

EXPLOITATION OF CONTRACT DOCUMENT FOR CONSTRUCTION
PROJECT PLANNING AND CONTROLLING

AMINUDIN BIN ALI

UNIVERSITI TEKNOLOGI MALAYSIA

ABSTRACT

Construction industry was plague with multitude of criticism and tribulations in the perspective of the client for cost overruns and delays. The broad-spectrum regions of problems were within the planning and controlling functions. Proper contract documentation between contracting parties within the planning and controlling functions are able to reduce the predicament. A Document Study was done for 16 numbers of construction contract documentation projects in UTM during the period of the 7th Malaysians' Plan from 1995 to 2000 with the total value of all projects in the excess RM70 million. The Client, Consultant, and Contractor become the main respondent target. The process of review, analyze and synthesis of contract document reveal 485 verses and phrase related to project planning and controlling functions that is further synthesis into 209 keywords. Time functions were establish to be the most important factor of planning and controlling within the contract document followed by cost function. The usage of contract document identifies construction activity function scored the highest within the content of Construction Drawing and secondly, the construction cost function within the content of Bills of Quantities. The respondent rated the highest score for the contract document to be very important for construction planning and controlling. In general, the contract document is also rated as highly used for construction planning and controlling function. Proposals were made to introduce new Bills of Activities in the contract document using a selected project for the exploitation validation. Microsoft Project 2003 was utilized to simulate the proposal. Finally, for the exploitation of the contract document, 93% of the respondent agreed that the contract document can be modified to become a Master Plan for the construction planning and control function to be contracted in the contract document, legally and binding.

Keywords: Construction planning, Construction controlling and Contract document

ABSTRAK

Industri pembinaan terwabak daripada pelbagai kritikan dan permasalahan dari kacamata gunawan oleh kerana pertambahan kos dan kelewatan. Permasalahan tersebut mengikut skop spektra umum adalah di dalam fungsi perancangan dan pengawalan. Dokumentasi kontrak yang baik di antara mereka yang berkontrak di dalam fungsi perancangan dan pengawalan akan mengatasi kesulitan tersebut. Kajian Dokumentasi telah dilakukan terhadap 16 dokumen kontrak projek pembinaan UTM di dalam jangkamasa Rancangan Malaysia ke 7 dari tahun 1995 hingga 2000 yang melebihi nilai RM70juta. Sasaran responden utama adalah gunawan, perunding dan kontraktor. Proses Semakan, Analisa dan Sintisis pada dokumen kontrak tersebut telah menemui 485 ungkapan dan rangkai kata yang berkaitan dengan fungsi perancangan dan pengawalan projek di mana ia selanjutnya di sintisiskan kepada 209 kata kunci. Fungsi Masa telah dikenalpasti sebagai faktor paling penting di dalam perancangan dan pengawalan di dalam dokumen kontrak dan diikuti oleh fungsi kos. Manakala dari segi penggunaan dokumen kontrak ia telah mengenalpasti fungsi Aktiviti Pembinaan memenangi mata tertinggi di dalam isi kandungan Lukisan Pembinaan dan yang keduanya, fungsi kos pembinaan di dalam isi kandungan Senarai Kuantiti. Responden telah tanda nilai mata tertinggi bagi dokumen kontrak yang menjadikannya sebagai sangat penting bagi perancangan dan pengawalan pembinaan. Secara amnya, dokumen kontrak juga dicatatkan sebagai tinggi penggunaannya di dalam fungsi perancangan dan pengawalan. Cadangan telah dibuat bagi memperkenalkan Senarai Aktiviti baru di dalam dokumen kontrak menggunakan projek yang terpilih bagi perakuan ekplotasi. Perisian Microsoft Project 2003 telah digunapakai untuk simulasi cadangan tersebut. Akhirnya, bagi exploitasi dokumen kontrak, 93% responden bersetuju bahawa kontrak dokumen boleh dimodifikasikan bagi menjadi Rancangan Utama untuk perancangan dan pengawalan pembinaan yang dikontrakkan di dalam kontrak secara sah di sisi perundangan dan termaktub.

Kata kunci: Perancangan Pembinaan, Pengawalan Pembinaan Dan Dokumen Kontrak

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The multiplex nature of construction industry is aggravated by its' reactive and changeable characteristic are generally due to its fundamental business core based on one-off projects and temporary relationships. It is to be expected that it carries with it a multitude of criticism and tribulations in the perspective of the client for a construction project (Knight et al 2002). The fragmentation of the industry is exacerbated by the insularity of the professions in project planning and controlling; the contract that separate design from construction; the uniqueness of projects and the ephemeral nature of the relationships and project organization (Masterman, 2002).

By that, the progressively more complicated construction projects ensuing in complex contract documents. Intricate contract and construction projects, not properly planned and controlled can often engulf in multifaceted legal disputes that arise from the convolution and enormity of the work requiring multiple prime contracting parties, inadequately organized, and executed contract documents, insufficient planning and controlling, financial matters, and communication difficulty (Harmon, 2003). All of these factors or any one of them can ruin a project and lead to complicated litigation or arbitration, increased costs, and delay thus breaking down in the parties' communication and relationship form the initial intention of contract.

The contracting parties in a construction project are the owner, the consultants, contractor and subcontractors, are in circumstance with an intricate set of interrelated and intertwine relationships requiring cooperation and collaboration to coordinate time, resources, and communication; that is the planning and control function (Latham, 1994). The focal objective of the parties involved in a construction project is a victorious project. This is translated as a project that has been constructed in accordance with the plans and specifications, within the time and cost originally anticipated. The success of a project depends on a number of variables, not the least of which is how the organizations approach conflicts relating to contract documentation, planning and control of the project (Egan 1998).

Construction planning and controlling is a basic elementary and imperative action in the management and implementation of construction projects. An excellent construction plan is the root for developing the budget and the schedule for work. It involves the choice of technology, the definition of work tasks, the estimation of the required resources and durations for individual tasks, and the identification of any interactions among the parties of different work tasks (Patrick, 2004). The controlling functions on the other hand ensure the performance achieved and satisfied as indicated in the planning process. Monitoring and controlling function guaranteed that the construction project within budget, on time and as the quality specified furnished by first-class a plan. In addition to these technical aspects of construction planning, it may also be necessary to make organizational decisions about the relationships between project participants and even which organizations to include in a project. At a construction site, various trades typically work separately on tasks specified in and coordinated by the master schedule. But this doesn't give them any incentive to work together, nor does it provide for much planning on the best way to deliver a feature. These include the functions of contract documