contractors and clients will have high risks as wrong pricing will give loss to the contractor and prompt to high variation works.

From the interviews, three, 3 interviewees pointed that design and built is the most suitable procurement systems for Malaysian Refurbishment Projects. Due to the uncertain, they in their opinion that is best and benefits if contractor able to design and construct the buildings based on the design intent provided by clients. However, this system is not suitable when client does not able to provide concept and intent in early stages.

5.1.4 Difficulties in managing Refurbishment Project

As discussed in the literature review, contractor is facing difficulties in managing Refurbishment Projects in using different types of procurement systems. The difficulties extend will be discussed as following:

5.1.4.1 Difficulties in Cash Flow and Financial

Table 5.10 shows findings for difficulties faced by contractor in managing cash flow and financial. A five-point scale from "very small extend" to "very high extend" was design in the questionnaire survey forms.

Table 5.10 Cash Flow and Finance

Difficulties Scale	Percentage (N=368)
Very Small Extend	12.2
Small Extend	26.4
Extend	40.2
Large Extend	15.8
Very Large Extend	5.4
Total	100.0

The result shows 20.2% of the contractors facing difficulties in managing cash flow and financial. Majority of the contractors with the record of 78.8% claimed 'extend' 'small extend' and 'very small extend' which are fair and less difficulties in managing the cash flow and financial. From the semi-structured interview findings, six, 6 interviewees were facing this problems due to late certification of the claim, site valuation and delay in the progress on site due to technical problems. Besides that, they also clarified that most of variation works are not been certified although the works has been done on site. These problems occurred was due to the variation cost had to go through several stages prior to get approval.

The result analysed from Pearson's Product Moment Correlation Coefficient Technique signifies that these difficulties will give impact to project outcomes in term of times, variation works and time. Therefore, it is important to ensure all parties to expedite in the claim and variation works submission and certification. Besides that, contractors, architect and client must take immediate action to solve the technical problems arise as delay in progress will cause preliminaries such as manpower and machinery cost increase.

5.1.4.2 Difficulties in Communication with consultants and client

The result obtained for problem face by contractors in communication with consultants and client is illustrated in Table 5.11.

Table 5.11 Communication with Consultants & Client

Difficulties Scale	Percentage (N=368)
Very small extend	5.4
Small Extend	19.8
Extend	41.6
Large Extend	25.3
Very Large Extend	7.9
Total	100.0

In general, 33.2% of 'large extend' to 'very large extend' were recorded for difficulties face by the contractor to communicate with consultants and client. In the semi-structured interviews, about two third of directors, managers, and senior executive from contractor company revealed that communication among client, quantity surveyor, architect, consulting, engineer, specialists and the contractor's organization is one of the problems faced by contractor in managing refurbishment. These problems were occurred due to the attitude of the human beings themselves, lack of coordination skills and short of tools such as fax and e-mail to convey the information. The interviewees added that small contractor companies are not facilitated with the complete sets of communication tools, in which some project site have no fax and internet connection.

The result analysed from Pearson's Product Moment Correlation Coefficient Techniquealso shows that problems in communication among parties involve are correlate to cost,

variation works, time, and complaints received. It is essential that various programmes to be properly coordinated, with some kind of workshop and design review. Coordination among all key participants would provide them with more information and understanding about the project scenario and how to find out the appropriate solutions. When dealing with existing old building, surprise is inevitable during the construction stage and this could have a significant impact on time and cost.

It can be concluded that the efficiency and effectiveness of the refurbishment process strongly depend on the quality of communication. For instance, Higgin and Jessop (1965), Thomas et al. (1998), Franks (1998), and Somogyi (1999) had pointed out that improvement in the communication within the building team in project teams and between project manager and contractors could reduce failure. In addition, more open communication at all levels could lead to innovations (Lenard and Eckersley, 1997)and better technical solutions (Sörensen, in Atkin et al., 2003) while improved communication during the briefing might lead to better decision making.

5.1.4.3 Difficulties in Slow decision making by clients

Tables 5.12 illustrated results obtained on to the contractor's perspective on client decision making in managing Refurbishment Project. From the result, 36.2% of the contractors claimed that they are facing problem in getting decision making from client. This result is confirmed by Ogunlana et al. (1996), and Assaf et al. (1995) statements whereby they have pointed out that slow decision making by clients is an issue face by most of the contractors. From the findings, 32.1% were recorded with 'small extent' and 'very small extend' for the

slow and improper decision making during refurbishment works is in the progress. The mean and mode reading are fair.

Table 5.12 Decision making by Client

Difficulties Scale	Percentage (N=368)
Very Small Extend	6.0
Small Extend	26.1
Extend	31.8
Large Extend	28.3
Very Large Extend	7.9
Total	100.0

In the semi-structured interview, ten, 10 interviewees mentioned that some of the clients have no experiences and not able to come out with the decisions. For instance, inexperienced clients are not able to decide on design concepts and not able to give confirmation on the specification required. This will consequently cause delay on the site progress. Moreover, wrong decision making will also give impact in terms of cost as it might prompt to hacking, re-do and repeated works.

As such, clients must take right and fast decision making to avoid any delay and additional cost incurred in a Refurbishment Project especially in fast track project (Ahuja et al., 1994).

5.1.4.4 Difficulties in Frequent change order by client

The 'extend' of frequent change order by client was measured on a five-point Likert scale for the present study.

Table 5.13 Frequent Change Order By Client

Difficulties Scale	Percentage (N=368)
Very Small Extend	**9.0**
Small Extend	**21.2**
Extend	**26.6**
Large Extend	**27.2**
Very Large Extend	**16.0**
Total	**100.0**

The result shows 43.2% of the respondents rated that they were having 'large' and 'very large' difficulties if client issues change order frequently. Besides that, the result also shows 56.8% of the respondents claimed scale of 'extend', 'small extend' and very small 'extend'. These mean that 30.2% of the respondents less problems with the frequency change orders by the client.

In the semi-structured interviews, thirteen, 13 interviewees revealed that the reason of the frequently changing order from clients are due to the nature of Refurbishment Projects which are the most complex and uncertain among all type of construction projects. Ali (2009) in his findings indicated that variation works were greatly increased for the Refurbishment Projects if compared to new-build projects. Besides that, some clients have no experience in design and handling refurbishment works. Due to this, clients are not able to prepare an adequate and sufficient comprehensive brief during pre-bid stage.

The frequent change orders of the refurbishment design will restrict or limit the effectiveness of the procurement process (Turin, 1973; Ofori, 1980; Edmonds and Miles, 1984, The World Bank, 1984; Wells, 1986; Wang, 1987, 1991; Master Builders, 1989, 1990;

Miles and Neale, 1991; Morledge, 1996). As a result, the Refurbishment Projects are mostly completed with high cost and time variances. The Pearson's Product Moment Correlation Coefficient was employed to analyse the correlation and the result shows that frequent change orders by clients will give impact in terms of time, cost and quality.

5.1.4.5 Difficulties in Insufficient/Discrepancies in contract documents

The result indicates that 26.9% of the respondents rated insufficient/Discrepancies in Contract Document as 'large extend' and 'very large extend', 39.8% of the respondents rated fair and 33.1% rated 'small extend' and very small extend.

Table 5.14 Insufficient/Discrepancies in Contract Document

Difficulties Scale	Percentage (N=368)
Very Small Extend	**7.1**
Small Extend	**26.1**
Extend	**39.9**
Large Extend	**19.0**
Very Large Extend	**7.9**
Total	**100.0**

In semi-structured findings, more than half of the interviewees said that all contractors are facing difficulties in discrepancies and insufficient of contract documents (Bill of quantities, drawings, specification and design brief) However, the level of difficulties extend is depending on the types of procurement system opted for the particular project. For instance, in design and build procurement systems, the bill of quantities provided is based on lump sum basis and certain BOQ does not provide any detail breakdown on the works. As such, insufficient drawings and specification provided to the contractor will cause additional cost incurred to the contractor.

One to third interviewees said that in traditional procurement system, the detail breakdown for the works are indicated clearly in the bill of quantities and detail of the drawings and specification will be provided. However, in the event that there are discrepancies found between drawings, BOQ and specification during the construction works is in the progress, it will cause contractor to stop works at site. Contractor has to carry out meeting with consultants and client to solve the problems arise. Besides that, Request for info, RFI will be issued to the client and their prompt feedback is crucial in ensuring smooth progress on site. RFI must be kept for record purposes and this information is useful for the contractor to claim for extension of time (EOT).

The Pearson's Product Moment Correlation Coefficient was employed to analyse the correlation and the result shows insufficient and discrepancies in contract documents are co-related to time, cost, and quality and variation order. Therefore, appropriate selection of procurement system is very important in determining the Refurbishment Project outcomes. Consultants and client also have to ensure that sufficient information is forwarded to the contractors in tender stage as this may reduce percentage of contractor problem.

5.1.4.6 Difficulties in Material price escalation

Table 5.15 shows that 27.8% of the respondents rated material price escalation as 'large extend' and 'very large extend', 47.8% of the respondents rated fair and 24.5% of the respondents rated 'small extend' and 'very small extend'.

Table 5.15 Material price escalation

Difficulties Scale	Percentage (N=368)
Very Small Extend	8.2
Small Extend	16.3
Extend	47.8
Large Extend	24.5
Very Large Extend	3.3
Total	100.0

Abdul R., Ayub and Janidah (2006) revealed that material price escalation is a common difficulties faced by most of the contractor. In the semi-structured interview, two third of the contractors mentioned that they are facing difficulties in material price escalation mostly to all types of procurement systems when a they price in lower rate for the materials during tender and the price steadily increase due to economic changes and higher demand. Differ from new project, materials and accessories for refurbishment works especially for historical building are less in the market; which mean that the options and choices of the material is less if comparing to new project.

As a result, the contractors may suffer loss from the project.The result analysed from Pearson's Product Moment Correlation Coefficient Technique also signifies that this difficulty is correlated to the cost. Therefore, contractors have to be more careful and able to forecast on the changes of market price when they price in the refurbishment tender.

5.1.4.7 Difficulties in skills, expertise's and experiences

Table 5.16 indicated that 39.7% of the respondents rated skills, expertise and experience as 'large extend' and 'very large extend', 28.8% of the respondents rated fair and 31.6% of the respondents rated 'small extend' and 'very small extend'.

Table 5.16 Contractor Skill, Expertise and Experience

Difficulties Scale	Percentage (N=368)
Very Small Extend	10.9
Small Extend	20.7
Extend	28.8
Large Extend	26.1
Very Large Extend	13.6
Total	100.0

In the semi-structured interview, eleven (11) interviewees mentioned that contractor is lack of skill, expertise and experience manpower and professional especially in small contractor company. Ofori (1991) also revealed that small contractors relate mainly to inadequate of the owners, and include lack of technical and managerial expertise necessary for running a refurbishment business, lack of entrepreneurship, inability or unwillingness to employ qualified personnel, limitations in terms of variety of projects they can undertake and short horizon and limited plans for expanding the firm.

Besides that, interviewees that the 'extend' level of the contractor facing difficulties on the skill, expertise and experience manpower is depending on the types of procurement opted for the Refurbishment Project. For instance, contractors whom handling design and build Refurbishment Project must have a skill, expertise and experience manpower and professional staff as they are bonded to provide the detail of the design.

In addition to that, contractor must be able to understand and coordinate with the design brief, drawings intent, technical specification, bill of quantities and others relevant documents and produce a comprehensive design, technical solution, programme and financial planning.

On the other hand, in traditional procurement, contractor can proceed to the works based on the detail drawings, bill of quantities and technical specification provided by the consultants and client. Lack of skill, expertise and experience of the contractor might not heavily affect the refurbishment works. Therefore, client must select an appropriate procurement and contractor in handling complexity Refurbishment Project.

5.2 DIFFICULTIES FACE BY CONTRACTOR AND PROJECT OUTCOMES USING DIFFERENT TYPES OF PROCUREMENT SYSTEMS

Mean readings for difficulties face by contractor and project outcomes by using different types of procurements system for the present study are discussed in detail as following:

5.2.1 Difficulties face by contractor using different types of procurements system

Table 5.17 provides the mean reading for the difficulties faced by contractor using different types of procurement systems. In the analysis, the readings less than 1.33 as regarded as less difficulties; 1.34 to 2.67 as a medium difficulties and 2.68 to 4.0 as high difficulties, as suggested by Rahmat (1997). These mean that the higher the reading, the greater the difficulties face by the contractor using different types of procurement system.

Table 5.17 Mean Readings for Difficulties face by contractor using different types of procurement system

Types of Procurement Systems	Cash Flow & Finance	Communication	Decision making by Client	Frequent Change Order	Insufficient/Discrepancies	Material price escalation	Skill, Expertise & Experience
Design and Build	**3.03**	**3.31**	**3.29**	**3.81**	**3.40**	**3.02**	**3.85**
Traditional	2.54	**2.99**	**2.92**	**2.78**	2.62	**2.99**	2.56
Turnkey System	**2.75**	**3.00**	**2.75**	**3.25**	**3.00**	**3.00**	**3.00**
Management Procurement	**3.00**	**2.75**	**2.81**	**2.81**	**2.81**	2.50	**3.19**
Built-Operate-Transfer BOT	**3.00**	2.00	**3.00**	**3.00**	**3.00**	**4.00**	**3.00**
Total	**2.76**	**3.10**	**3.06**	**3.20**	**2.95**	**2.98**	**3.11**

Legend: Bold – High difficulties face by the contractor

According to CIDB statistics (2011), Rosli et al. (2006), OBD (1997), Masterman (1996), and findings in semi-structured interview, there are five (5) types of procurement system that are commonly used in Malaysia Construction Industry. The definition of the types of procurement systems are as follow:

Design and Build: Refers to the procurement strategy that entails the contractor in carrying out the work; the design works as well as the construction and completion of the work. It is a contract whereby the responsibility for both design and construction in the hands of the contractor, which mean that contractor play its roles as one point of responsibility.

Traditional system: It is a contract where the client will appoint a consultant team to act on his behalf to produce construction drawings, specification. Contractor is not being

responsible for the design or the documentation work and with a clear division between the design and construction process responsibilities.

Turnkey system: In this system, a contractor is commissioned to undertake the responsibilities for everything that is necessary for the construction, completion, commissioning and hand over the project. For instance, contractor will have to do everything from preparing project brief, getting approval, designing, financing, construction, furnishing and decorating to commissioning and handing over completed, cleaned and ready for use project

Management Procurement: In the case of management contracting, the contractor has direct contractual links with all the works and a contractor is responsible for all construction work. On the other hand, in construction management, a contractor is paid a fee to professionally manage, develop a programme and coordinate the design and construction activities, and to facilitate collaboration to improve the project's constructability

Build-Operate-Transfer (BOT): This is a contract where developers will use their own funding sources to construct a public facility in return for the right to operate it and charge a fee for its use. At the end of an agreed period the facility may revert to the landholder. Contractors that are involved in this type of development are usually part of a consortium and responsible for the design, construction and delivery of the project. Government and its agencies, as either direct or indirect purchasers of services from BOOT projects

Table 5.17 shows contractor is having high difficulties in cash flow and finance, communication, clients decision making, frequent change order, insufficient/discrepancies in contractor documents, material price escalation and skill, expertise and experience of contractor in using design and build and turnkey procurement systems. As pointed out by Peter et al. (2006) contractor is exposing to higher risks in using design and builds as well as turnkey procurement systems.

Unlike new project, refurbishment works are having more complexity and uncertainty. According to Natasa (2007), Emma (2010), and Peter et al. (2008), client experienced difficulties in preparing an adequate and sufficiently comprehensive brief. As a result, contractor will face great difficulty in pricing the tender and the price submitted does not taking into consideration on certain part of the construction elements due to insufficient and inadequate information provided by client (Masterman, 2002). This will consequently increase the construction cost and lead to unhealthy cash flow and financial problems.

In addition to that, Natasa (2007), Emma (2010), and Peter et al. (2008) also pointed out that client is required to come out with a concept design at an early stage. Undecided and incomplete concept committed to contractor at the early stage of the project will lead to higher frequent change order by client. In semi-structured interview, nine, 9 of the interviewees commented that unclear design concept and insufficient design brief forwarded to them during tender stage will give a huge impact to the contractor after the project commenced on site.

For instance, contractor always complaining on insufficient documents attached in the contract with unclear design concept that is always lead to cash flow and financial problem, frequent change order by clients. Half of the interviewees further added that the problems arise were due to the complexity and uncertainty of refurbishment works. Moreover, the absence of a bill of quantities makes the valuations of variations extremely difficult and restricts the freedom of clients to make changes to the design of the project during the post-contract period (Peter et al., 2008). These again cause difficulties in managing cash flow and prompt to higher variation works if changes order is instructed.

As illustrated in Table 5.17, contractor also faces difficulties in clients' decision making for the works carried out using design and build and turnkey procurement systems. In semi-structured interview, two and third of the interviewees mentioned that most of the clients are inexperience in handling refurbishment works and not able to make decision which this has caused delay in the site method of statement, programme and site progress. Besides that, the refurbishment works that involve changes of design concept is one of the root causes of slow decision making as client does not allocated budget for variation works.

Besides that, materials price escalation is also one of the difficulties faced by the contractor in using design and build and turnkey system. As clarified by half of the interviewees, refurbishment works is totally differing with new project. The materials for refurbishment works especially historical building are limited in Malaysia market and some of the materials have to be imported from other country. Moreover, the suppliers will increase the price if the demand increases and contractor may suffer for the losses. Besides, contractor also faces these difficulties in traditional and Built-Operate-Transfer procurement system.

As pointed out by Ng and Aminah (2006), in Design and Build contract, usually a contractor responsibility for the design in whole or in part and for the construction and completion of a Refurbishment Project. In addition to these, the complexity and uncertainties of the refurbishment works force contractor to employ a skill, expertise and experience workers. As discussed earlier, small contractors relate mainly to inadequate of the owners, and include lack of technical and managerial expertise necessary for running a refurbishment business, lack of entrepreneurship and inability or unwillingness to employ qualified personnel and these will lead to poor project performance.

As discussed earlier, the communication problem were occurred due to the attitude of the human beings themselves, lack of coordination skills and short of tools such as fax and e-mail to convey the information. In design and build and turnkey procurement system, it is always illustrated as a single entity responsibility and if miscommunication continuous in the project, it will cause loss not only to the contractor but also clients in term of cost, time and quality.

Unlike design and build, contractor is facing less difficulty in cash flow using traditional procurement. Detailing and breakdown of the bill of quantities (BQ) makes the valuation of the refurbishment works easier if compared to design and build, turnkey system, Built-Operate-Transfer and Management Procurement. By using traditional procurement it will ease contractor in cash inflow which is valuation of progress claim and cash outflow; which is certification to the sub-contractors. Based on the findings in semi-structured interview, seven, 7 interviewees commented that contractor can proceed to the construction of the refurbishment works based on the detailing of the information given by the consultants

employed by the client. Therefore, contractors are not necessary required extremely skills, expertise and experience manpower but in certain times, if the expertise are required contractor can still engaged externally.

However, through traditional procurement contractor still facing difficulties in communication with clients, frequent change order by clients, insufficient/discrepancies in contract document and material price escalation; however, the difficulties face is less if compared to design and build and turnkey systems. In traditional system, although the detailing of the specification, detail drawings, and bill of quantities breakdown are provided, however, if the information given such as specifications are inadequate, contractor still will face difficulties during construction works carry out.

Okoroh (1992) pointed out that inadequacy the specifications from the architects make it difficult for contractors to define the exact scope of work in advance. A s a result, the planning and control of refurbishment works tend to be difficult; for example, in determining the actual time and cost of the works and in producing method statements and programmes (CIOB, 1987) . The evidence is provided by Quah (1992) in her study titled, 'Comparative variability in tender bid s for refurbishment and new build work'. In Quah's (1992) study, it was found that regardless of project size, refurbishment tenders had a higher bid variance than new build tenders. The higher variability in tender bids reflect the inadequacy of specifications and unfamiliarity with the technical problems of refurbishment work.

According to Walker and Hampson (2003), traditional procurement consists of a potential for adversarial relationships between the contractors and the architect. Mostly, there can be cases that, the architect and the contractor will not agree with each other. In traditional procurement, lacking of team work that brings to communication breakdown which on the other hand cause delays and cost overrun. In other words, poor design coordination and quality at subsequent stages may result in costly design changes.

According to Peter et al. (2008), in management procurement contract, besides required proactive client, client also must provide a good quality brief to the design team as the design will not be completed until resources have been committed to the project in running the construction works. Therefore, inexperience client in managing Refurbishment Project will give loss to the project in term of time, cost, and quality. As illustrated in table 5.17, contractor is facing higher difficulties in cash flow and finance, communication, decision making by client, frequent change order, insufficient and discrepancies of contract document and skill expertise and experience of contractor using management procurement.

As shows in table 5.17, the respondent rated cash flow, client decision making, frequent change order, insufficient and discrepancies of contract document, material price escalation and skill, expertise and experience as higher difficulties faced by the contract in using built-operate-transfer BOT procurement system. BOT procurement system is commonly used to construct the public facility such as highway and is rarely used in Refurbishment Project.

From the result, contractor is facing high difficulties for cash flow, client decision making, communication, frequent change order, insufficient and discrepancies of contract document,

material price escalation and skill, expertise and experience. Due to the level of difficulties faced by the contractor is differing in using different types of procurement system, therefore, client must consider these factor during deciding and selecting the procurement method.

5.2.2. Actual project cost to target project cost using different types of procurement systems (Cost variances)

Table 5.18 shows the mean reading for actual project cost to target project cost using different types of procurement systems (Cost variances). As discussed earlier, if the readings less than 2.67 are regarded as; within budget and 2.68 to 4.0 as exceeded budget. The result shows that the Refurbishment Project was completed within budget by using traditional procurement systems. Other types of procurement systems such as design and build and turnkey system have exceeded budget, follow by management procurement and build-operate-transfer.

Table 5.18 Mean for cost variances in using different types of procurement systems

Actual Project Cost versus Target Project Cost

Types of Procurement Systems	Mean
Design and Build	3.50
Traditional	**2.55**
Turnkey System	3.50
Management Procurement	3.75
Built-Operate-Transfer BOT	4.00
Total	3.00

Legend: Bold – Within budget

Tenah (2001), Walker and Hampson (2003), and (Wearne 1997) emphasize that traditional system is separated into different process with design and construction. Each phase contains different stages. The design development phase, for example, comprises project briefing, feasibility studies, outline proposals, scheme design and detail design (Smith, 1998). The drawings, specification, and bill of quantities breakdown are provided by the client to the contractor during tender stage for ease of pricing.

For instance, traditional system provides more price certainty to the client at the very early stage of the project. It also gives the client firmer and more competitive price because the design plus the complete working drawings have been fully developed and detailed out prior to tendering. It eliminates any design or construction ambiguity or uncertainty which often causes the contractors to unnecessarily inflate the price. In the case where bill of quantities is used, the bidding tend to be more fair as such the project cost is lower. The system also has a better cost control (Masterman, 1996).

In the semi-structured interview, 12 of the interviewees commented that in term of cost, traditional procurement system is the best option to be opted for Refurbishment Project. Emma (2010) and Peter et al. (2008) pointed out that through these procurement system, it is able to produces the lowest bid. However, works were often disrupted when there are too many variations (due to unforeseeable problems) and it tends to cause the cost to inflate.

In design and Build and Turnkey procurement system, the cost to construct the refurbishment works is often higher than the traditional contracting system. This is due to the lack of design, specification detailing and absence of bill of quantities during tender and

contractors are not considering the certain part of the work that are uncertain. This will consequently increase the construction cost and lead to the construction cost exceeded the budgeted cost

Turnkey, management and built-operate-transfer BOT system are less opted in Malaysian Refurbishment Projects as they are found not suitable. Figure 5.18 show that contractor is suffered for loss in the Refurbishment Project using these procurement systems.

5.2.3. Actual project time to target project time using different types of procurement systems (Time variances)

Table 5.19 shows the mean reading for actual project time to target project time using different types of procurement systems (Time variances). In these analyses, the readings less than 2.67 are regarded as; within time frame and 2.68 to 4.0 as exceeded time frame.

Table 5.19 Mean for time variances in using different types of procurement systems

Actual Project Time versus Target Project Time

Types of Procurement Systems	Mean
Design and Build	**2.66**
Traditional	**2.30**
Turnkey System	3.75
Management Procurement	4.19
Built-Operate-Transfer BOT	3.00
Total	**2.54**

Legend: Bold – Within time frame

The result shows that traditional and design and build procurement systems opted for Refurbishment Project are completed within time frame given while it shows the project that selected for built-operate-transfer BOT, turnkey system and management contracting have exceeded the time frame given.

Emma (2010) and Peter et al. (2008) also highlighted that contractors are more familiar with traditional system as It is the most common types of procurement use in construction industry. Most of the contractors have much experience with this type of procurement method in Refurbishment Projects. In addition to this, the completed or largely completed designs would help contractors in forecasting workloads, allocation of resources, prepare programmes, method of statement. In the semi-structured interview, twelve, 12 of the interviewees have commented that in traditional procurement is a popular system that are commonly used for Refurbishment Project as contractor can proceed to the works based on detail design provided.

Design and build and Turnkey procurement systems which are also called "Fast-tracking" project delivery system where design and construction is put in one hand and its pre-tender process can allow fast construction date. In other words, it also allows the details of the project to run almost at the same time to each other, this means that it is going to reduce the overall project development period considerably.

In the case where this method of procurement has the single entity responsibility for both design and construction, contractor should be able to control not only the construction aspect of the project at a time but also there should be time reserved for the design of the

project; this goes at long run to reduce the overall time duration of the project. In short, the construction time will be reduced because the process of design and build is able to work parallel.

Built-operate-transfer BOT, turnkey system and management contracting opted for Refurbishment Project are completed more than the time frame have exceed the time frame given. This implies that contractor have no experience in handling the Refurbishment Project using these procurement systems.

5.2.3. Variation order incurred in using different types of procurement systems

Table 5.20 shows the mean readings for variation order incurred in using different types of procurement systems.

Table 5.20 Mean for variation works incur. in using different type of procurement systems

Percentage of Variation Works (VO)

Types of Procurement Systems	Mean
Design and Build	3.59
Traditional	**2.26**
Turnkey System	3.00
Management Procurement	3.19
Built-Operate-Transfer BOT	3.00
Total	2.84

Legend: Bold – Less variation work

In these analyses, the readings less than 2.67 are regarded as; less variation work and 2.68 to 4.0 as high variation work. From the result, it shows that Refurbishment Project using traditional procurement system has less variation works incurred.

As discussed earlier, the drawings, specification, and bill of quantities breakdown are provided by the client to the contractor. Client has a clear on the concept of design and contractor is only required to construct the works based on the detailing provided. As discussed earlier, client is required to come out with a concept design at an early stage for design and build system. Undecided and incomplete concept committed to contractor at the early stage of the project will lead to higher frequent change order by client during construction stage.

Procurement systems opted for Refurbishment Project such as built-operate-transfer procurement system, turnkey system and management contracting shows high percentage of variation works incurred. This is due to the changes of concept and design intent by the client.

5.2.4. Numbers of complaints received in using different types of procurement systems

Table 5.21 shows the mean reading for numbers of complaints received in using different types of procurement systems. In these analyses, the readings less than 2.67 are regarded as; less complaint received and 2.68 to 4.0 as high complaint received.

Table 5.21 Mean for complaints received in using different types of procurement systems

Average numbers of Complaint received

Types of Procurement Systems	Mean
Design and Build	3.15
Traditional	**2.28**
Turnkey System	4.00
Management Procurement	2.81
Built-Operate-Transfer BOT	3.00
Total	2.67

Legend: Bold – Less complaint received

The mean readings shows the Refurbishment Project based on traditional procurement system has less complained by the clients and customers, follow by management procurement; mean reading shows 2.81; which has received complaint less than the project opted for design and build, turnkey system and Built-Operate-Transfer BOT.

The traditional procurement also known as the design-bid-build system of procurement provides its clients a higher degree of quality project with more functional standards. In terms of quality, traditional procurement provides more opportunities for the clients to combine the best design, management and construction knowledge between the contractor and consultant more than that of the design-build method. The traditional procurement system also provides a high degree of quality certainty and functional standards.

In semi-structured interview, half of the contractors were in the opinion that traditional system also provides an opportunity for the building owner to combine the best design, management and construction expertise between consultants and contractor. It also provides

more time for client and consultants to review and fully develop the design and specification thus allowing better documentation preparation.

Design-build and Turnkey form of procurement system is not mean to compromise with the use of quality; nevertheless, design-build procurement systems reputation has been suffering from criticism from the owners. It is more often found that the quality of work under this contracting system tend to be questionable. The assigning of the designing and construction to a contractor has caused the client to lose control of the design and supervision of the work. This is extraordinary significant when the client does have his own team of consultants. As far the contractor is concerned, they tend to cut corners in order to maximize their profit, especially when they feel that they have underpriced their quotation during when tendering for the work.

In Management Contract and Contract Management, the management contractor or the professional construction manager tend to be more serious with the standard and quality of the work done by the package contractors. Their experience as contractor or construction manager made them more proficient and more effective in ensuring high quality works. Their knowledge and experience also made them more adept in selecting materials and components of the right type and quality (Rosli Abdul Rashid et al, 2006).

5.2.5. Numbers of Non-compliance records using different types of procurement systems

Table 5.21 shows the mean reading for non-compliance records received in using different types of procurement systems. In these analyses, the readings less than 2.67 are regarded as; less non-compliance records received and 2.68 to 4.0 as high non-compliance records received.

Table 5.22 Mean for NCR in using different types of procurement systems

Average numbers of Non-Compliance Records

Types of Procurement Systems	Mean
Design and Build	2.71
Traditional	**2.27**
Turnkey System	4.25
Management Procurement	2.75
Built-Operate-Transfer BOT	**2.00**
Total	2.49

Legend: Bold – Less non-compliance record received

The result illustrated that refurbishment project based on traditional and built-operate-transfer BOT procurement system has less non-compliance records, while the project using design and build procurement system is categorized in high non-compliance records but it is lower if compared to turnkey and management procurement system. These mean that the higher the reading, the greater the difficulties face by the contractor using different types of procurement system. In the semi-structured interview, half of the interviewees said that the non-compliance record is very much affected by method of construction and materials used for the construction. For instance, project using design and build and turnkey procurement,

will suffered for more defects as contractor is often under-priced during tender due to insufficient contract documents and they can always come out with the cheaper proposal in order to save cost.

5.3 RELATIONSHIP BETWEEN CONTRACTOR DIFFICULTIES IN USING DIFFERENT TYPES OF PROCUREMENTS TOWARDS PERFORMANCE OF REFURBISHMENT PROJECTS.

Pearson's Product Moment Correlation Coefficient Technique was employed for present study. The contractor difficulties in using different types of procurement systems are independent variables whereas Refurbishment Project performances are dependent variables.

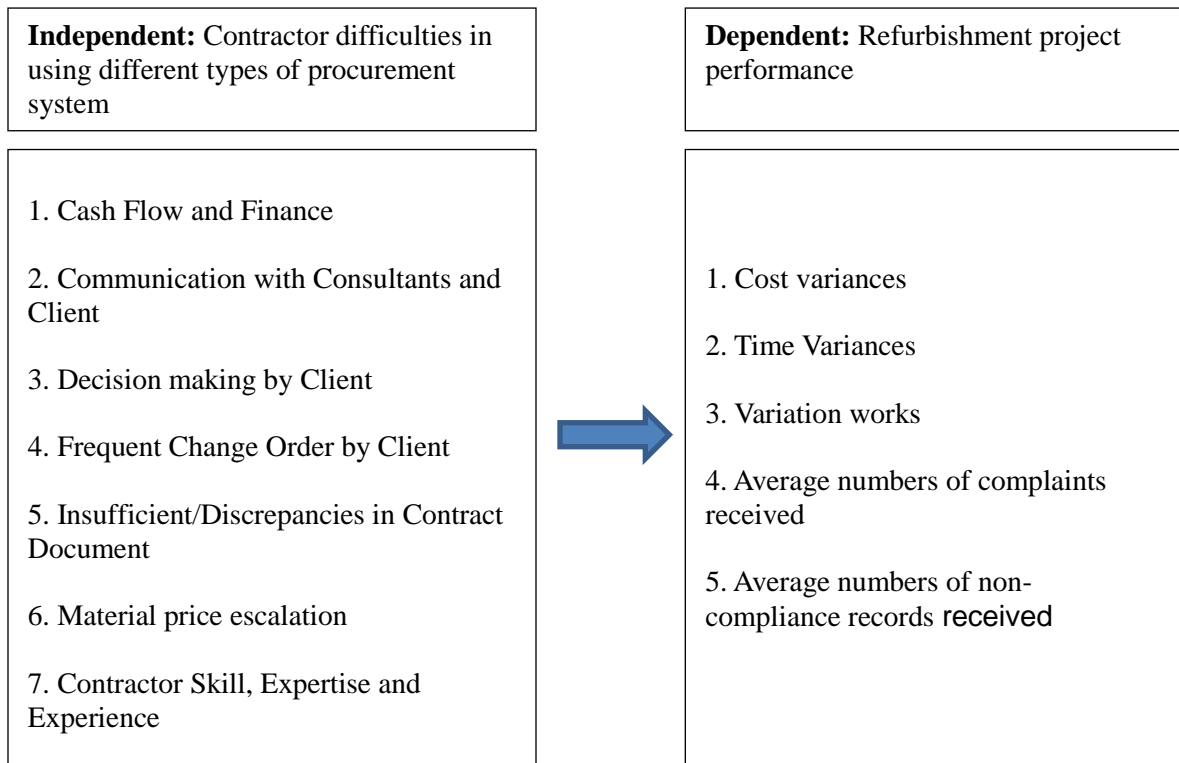| **Independent:** Contractor difficulties in using different types of procurement system	**Dependent:** Refurbishment project performance
1. Cash Flow and Finance 2. Communication with Consultants and Client 3. Decision making by Client 4. Frequent Change Order by Client 5. Insufficient/Discrepancies in Contract Document 6. Material price escalation 7. Contractor Skill, Expertise and Experience	1. Cost variances 2. Time Variances 3. Variation works 4. Average numbers of complaints received 5. Average numbers of non-compliance records received

Figure 5.2: The Correlation Test Diagram between Contractor difficulties and Project Performance Variables.

The contractor difficulties in using different types of procurement systems variables were coded in descending order from (5) very small extend to (1) very large extend. In contrast, the Refurbishment Project performance variables were coded in ascending order from low to high, as illustrated in Figure 5.3.
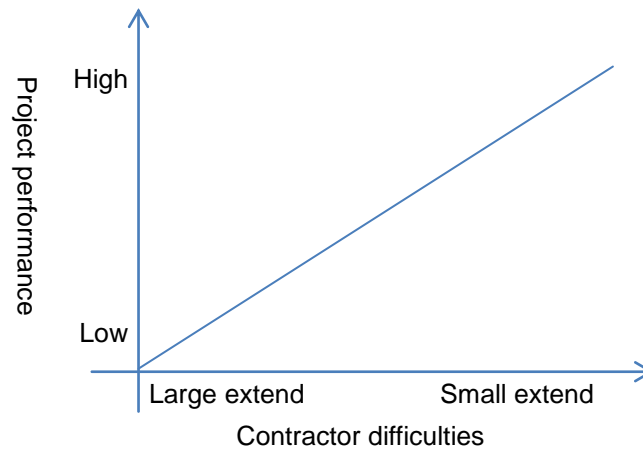

Figure 5.3: The Expected Results Diagram for Correlations Tests between Contractor difficulties variables and Refurbishment Project performance variables

In this study, independent variables refer to cash flow and finance, communication with consultant and client, decision making by client, frequent change order by client, insufficient and discrepancies in contract document, material price escalation and contractor skills, expertise and experience in handling refurbishment works whereas dependant variables refer cost variances, time variances, percentage of variation works, average numbers of complaints received and average numbers of non-compliance report. These analyses are used to achieve third objective of the present study which is; to examine relationship between problem and difficulties encountered by contractor using different types of procurements towards performance of Refurbishment Projects.

The result was expected to show a positive correlation that would indicate that lesser difficulties face by the contractor in using different types of procurement systems is associated with higher project performance in Refurbishment Projects. The results of the correlation test are shown in Table 5.23.

Table 5.23 Correlation between contractor difficulties and project performance

	Cost Variances	Variation Works (VO)	Time Variances	Numbers of Complaint	Numbers of NCR
Cash Flow and Finance	.361**	.238**	.132*	.119*	.003
Communication with Consultants and Client	.276**	.145**	.183**	.150**	.063
Decision making by Client	.195**	.159**	.166**	.137**	-.063
Frequent Change Order By Client	.294**	.463**	.072	.142**	.101
Insufficient/Discrepancies in Contract Document	.312**	.318**	.171**	.151**	.028
Material price escalation	.120*	.011	.005	.004	-.056
Contractor Skill, Expertise and Experience	.229**	.319**	.084	.076	.018

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5.23 shows that generally more positive correlations were detected in the test. This indicates that contractor difficulties using different types of procurement influence it will be discussed as following:

5.3.1. The effect of cash flow and finance towards Refurbishment Project performance

The result shows the difficulties in cash flow and finance are significant correlated with:

- Cost variances

- Percentage of variation works

- Time variances

- Average numbers of complaint received

Cash flow and financial is very important in determining project budget and actual cost. Cash inflow refers to the interim progress payment certified by client whereas cash outflow refers to the payment to sub-contractor and suppliers. In the event that cash out flow is more than cash inflow, it means that the cash flow is unhealthy and contractor will face difficulty in their financial.

Contractor difficulties in managing cash flow and financial is found significant to the cost variances (actual project cost to target project cost). Late issuance of payment by client also will cause a huge cash flow problem and financial difficulty to Contractor. Unhealthy cash flow of a project in continuous manner will cause the contractor suffer for a loss as their monthly income is less than their monthly expenses. After the works has been completed on site, contractor has lesser bargaining power to claim for certain works that are not in the contract such as variation works. For instance, contractor may not being paid for the variation works as in client opinion; the works shall be price in the contract. As a result, contractor suffer for a loss in profits as payment for the sub-contractor and supplier have

been make and the additional works are not able to claim from the client. Therefore, a good and healthy cash flow and financial is very crucial in ensuring the performance of project cost.

Secondly, difficulties in cash flow and financial also found is significant with percentage of variation works. Due to unhealthy or poor cash flow and financial, contractor may work for extra miles to claim for the variation works. For instance, in design and build procurement system, contractor may claim certain of the works may not been price in the contract as the design intent and specification provided are not sufficient in tendering stage. In this case, it will prompt to high variation works. In the event that client refuses on that, contractor may come out with an alternative proposal with cheaper materials. This will cause poor quality and consequently lead to high defects and at the end of the day, client will make complaints on the works. The result also indicates that difficulties in cash flow and financial is significant with the average numbers of complaints received.

Besides that, difficulties in cash flow and financial also found is significant with time variances. This finding result is supported by Abdul Kadir, et al. (2005) and Bartholomew (1998) who mentioned that most contractors do not have an excellent financial standing and they are sub-contracting most of the works. The progress and speed of the refurbishment works is largely depend on the efficiency and availability of the workers. In the event late issuance payment from client, the contractor is facing difficulty in paying or not able to pay to the sub-contractor and suppliers. This indirectly will give an implication in stoppage of material delivery on site and sub-contractors tend to reduce speed and stop works at site.

The result implies that a healthy cash flow and financial during the construction stage is required to ensure the contractor complete their job within determined budget, reduce percentage of variation works, assist contractor in payment certification which can avoid delay in the progress. Moreover, with the health financial will encourage contractor perform in term of quality.

5.3.2. The effect of communication with consultants and client towards Refurbishment Project performance

The effect of contractor in having difficulties in communication with consultants and client shows four significance correlations as follow:

- Cost variances
- Percentage of variation works
- Time variances
- Average numbers of complaint received

Higgin and Jessop (1965), Thomas et al. (1998), Franks (1998), and Somogyi (1999) mentioned that the efficiency and effectiveness of the refurbishment process strongly depend on the quality of communication. For instance, improvement in the communication within the parties involved could reduce failure and smoothen of the project. In the semi-structured interview, half of the interviewees commented that failure in communication may cause actual project cost incurred higher than budgeted cost, delay in the project, increase of variation works and poor quality of the works.

For instance, lack of communication between contractor and consultants and client may cause the information given are not convey among the parties and contractor may constructed the works on site without knowing the changes or instruction given. This will consequently cause argument and dispute between contractor and consultants which will lead to hacking and re-do and repeated works on site. As a result, the project will incurred a higher cost as contractor required additional overhead and materials to do the hacking and reinstallation works. Due to this, the progress may delay as it will cause other elements or part of building could not be constructed / installed.

In addition to the above, if the communication failure is part of the client fault, contractor is entitled to claim for variation works and client has to issue a variation order to contractor to adjust the contract sum. Other than that, in order to catch up the programme and to avoid any liquidated ascertained damage (LAD), contractor may accelerate the works without much concern on the quality. For instance, concreting of foundation must require 14 days for curing process; however, in order to catch up for the progress the contractor may start for the column works before the foundation is fully cured. This will consequently cause poor quality of the works and lead to major defect works in future. As a result, contractor may receive high numbers of complaints from the client due to the poor quality.

This implies that effectiveness communication between client, consultant and contractor is crucial in order to ensure the project is completed within budget, time frame and quality. In addition, it may also reduce variation works and additional cost to client.

5.3.3. The effect of client decision making towards Refurbishment Project performance

The effect of contractor difficulties in client decision making shows four significance correlations as follow:

- Cost variances

- Percentage of variation works

- Time variances

- Average numbers of complaint received

Contractors' difficulties in client decision making is found significant to the cost variances (actual project cost to target project cost) and percentage of variation works. Client plays an important role in deciding and solves the issues and problems that may give a huge impact in cost, time and quality. In the semi-structured interview, 8 of the interviewees said that inexperience client in refurbishment works is not able to make a prompt decision on the problems highlighted whereas some of the clients make a wrong decision and it has caused increase in variation works as well as the costs.

Although contractors are able to claim for the variation works due to the wrong and slow decision making, contractor is also suffering for certain cost that might not able to be claimed; which are overhead and machineries cost. For instance, slow decision making by client may cause idling of the machineries such as crane, generator set, compactor, and any

others. Therefore, slow and wrong decision making not only will affect the additional works and cost to client but also will give impact to the contractor in terms profits and loss.

In addition to that, contractor difficulties in client decision making also found significant with the time variances and number of complaint received. Slow and wrong decision making by client also will cause delay in the site progress. The delay of the decision may lead stop work or changes of sequence of construction for the Refurbishment Projects. As a result, contractor has to expedite and accelerate the work progress on site and this may affect the quality of the works. Ahuja et al. (1994) pointed out that a right and fast decision making can prevent delay in a Refurbishment Project especially in fast track project.

The result implies that a prompt and appropriate decision making by client during the construction stage is crucial to ensure and determine project performance in terms of cost, time and quality. Moreover, with the prompt and appropriate decision it can reduce percentage of variation works and cost to the client.

5.3.4. The effect of frequent change order by client towards Refurbishment Project performance

The effect of contractor difficulties in frequent change order by client is significant correlated with:

- Cost variances
- Percentage of variation works

- Average numbers of complaint received

Client needs for the projects are normally described through the briefing process. Designers will translate the client needs by producing a concept followed by detailed design. However, client frequently change their preferences throughout the design process and some clients are not able to prepare an adequate and sufficiently comprehensive brief.

Without adequate and sufficient comprehensive brief, it is difficult for the designers to complete the design before work starts on site. The "theoretically completed" design, which keeps on changing, requires the designers to allocate an amount of provisional sum in the contract to cater for the uncertainty in the client's needs. This result supports statements by Gregory A. H. (2002) who stated that design changes were caused by clients changing their needs as the project progresses. This will result to additional variation works and costs to client.

In addition, contractor facing difficulties in frequent change order by client is also significant with cost variances and average numbers of complaints received. Variation works due to changes of drawings may give a huge possibility in re-do and hacking works. Contractor with low productivity and poor in controlling labours and machineries will cause increase in man powers and machineries cost. Besides that, in the event contractor underpriced the items in the contract, any variation works shall be followed contract rate; which mean that contractor have to proceed to the variation works although there is no profits on works. As a result, contractor may use cheaper materials in order to cover the losses.

This implies that frequent change order by client during construction works in progress will give impact to the project performance in terms of additional variation works, additional cost and poor quality.

5.3.5. The effect of contract difficulties in insufficient and discrepancies in contract document towards Refurbishment Project performance

The effect of contract difficulties in insufficient and discrepancies in contract document shows four significance correlations as follow:

- Cost variances
- Percentage of variation works
- Time variances
- Average numbers of complaint received

Contract documents consist of conditions of contract, specification, drawings and bill of quantities (BQ). As discussed earlier, Okoroh (1992) has pointed out that inadequacy the specifications from the architects make it difficult for contractors to define the exact scope of work in advance. Due to this, the planning and control of refurbishment works tend to be difficult in determining the actual time and cost of the works and in producing method statements and programmes (CIOB, 1987). As a result of poor planning and control, it will cause delay in the project, higher cost incurred by contractor due to wrong construction sequence, increase percentage of variegation works and additional cost to clients and resulting in poor quality of the works. Therefore, sufficient contract document such as

detailing specification, drawings, and bill of quantities are required for ensuring the project is well perform in terms of cost, time and quality.

5.3.6. The effect of contractor difficulties in material price escalation towards Refurbishment Project performance

A significant correlation was detected for the variable material price escalation with cost variances. Abdul R., Ayub and Janidah (2006) pointed out that contractor is commonly facing problem in materials price escalation. As discussed earlier, half of the interviewees clarified that refurbishment works are differing with new project. The materials for refurbishment works especially historical building are limited in Malaysia market and some of the materials have to be imported from other country. Due to its limitation, the price is control by the suppliers. In the event that the demand increases, the price will increase and contractor is suffered for the losses of profits. Therefore, contractors must be able to foresee on the market price in tendering stage.

5.3.7. The effect of contractor difficulties without skill, expertise and experience towards Refurbishment Project performance

Table 5.23 revealed two significant correlations for the contractor difficulties in skill, expertise and experience with:

- Cost variances
- Percentage of variation works

The BRE (1990) cited that due to the condition of the existing building is uncertain; the responsibilities of the organizations and individuals on site cannot be clear-cut. Refurbishment work proceeds as a succession of technical problems requiring quick solutions. Frequently, techniques and methods of repair have to be uniquely developed for each building, eve n for similar building s built in the same period. Consequently, to plan and incorporate al l uncertainties s would be extremely difficult.

Therefore, skill, expertise and experience contractors especially in design and build project is a must in ensuring the project can be perform within budget and lesser variation works. Skill and experience contractor able to come out with the design in cost savings and also reduce variation works by suggests better technical solutions.

The correlation test results in Table 5.23 indicate that there are significant correlations between the contractor difficulties in using different types of procurement systems variables and the Refurbishment Project performance variables. Seven out of seven contractor difficulties variables tested were correlated with at least one Refurbishment Project performance variable.

The result of interrelationships of the contractor difficulties variables and the project performance variables are illustrated in Figure 5.3.
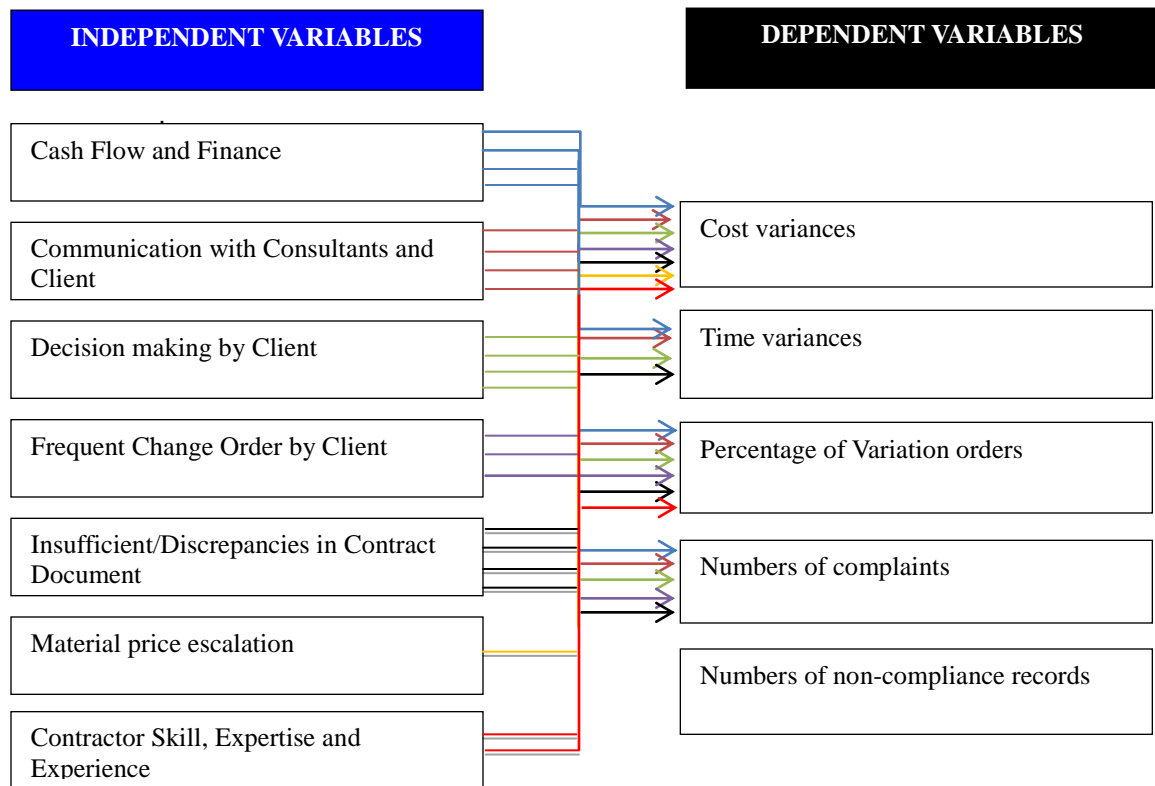
INDEPENDENT VARIABLES		DEPENDENT VARIABLES

Cash Flow and Finance

Communication with Consultants and Client

Decision making by Client

Frequent Change Order by Client

Insufficient/Discrepancies in Contract Document

Material price escalation

Contractor Skill, Expertise and Experience

Cost variances

Time variances

Percentage of Variation orders

Numbers of complaints

Numbers of non-compliance records

Legend: ——————— Significant correlation

Figure 5.4: Interrelationships of the contractor difficulties variables and the project performance variables

5.4 SUMMARY OF CHAPTER

In the present study, 24.53 % response rate was obtained from 1500 questionnaires. This chapter was divided into three sections; which first section consist of descriptive frequency that has discussed on the data obtained including all personal data and classification such as particulars, Refurbishment Project characteristics, types of procurement system, difficulties and problems faced by contractor. In section two, mean readings for difficulties face by contractor and project outcomes by using different types of procurements system has been discussed. The Refurbishment Projects performance shows that Refurbishment Projects using traditional procurement systems were completed within budget, time, quality and less

variation works whereas project opted design and build procurement systems were completed within time frame but however it has exceeded budget and with unsatisfactory qualities. Besides that, project based on turnkey system, management systems and built-operate transfer BOT were not completed within budget, time and quality. This was due to the difficulties face by contractor in using traditional procurement system for Refurbishment Project is less if compared to other procurement systems.

In section three, relationship between contractors difficulties in using different types of procurement systems towards Refurbishment Project performance were discussed. In summary, seven out of seven contractor difficulties variables tested were correlated with at least one Refurbishment Project performance variables. Independent variables for contractor difficulties are cash flow and financial, communication with client and consultants, client decision making, frequent change order by client, insufficient or discrepancies of contract documents, material price escalation and skill, expertise and experience while depend variables for Refurbishment Project performance are cost variances, time variances, number of complaint received, number of non-compliance order, and percentage of variation works. It can be summarized that all of the independent variables have significant correlation with the cost variances whereas six, 6 numbers of independent variables which are cash flow and financial, communication with client and consultants, client decision making, frequent change order by client, insufficient or discrepancies of contract documents and skill, expertise and experience has significant correlation with percentage of variation works. There are only four, 4 numbers of independent variables have significance correlation with time variances which are cash flow and financial, communication with client and consultants, client decision making and

insufficient or discrepancies of contract documents. Besides that, five, 5 numbers of independent variables which are cash flow and financial, communication with client and consultants, client decision making, frequent change order by client, insufficient or discrepancies of contract document have significant correlation with numbers of complaints received. However, there is no significant correlation found between all of the independent variables with number of non-compliance records issued.

CHAPTER 6

CONCLUSION AND RECOMMENDATION

6.0 INTRODUCTION

This chapter summarized the overall findings of this study that regard to project procurement approach. The conclusions are derived from the main findings of the study as discussed in the previous chapter. At the end of this chapter, some recommendations are made regarding the potential area in refurbishment management that requires further investigation.

6.1 SUMMARY OF THE FINDINGS

From the literature reviews in the areas of refurbishment works, procurement systems, contractor difficulties, and key performance indicator, a theoretical framework was developed to provide a framework and guide for this study. Before distributing the final questionnaire surveys, a total numbers of thirty five, 35, pilot questionnaires surveys were distributed to the selected contractor companies to ensure the questionnaire design is clear and understand by the respondents. Before the questionnaires were sent out to the respondents, it was piloted on thirty five, 35 potential respondents. Some of the comments

and suggestions from the pilot survey were taken into consideration before the actual distribution of the questionnaires was made. Final questionnaire surveys were then distributed to one thousand five hundred, 1500 contractor companies in Malaysia. A period of two months was allocated to receive replies.

Four Hundred and Ten, 410 closed-ended questionnaires were obtained but three hundred sixty eight, 368 questionnaires were found to be useful for data analysis, giving a final response percentage of approximately 24.53 %. Out of this percentage, almost 60% of the respondents were manager and director level and 63.3% of them had more than 10 years' experience in construction industries. Semi-structured interview was then carried out to fifteen, 15 selected contractor companies in Malaysia. From the findings, the aims and objectives formulated for this study are discussed as following:

6.1.1 Objective 1: To identify types of procurement methods used in Malaysian refurbishment projects.

From the results obtained from the questionnaire surveys and semi-structured interview, it's concluded that traditional procurement systems are the most preferred system used in Malaysia Refurbishment projects, then followed by design and build. Management procurement, Turnkey system and built-operate transfer, BOT are less used in refurbishment project. 60% of the refurbishment projects were exceeded RM2, 000,000 contract values. Most of the projects were carried out in big scale. However, despite large scale of the refurbishment projects size, it still completed within targeted time, cost and quality.

The refurbishment project performance in using different types of procurement systems is illustrated in Table 6.1.

PROCUREMENT/PERFORMANCE	COST	TIME	% VO	COMPL	NCR
TRADITIONAL SYSTEM	✧	✧	✧	✧	✧
DESIGN & BUILD SYSTEM		✧			
TURNKEY SYSTEM					
MANAGEMENT CONTRACT SYSTEM					
BUILT-OPERATE-TRANSFER, BOT					✧

Legend: √ - Within targeted (perform)

Table 6.1: Refurbishment project performance in using different types of procurement systems

Table 6.1 summarized the performance of the refurbishment projects in using different types of procurement systems. The result shows that most of the traditional procurement system is completed within cost, time and quality. There are three types of traditional procurement method which consist of lump sum contract, measurement contract and cost reimbursement/cost plus contract. Findings from in the semi-structured interview revealed that cost reimbursement/cost plus are the best option opted for Refurbishment Project due to the activities carried out are uncertain. These mean that contractor is being paid for an agreed fee to cover management, overheads and profits.

6.1.2 Objective 2: To identify problems and difficulties encountered by contractor using different types of procurement systems in refurbishment projects.

The identification of variables was made through an extensive review of the literature. The identified variables were validated through semi-structured interview. Seven contractor difficulties variables were identified as following:

    i.   Cash flow and financial

   ii.   Material price escalation

  iii.   Lack skill, expertise and experience

  iv.   Lack of communication

   v.   Frequent Change Oder

  vi.   Slow decision making

 vii.   Discrepancies/insufficient contract documents.

Generally, greater part of the contractors were suffered on high extend of difficulties in managing refurbishment project using different types of procurement systems. In using design and build procurement system, contractors were suffered higher extend of difficulties in cash flow and financial, lack of communication, slow decision making by clients, frequent change order, insufficient/discrepancies in contract documents and lack of skill, expertise and experience staffs/workers if compared to other type of procurement systems. On the other hand, contractors facing higher extend of difficulties in material price escalation in using Built-operate-Transfer, BOT type of procurement system.

6.1.3 Objective 3: To establish relationship between problem and difficulties encountered by contractor using different types of procurements towards performance of refurbishmentprojects.

Twelve dependent and independent variables were tested using statistical analysis software to identify for a significant correlation between contractor difficulties in using different types of procurement systems and refurbishment project performance. To examine the relationship between problem and difficulties encountered by the contractor using different types of procurement towards project performance, statistical analysis using a correlation test was employed. The correlation coefficients (namelyPearson's Product Moment Correlation Coefficient Technique) were used in order to establish whether significant relationship existed among these variables. Seven out of seven contractor difficulties variables (independent) tested were correlated with at least one Refurbishment Project performance variable (dependent):

1. The difficulties in cash flow and finance are significant correlated with four
    performance variables:

    i.   Cost variances

    ii.   Percentage of variation works

    iii. Time variances

    iv.   Average numbers of complaint received

2. The effect of contractor in having difficulties in communication with consultants and client shows four significance correlations as follow:

    i.   Cost variances

    ii.   Percentage of variation works

    iii.   Time variances

    iv.   Average numbers of complaint received

3. The effect of contractor difficulties in client decision making are significance correlated with four dependent variables as follow:

    i.   Cost variances

    ii.   Percentage of variation works

    iii.   Time variances

    iv.   Average numbers of complaint received

4. The effect of contractor difficulties in frequent change order by client is significant correlated with:

    i.   Cost variances

    ii.   Percentage of variation works

    iii.   Average numbers of complaint received

5. The effect of contract difficulties in insufficient and discrepancies in contract document shows four significance correlations as follow:

     i.   Cost variances

    ii.   Percentage of variation works

   iii.   Time variances

   iv.   Average numbers of complaint received

6. A significant correlation was detected for the variable material price escalation with cost variances.

7. The contractor difficulties in skill, expertise and experience are significant correlation with:

     i.   Cost variances

    ii.   Percentage of variation works

6.2 RECOMMENDATION FOR FURTHER RESEARCH

1. A similar study should be carried out in other countries. A comparative study is required with the same aims and objective to further validate the research findings and the theoretical framework.

2. Similar research could be carried out by using different profession as respondents such as developers/clients and consultants. The results obtained shall be compared with this study results to obtain further validation.

3. A similar study shall be carried out with smaller sized refurbishment projects, which is less than RM 500,000.00. The results shown for this study were in large size refurbishment contract value. This would allow a comparative analysis to be made for all sizes of refurbishment projects.

4. Further study on the criteria's and factors that are require taking into consideration in selecting types of procurement systems for refurbishment project.

REFERENCES

Abdel-Razek, R.H. (1997). How construction managers would like their performance to be evaluated. Journal of Construction Engineering and Management 123(3), 208–213.

Abdullah, A.R. (1995). Implication of the CIDB Act 1994 on the Malaysian Construction Industry.*Unpublished paper.*Construction Industry Development Board Malaysia.

Abdul K., Lee, W. P., Jaafar, M.S., Sapuan, S.M., and Ali, A.A.A. (2005). Factors affecting construction labour productivity for Malaysian residential projects. *Structural Survey, Vol. 23 Iss: 1*, pp.42 - 54

Abdul R., Ayub and Janidah (2006) A study on the problems encountered by organizations in the implementation of quality management system ISO 9001:2000 in construction industry. (case study location: Klang Valley Area, N. Sembilan, Melaka And Johore- 2 Site- Visits Per Location)

Addleson, L., and Rice, C. (1991). Performance of Materials in Building. Butterworth-Heinemann: London.

Ahuja, H. N. Dozzi, S. P., and Abourizk, S. M. (1994).Project Management: Techniques in planning and controlling construction projects, 2nd Ed. New York.

Aikivuori, A. (1996). Periods of demand for private sector housing refurbishment.*Construction Management and Economics Journal, Vol.14,* pp.3-12.

Al-Jibouri S.H. (2003). Monitoring systems and their effectiveness for project cost control in construction. 'International Journal of Project Management', Vol. 21, No. 2, pp. 145-154(10)

Ali, A.S., Rahmat, I., and Hassan, H. (2008). Involvement of key design participants in refurbishment design process, *Facilities. Vol. 26 No. 9/10,*pp 389-400

Ali, A. S., Syahrul N. K., and Hafez S. (2009).The characteristics of refurbishment projects in Malaysia.*Facilities Vol. 27* No. 1/2, pp. 56-65

Ali, A. S., Norhanim Z. and Adi-I.C.-A. (2011). The Effect of Procurement System towards the Performance of RefurbishmentWorks: Faculty *of Built Environment, University of Malaya, Kuala Lumpur, Malaysia Conference*

Ashworth, A. (2001). Contractual Procedures in the Construction Industry. UNITEC, New Zealand

Assaf. S. A., and Al-Hejji, S. (2006). Causes of Delay in Large Construction Projects.*International Journal of Project Management 24:*349- 357

Assaf, S. A., Al-Khalil, M. and Al-Hazmi, M. (1995).Causes of Delay in Large Building Construction Projects.*Journal of Project Management in Engineering ASCE, 2;* 45-50.

Atkin, B., Borgbrant, J. and Josephson, P.E. 2003, Construction Process Improvement, Blackwell Science.

Atkinson, A.A., Waterhouse, J.H., and Wells, R.B. (1997). A stakeholder approach to strategic performance measurement. Sloan Management Review; Cambridge, 38 (3) pp 25-37.

Baker, B.N., Murphy, D.C., and Fisher, D. (1983).*Factors affecting project success.* In: D.I. Cleland, (ed.). Project Management handbook. New York: Van Nostrand Reinhold.

Barret, P. 1995, Facilities Management: Towards Best Practice, Blackwell Science.

Bartholomew, S.H. (1998). Construction contracting/ Business and legal principles. N.J.

Beger, H., Wolf, H.F. and Ullmann, E. (1989). *Handbook der SozialistischenForschung, Methodologies, Method, Techniques*. Berlin: Academy Verlag.

Belassi, W. and Tukel, O.I. (1996) A new framework for determining critical success/failure

    factors in projects. International Journal of Project Management. 14(3), 141–151.

Bititci, U.S. (1994). Measuring your way to profit. Management Accounting. 32(6), 16–24.

Bower, D. (2003). Management of procurement. London: Thomas Telford Publications.

Boyd, D. and Jankovich, L. (1993). The limits of intelligent building refurbishment.*Journal

    of Property Management, Vol 11, no.2,* 102-113.

Boyd, D. and Weaver, P. (1994).Improving the management and operations of

    refurbishmentprojects.*Proceedings of the 10th ARCOM Annual Conference*.

    Loughbrough University of Technology, Leics, 14-16 September

Brown, D.M. and Laverick, S., (1994) Measuring corporate performance. Long Range

    Planning. 27(4), 89–97.

Brown, S. A. (2001). Communication in the design process.Spon Press.

British Research Establishment (1990). *Assessing traditional housing for rehabilitation*.

    HMSO: London, UK.

Chartered Institute of Building (CIOB) (1987). Code of Estimating Practice Supplement

    One: Refurbishment and Modernization. CIOB: Ascot.

Cheung, K.K.W., Henry, C.H.S., Cheung, S.O. (2004), 'PPMS: a Web-based construction

    Project Performance Monitoring System' Construction Dispute Resolution Research

    Unit, Department of Building and Construction, City University of Hong Kong.

Chinyio E.A, Olomolaiye P.O., and Corbett, P. (1998) An evaluation of the project needs of

    UK Building clients. International Journal of Project Management. 16(6), 385–391.

Chua DKH, Kog YC, Loh PK (1999), "Critical success factors for different project

    objectives." Journal of Construction Engineering and Management, pp. 142-150

Churchill, G.A. and Iacobucci, D. (2004).*Marketing research: Methodological foundations*.

9th ed. Ohio: Thomson South-Western.

CIDB (2007). CIDB Statistics 2006-2011. Construction Quarterly Statistical Bulletin –

Fourth Quarter 2006, CIDB, Malaysia

CIB (Construction Industry Board Working Group) (1997). Briefing the Team, Thomas

Telford.

CIDB

Websitehttp://www.cidb.gov.my/cidbweb/index.php?option=com_content&view=ar

ticle&id=217&Itemid=313&lang=en

Construction Industry Research and Information Association (1994). A guide to

management of building refurbishment. CIRIA Report No 133, Construction

Industry Research and Information Association, London.

Construction Industry Board (1998) Key performance indicators for the construction

industry. London: Construction Industry Board.

Construction Productivity Network (1998) Conference report on performance measurement

in construction. (Report CPN816L) London: Construction Industry Research and

Information Association.

Cordero, R., (1990) The measurement of innovation performance in the firm: an overview.

Research Policy, 19, 185-192.

Crawford, P. and Bryce, P. (2003). Project Monitoring and evaluation: a method for

enhancing the efficiency and effectiveness of aid project implementation.

International Journal of Project Management, pp. 363-373

Creswell, J. (1994). *Research Design – Qualitative and Quantitative Approaches*.

California: SAGE Publications.

Cuff, D. (1996). Architecture: The Story of Practice, MIT Press.

DETR (1998). The Report of the Construction Industry Task Force: Rethinking
Construction. The Egan Report, HMSO.

Drucker, P. F. (1974). Management. tasks, responsibilities, practices. London: Heinemann.

Douglas, J. (2004). Building Adaptation. Butterworth-Heinemann: Oxford.

Du Plooy, G.M. (1995). *Introduction to Communication: Course Book - Communication
Research*. Keuwyn: Juta.

Edmonds, G.A., and Miles, D.W.J. (1984).*Foundations for change: aspects of the
construction industry in developing countries.* London: Intermediate Technology
Publications Ltd.

Egan, J. (1998). Rethinking Construction, Department of the Environment, Transport and
the Regions and HMSO, London.

Egbu, C.O. (1994). Management education and training for refurbishment work within the
construction industry. PhD. thesis. Department of Civil Engineering, University of
Salford, Salford..

Egbu, C. O. (1996). Characteristics and Difficulties Associated with Refurbishment,
Construction Papers No.66, CIOB, Ascot.

Egbu, C.O., Young, B.A. and Torrance, V.B. (1998).Planning and control processes and
techniques for refurbishment management. *Journal of Construction Management
and Economics, Vol. 16,* pp. 315-325.

Emma, K. (2010). Effective implementation of Design – Build Procurement In Ghana, Bsc
of architectural technology and construction management.

Emmerson, H. 1962, Survey of Problems Before the Construction Industries: A Report
prepared for the Minister of Works, HMSO.

Emmitt, S. and Gorse, C. (2003). Construction Communication, Blackwell Publishing Ltd.

Fellows, R.F. (1993).*Contracts for Refurbishment.*School of Architecture and Building

Engineering, University of Bath Press, Bath.

Fiedler.,K. (1987). Special conditions for time scheduling of building modernization

process.*International Journal of Project Management, 9 (1),* Butterworth-

Heinemann, 53-60

Flanagan, R., Norman, G., Meadows, J., and Robinson, G. (1989).Life Cycle Costing

Theory and Practice. BSP Professional Books: Oxford.

Frankfort-Nachmias, C. and Nachmias D. (1996). Research Methods in the Social

Sciences.St. Martin's Press.

Franks, J. (1998). Building Procurement Systems, 3rd edition.Longman.

Frederick E., Gould and Nancy E. Joyce.(2003). *Construction Project*

*Management.*Prentice Hall.

Gidado, K and Barter, G (1996). The constraints to effective information flow in the

construction management procurement system. Journal of Construction

Procurement, 2(2), 52–68.

Goddard, W. and Melville, S. (2004). Research Methodology: An Introduction. Juta and

Company Ltd.

Goldfayl, G. (1999). Construction Contract Administration. Victoria: Deakin University

Press.

Gray, C., Hughes, W. and Bennet, J. (1994).The Successful Management of Design. The

University of Reading Centre for Strategic Studies.

Gregory A. H. (2002). Renovation projects: Design process problems and improvement mechanisms Panagiotis Mitropoulos. *Journal of Management in Engineering 2002;18(4):*179-185.

Grinnel, R.M. (1993). *Social work research and evaluation*. 4th Ed. Illinois: F.C. Peacock Publishers.

Guba, E.G., and Lincoln, Y.S. (1989).Fourth generation evaluation. Newbury Park, CA.

Gwen F., J. J. (1998). Field-Level Management's Prespective of Design/Build. American Society of Civil Engineers.

Hamilton, B. (2003). Preventive and corrective maintenance of buildings. Presented at 2nd Building Management and Maintenance Seminar, Enhancing Quality Through Expanding Systems, Kuala Lumpur, 22-23 December.

Hammersley, M., and Atkinson, P. (1983). Ethnography, principles in practice. London: Tavistock Publications.

Harvey, R.C. and Ashworth, A. (1997) The construction industry of Great Britain. London: Laxtons.

Higgin, G. and Jessop, N. (1965). Communication in the Building Industry: The Report of a Pilot Study,Tavistock.

Hardcastle, C., Holmes, A., and Nairn, C. (1997). Requirements from refurbished office spaces: the views of occupiers, planners and developers. A paper presented at the RICS Cutting Edge Conference, University of West of England, Bristol.

Hardcastle C. and J.E. Tookey, (1998).Re-engineering the Building Procurement Decision Making Process. Department of Building and Surveying, Glasgow Caledonian University: Cobra 1998 Conference

Hashim A.E., (2004). Planning and control of safety in construction refurbishment projects, Unpublished PhD Thesis, UniversitiTeknologi MARA, Shah Alam, Malaysia.

Hatush, Z. and Skitmore, M. (1997) 'Evaluating contractor prequalifi cation data: selection criteria and project success factors', Construction Management and Economics, 15(2), 129-147.

Hollis, M., and Gibson, C. (2004).Surveying Buildings, 4th ed. RICS Business Services Limited, Coventry.

Hill, C.J. (1995). Communication on construction sites.Proceedings of 11th Annual Conference of Association of Researchers in Construction Management, September 18-20, University of York.

Hopkins, W.G., 2000, May 4. *Quantitative research deisgn*. New Zealand: Department of Physiology and School of Physical Education,University of Otago, Dunedin

Hovet, T. D. (1994). Allowing the Design/Build Project Delivery Method in the Procurement of Public Construction Contracts. www.cascadepolicy.org/bgc/build. htm (assessed March 16, 2004).

Huges, W., Hillebrandt P., Greenwood D., and Kwawu W., (2006).Procurement in Construction Industry.The impact and cost of alternative market and supply process. Taylor & Francis is an imprint of the Taylor & Francis Group, an informa business, published in the Taylor & Francis e-Library

Idoro, G.I. (2008) 'Effect of mechanisation on project performance in the Nigerian construction industry', in proceedings of the RICS Construction and Building Research Conference COBRA 2008, Dublin, 4-5 September.

Industrial Market Research (1987).Private Office Refurbishment-The Current Market and Future Prospects. A report commissioned by Touche Ross, London.

International Labour Office (1987).Guidelines for the Development of Small-Scale Construction Enterprise Geneva.

IrHarbans Singh K. S. (2007).Engineering and Construction Contracts Management (Law and Principles). Singapore: LexisNexis.

Jobber, D. (1996).Improving response rate in industrial mail surveys.Industrial Marketing Management. 15: 183-185.

John R. M. (Revised 2000 & 2001). What's in a name? Complexities in the definition of refurbishment. School of Property and Construction, Nottingham Trent University, Nottingham, UK

Jones Lang Wooten, Estates Gazette and South Bank Polytechnic (1989).The Glossary of Property Terms. Estates Gazette: London.

Josephson, P. E. and Lindstrom, J. (2007).Measuring Performance in Construction Projects.Proceeding of the CIB World Building Conference on Construction for Development, Cape Town, South Africa, 14 – 18 May 2007, pp 383-394

Kangari, R. Farid, F. and Elgharib, H. M. (1992). Financial Performance analysis for construction industry. Journal of Construction Engineering and Management, ASCE, 118 (2):349-361

Kartam, N.A. (1999). Design construction integration: issue and illustrative prototype. *Journal Engineering, Construction and Architectural Management, Vol. 6 No. 3,* pp. 299-314.

Kay, J (1993) Foundations for corporate success. Oxford: Oxford University Press.

Keller, G., and Warrack, B. (2004). Statistics for management and economics. Pacific Grove, CA: Thomson/Brooks/Cole

Khairul N. F. B. M. (2007). Building Refurbishment Project In Malaysia. Faculty of Civil Engineering, University Teknologi Malaysia

Kincaid, D. (2003). Adapting Buildings for Changing Uses, Guidelines for Change of Use Refurbishment. Spon Press: London.

Kingdon, D.R. (1973). Matrix Organization, Tavistock, London

Kometa, S.T., Olomolaiye, P.O., and Harris, F.C. (1995). An evaluation of clients' needs and responsibilities in the construction process. Engineering, construction and Architectural management, 2 (1), pp. 57-7

Kong, A. T., and Gray, J. (2006). Problems With Traditional Procurement in the Malaysian Construction Industry - a Survey . In Runeson, Goran and Best, Rick, Eds. Proceedings Australasian Universities Building Educators Association Annual Conference, pages pp. 1-21, University of Technology, Sydney.

Latham, M. (1994) Constructing the Team: Final Report of the Government/Industry Review of Procurement And Contractual Arrangements in the UK Construction Industry. London:HMSO.

Lee, R. (1987). Building Maintenance Management (3rded). BSP Professional: Oxford.

Leedy, P. D. (1993). Practical Research Planning and Design. 5th ed. New York: Macmillan Publishing Company.

Leedy, P. (1997). Practical research: Planning and design. 6th ed. New Jersey: Prentice-Hall.

Lenard, D. and Eckersley, Y. 1997, Driving Innovation: the Role of the Client and the Contractor, Report No. 11, Construction Industry Institute, Adelaide, Australia.

Liaw, Shu H. and Goh, Kim L. (2002) Biases in student evaluation of teaching: The case of Faculty of Economics & Administration, University of Malaya (Kuala Lumpur, Malaysia, Dept. of Applied Statistics, Faculty of Economics & Administration, University of Malaya).

Lind, D.A,,Marchal, W.G. and Wathen, S.A. (2003). Basic Statistics For Business and Economies. McGraw Hills, United States.

Ling, F. Y. Y. (2004.) Key Determinants of Performance of DBB Projects in Singapore. Building Research and Information, 32(2), 128-139

Ling, F. Y. Y., and Chan, S. L. (2002).Performance Evaluation of Alternative Project Procurement Methods. Research Brief. Department of Building, School of Design and Environment, National University of Singapore.

Love, P. E. D., Skitmore, R. M. and Li, H. (1997).Toward an Innovative Procurement.*Construction Management and Economics Journal.*

Love, P.E.D., Skitmore, R.M., & Earl, G. (1998).Selecting a suitable procurement method for a building project. *Construction Management and Economics Journal, 16(2),* pp.221-233

Lynn, P. (2004). Measuring and Communicating Survey Quality.Journal of the Royal Statiatical Society Series A 167 (4). London: Blackwell Publishing.

Markus, A.M. (1979). Building Conversion and Rehabilitation: Designing for Change in Building Use. Newnes-Butterworth: London.

Marsh, P. (1983). The Refurbishment of Commercial and Industrial Buildings, Construction Press, London, p. 3.

Martin, R. (2000). Pitfalls to be Avoided by Design and Build Contractors. www.jrk.com.my/articles/pitfalls.htm (retrieved March 16, 2012).

Master Builders (1989, 1990). *Joint Call to Curb Price Surge*. Master Builders, pp. 30-36.

Masterman, J.W.E. (1992). An Introduction to Building Procurement Systems. London: E & FN Spon.

Masterman, J. W. E. (1996). Building Procurement Systems: An Introduction. E & FN Spon: London

Masterman J. W. E. (2002). Introduction to Building Procurement Systems. London; New York: Spon Press.

Mbugua, L. M., Harris, P., Holt, G. D., and Olomolaiye, P. O (1999). A framework for determining critical success factors influencing construction business performance. In: Hughes, W. (ed) Procs. 15th Annual ARCOM Conference. September 5-7, Reading: ARCOM. 1: 255-264

Mo, J. K. W., and L. Y. Ng. (1997). Design and Build Procurement Method in Hong Kong – An Overview. In Procurement – A Key to Innovation, 453-462. Canada: CIB Proceeding.

Mackinder, M. and Marvin, H. (1982), 'Design: Decision Making in Architectural Practice', in BRE Information Paper, Ip 11/82, July.

Mansfeild N.R, Ugwu O.O and Doran T. (1994). Causes of delay and cost overruns in Nigerian construction projects.*International Journal of Project Management, 12 (4),* 254-60.

McLennan, P.M., Nutt, B. & Walters, R. (1998). *Refurbishing Occupied Buildings (Management of Risk Under the CDM Regulations).* Thomas Telford, London.

Miles, Derek and Richard N. (1991). Building for Tomorrow: International Experience in Construction Industry Development. International Labour Organization.

Ministry of Finance Economic Reports (1988/89 - 96/97). Kuala Lumpur: Ministry of
    Finance Malaysia.

Mintzberg, H. 1978. Patterns in strategy formation. Management Science 24:934–948.

Moore, R.M. and Dainty, A.R.J. (2001). Intra-team boundaries as inhibitors of performance
    improvement in UK design and build projects: a call for change. *Construction
    Management and Economics, Vol.19,* 559 – 562.

Morledge, R. (1996). Editor's Introduction. *Journal of Construction Procurement, 2(1)*, 1-2.

Morris, P.W.G. and Hough, G.H. (1987).*The Anatomy of Major Projects: A study of the
    reality of project management.*Chichester: John Wiley & Sons.

Mouton, J. and Marais, (1988). *Basic concepts in the methodology of the social sciences:
    Human Sciences Research Council (HSRC)* Studies in Research Methodology 4.

Mohd Danuri M.S., CheMunaaim, Abdul Rahman M.E.,H. and M.Hanid. (2006). Late and
    Non-Payment Issues in the Malaysian Construction Industry - Contractor's
    Perspective. 613-623.

Naoum, S.G. (1998). Dissertation research and writing for construction student, Second
    Edition.

Naoum, S. G. (1999). An Investigation into the Performance of Management Contractsand
    the Traditional Method of Building Procurement.PhD Thesis, Brunel University.

Natasha, T. (2007)."Design and build" in comparison with the traditional procurement
    method and the possibility of its application in the croatian construction industry,
    University of Rijeka, Faculty of Civil Engineering, Croatia.

Neighbour, K. (2000). The Clients' Guide to Construction Projects: Best
    Practices..Empowering the Construction Project Team.*International Journal of
    Project Management, 14 (2):* 75-80.

Neto, J. B., Mourao, Y. R., Ferreira de Freitas, A. A., and Aves, T. L. (2007).A Method toEvaluate and Manage Client Requirements in Housing Projects. Proceeding of the CIBWorld Building Conference on Construction for Development, Cape Town, South Africa,14 – 18 May 2007, pp 310-321

New Mexico Statute, (2009), Chapter 60 – Business Licenses. Article 13 – Construction Industries Licensing Section 60-13-3-Definition; Contractor

Ng, W. S., Aminah and MdYusof (2006). The success factors of design and build, procurement method: a literature visit. Proceedings of the 6th asia-pacific structural engineering and construction conference (APSEC 2006). Kuala Lumpur, Malaysia.

Nuhu B. and Issaka Nd.. (2008). Factors influencing the selection of delay analysis methodologies.*International Journal of Project Management , 26*, 789-799.

Nunnally, J.O. (1978). Psychometric theory. New York: McGraw-Hill.

Nutt, B. (1988). Strategic Briefing.*Long Range Planning, Vol. 21, No. 4.*

Odeh A.M and Battaineh H.T (2002). Causes of Construction Delay: Traditional Contracts. *Int J Project Manage 20 (1):* 67–73.

Office of Building and Development (1997). Building Victoria's future. Building procurement: Choosing the best option for your project. Information Sheet 9, Office of Building and Development, Melbourne, Australia

Ofori, G. (1980). The construction industries of developing countries: the applicability of existing theories and strategies for their improvement and lessons for the future: the case of Ghana. Unpublished PhD Thesis, University College London.

Ofori, G. (1991). Programme for Improving The performance of Contracting Firm in Developing Countries: A review of Approcahes and Appropriate Options. *Journal of construction Management and Economics, Vol 9*, pp 19-38.

Ogunlana S.O. Prokuntong, K. and Jearkjirm, V. (1996). Construction Delays in Fast Growing Economy Comparing Thailand with Other Economies. International Journal of Project Management 14 (1),37-45.

Okoroh, M.C. (1992). Knowledge-based decision support system for the selection andappointment of subcontractors for building refurbishment contracts.PhD thesis,Loughbourough University, Loughbourough.

Pallant, J. (2001). The SPSS survival manual: A step-by-step guide to data analysis using SPSS for Windows (Version 10). St Leonards, NSW: Allen &Unwin

Pallant, J. (2002). *SPSS survival manual*.Open University Press, USA.

Peter D. et al. (2006). Report Building Procurement Methods. Research Project No: 2006-034-C-02

Peter D., Peter L., David B., Geoff W., Robert L. (2008). Capital Works Procurement: The Selection of a Building Procurement Method. Project Affiliates Curtin University of Technology Western Australia Department of Housing & Work Royal Melbourne Institute of Technology Research Program: Deliver and Management of Built Assets

Pietroforte, R. 1992, Communication and Information in the Building Delivery Process, PhD Thesis, Massachusetts Institute of Technology.

Pinto, J. K. and Slevin, D. P. (1998). Project Success: Definitions and ManagementTechniques. *Project Management Journal, 19(1),* 67-71

Preiser, W. (1993).Professional Practice in Facility Programming. Van Nostrand Reinhold Process for Construction, Proceedings of the CIB W-92 Procurement Symposium. Procurement The Key to Innovation, University of Montreal, Montreal, 18th - 22nd May, Canada, 395-405.

Quah, L.K. (1992) Comparative variability in tender bids for refurbishment and new build

    work .*Construction Management and Economic Journal, 10,* 263–269.

Quah, L.K. (1988). An evaluation of the risks in estimating and tendering for refurbishment

    work.PhD thesis.Herriot Watt University, Edinburgh.

Rahmat, I. (1997). The planning and control process of refurbishment projects. PhD thesis,

    University College, London

Rahmat, I., Torrance, V.B., and Ezanee, A.H. (2003).Refurbishment cycles and the

    management of refurbishment projects.UiTM Research Centre, Shah Alam,

    Selangor, Malaysia.

Rayers, J., and Mansfield, J. (2001).The assessment of risk in conservation refurbishment

    projects.*Journal of Structural Survey, Vol. 19 No. 5,* pp. 238-44

Richardson, B. (1996). Marketing for Architects and Engineers. E & FN Spon.

Robinson, H, Anumba, C, Carillo, P and Al-Ghassani, A (2005). Business Performance

    Measurement in Construction Engineering Organisations. Measuring Business

    Excellence,9(1), 13-22

Rogers, E.M. and Kincaid, D.L. (1981). Communication Networks: Toward a New

    Paradigm for Research. The Free Press, New York.

Roscoe, J.T. (1975). Fundamental research statistic for the behavioral sciences (2[nd]ed.).

    New York: Holt, Rinehart and Windston.

Rosli A. R., Ismail M. T., Wan B. W. A., Md. Asrul N., Wan N. W. A. and Zainab M. Z.

    (2006). Effect of procurement systems on the performance of construction projects.

    Department of Quantity Surveying, Faculty of Built Environment, Universiti

    Teknologi Malaysia.

Rowlinson, S. (1999). A Definition of Procurement Systems. In Procurement Systems: A

Guide to Best Practice in Construction (ed). 27-51. London: E & FN Spon.

Royal Institution of Chartered Surveyors (RICS) (1997). Refurbishment in the Office

Sector 1997/8: The Connaught report, RICS, London.

Royal Institution of Chartered Surveyors (RICS) (1998).Building Conservation Practice

Panel Note 6 "The Principles of Building Conservation". Appendix B, RICS,

London

Ruyon, R.P. (1997). Non-parametric statistics: *A Contemporary Approach.* Addison-Wesley

Publishing Company Inc., United States.

Rwelamila, P.D. and Hall, K.A., (1994) An inadequate traditional procurement system?

Where do we go from here? Proceedings of the Procurement Systems Symposium,

December, University of Hong Kong, HONG KONG.

Rwelamila, P. D., and C. Meyer (1999).Appropriate or Default Project Procurement

Systems.*Cost Engineering, 41 (9):* 40-44.

Salisbury, F. and White, B. (1980). Briefing and its Relationship to Design: Draft Guide for

Clients of the Construction Industry. Building Research Establishment.

Salisbury, F. (1998). Briefing Your Architect, The Architectural Press, 2nd edition.

Reprinted by Butterworth Heinman.

Sarantakos, S., (1988). *Sosial Research.* New York: Palgrave, New York

Seeley, I. (1987). Building Maintenance (2nd ed). Macmillan: Basingstoke.

Sekaran, U. (2005). *Research Methods For Business: A Skill Building Approach*. 4 ed.

Carbondale: John Wiley & Sons, Inc.

Shabha, G. (2003). A low-cost maintenance approach to high-rise flats.*Facilities*. 21(13/14):

315-322.

Shah, J.B. and Murphy, J. (1995) Performance appraisals for improved productivity. Journal of Management in Engineering. 11(2), 26–29

Sharp, J.A. and Howard, K. (1996). The Management of a Student Project (2nd ed).Aldershot, Gower.

Shannon, C.E. and Weaver, W. (1949). The Mathematical Theory of Communication. University of Illinois.

Sharif, A., and Morledge, R. (1996). Procurement strategies and national organizations: the dependency linkage. CIB W92 Symposium North Meets South: Developing Ideas. Durban South Africa, 14-17.

Sharif, A. (1996). A functional analysis of building procurement systems and strategies in an international context. Unpublished PhD Thesis, The Nottingham Trent University.

Siddiqui, I. (1996). Novation : and its comparison with common forms of building procurement. Ascot. CIOB

Sinclair, D. and Zairi, M. (1995). Effective process management through performance measurement: part III-an integrated model of total quality-based performance measurement. Business Process Re-engineering & Management Journal, 1(3): 50-65

Slevin, D.P. and Pinto, J.K. (1986). The Project Implementation Profile: a new tool for project managers. *Project Management Journal, 17 (4),* 57 -70.

Smith, J. (1998). Building Cost Planning for the Design Team. Victoria: Deakin University Press.

Smith, J., Zheng, B., Peter E.D. Love, and David J. Edwards (2004). Procurement of construction facilities in Guangdong Province, China: factors influencing the choice of procurement method. *Facilities Volume 22 (5/6)*, pp. 141-148

Somogyi, A. (1999) The Role of Project Management. Report unpublished.

Sweis G., Sweis R., Hammad, A. A., Shboul, A. (2007). Delays in Construction Projects: The Case of Jordan. *International Journal of Project Management*

Syed A. A. and Bhag S. M. L. J. (2001). Design and Build Construction Contracts : A Conflict Between Law and Practise.

Tam, C. M. (1997). Design and Build for a Complicated Re-development Project in Hong Kong: The Happy Valley Racecourse Redevelopment. *In Procurement – A Key to Innovation,* 743-750. Canada: CIB Proceeding.

Tan, D. (2001). Problems with Design and Build Contract in Malaysia. www.jrk.com.my/articles/designbld.htm (assessed May 28, 2004).

Taylor, R. G., P. D. Rwelamila, and P. McDermott (1999). From Conventionally Orientated to Developmentally Orientated Procurement Systems: Experiences from South Africa. In Procurement Systems: A Guide to Best Practice in Construction, ed. S. Rowlinson and P. McDermott., 163-183. London: E & FN Spon.

Tenah, K. A. (2001). *Cost Engineering, 43 (1)*: 30-36. (accessed April 2, 2004, from ProQuest: Academic Research Library).

The Aqua Group (2001). Tenders and Contract for Building- 3rd. Edition Blackwell Science: London

Thomas, S. R., Tucker, R. L., Kelly, W. R. (1998). Critical communication variables. *Journal of Construction Engineering and Management.Vol. 124, No. 1.*

Thomas, S. R., Macken, C. L., Chung, T. H., and Kim, I. (2002).Measuring the Impact of theDelivery System on Project Performance: Deisgn-Build and Design-Bid-Build NIST GCR 02-840. Construction Industry Institute. Austin.

Turina, N. (2007). "Design and build" in comparison with the traditional procurement method and the possibility of its application in the Croatian construction industry. University of Zagreb, Faculty of Civil Engineering, Croatia

Turner, A. (1990). Building Procurement. London: Macmillan Education Ltd.

Turner, R.J. (1993). *The Handbook of Project-Based Management*. London: McGraw-Hill Companies.

Turin, D.A. (1973). The construction industry: its economic significance and its role in development. London: University College Environmental Research Group.

United Nations Centre for Human Settlements (UNCHS) (1981).The Construction Industry in Human Settlemen Programmers. Nairobi. CHS/OP/81/6.

Usmani, A. and Winch, G. (1993). The Management of a Design Process: The Case of Architectural and Urban Projects. Bartlett Research, Paper No. 1.

Walker, D.H.T. (1994). Procurement Systems and Construction Time Performance.Proceedings of CIB W92 Symposium, 4-7 Dec, Hong Kong, pp343-352.

Walker, D.H.T. (1996). The Contribution of the Construction Management Team to Good Construction Time Performance – An Australian Experience.*Journal of Construction Procurement, Vol.2, No.2*, pp4-18.

Walker, A. (2002). Project Management in Construction.Blackwell Science.

Walker, D., and Hampson, K. (2003).Procurement Choices. In Procurement Strategies: A Relationship-Based Approach (ed). Victoria: Blackwell Science Ltd.

Watkins, E. (1996). Why renovate?.*Lodging Hospitality, April,* pp. 32-6.

Wang, B.T.H. (1987). *Construction and development (with reference to Malaysia)*. Kuala Lumpur: Pelanduk Publications.

Wang, B.T.H. (1991). Development of the Malaysian construction industry: its concept, approach and strategy. Procs ASEAN International Symposium on Construction and Development, Master Builders Association of Malaysia in association with Chartered Institute of Building, Malaysian Chapter.

Wang, T. H. (1994). The Malaysian Construction Industry, its trend of growth-past, present & future. *The Master Builders Journal*, pp 3-7

Wearne, S. (1997). Innovations in Procurement – Why, and to Where? Questions for Research.*In Procurement – A Key to Innovation*, 781-790. Canada: CIB Proceeding.

Wellington D. T. and Mpendulo M. (2008). Current challenges and problems facing small and medium size contractors in Swaziland.*African Journal of Business Management, 2 (5).*

Wells, J. (1986). The construction industry in developing countries: alternative strategies for development. Kent: Croom-Helm Ltd.

World Bank (1984). The construction industry: issues and strategies in developing countries. Washington DC; The World Bank.

Yasamis, F., Arditi, D., and Mohammadi, J. (2002).Assessing contractor quality performance.*Construction Management and Economics Journal, Vol. 20 No. 3*, pp. 211-23.

Young, B. A., and Egbu, C. O. (1993). The Characteristics and Difficulties Associated with Refurbishment and the Need for Education and Training from a Management Perspective. Proceedings of 9th Annual Conference of the Association of Researchers in Construction Management (ARCOM), 14 - 16 Sept., Oxford University, U.K. ,pp. 338 - 350.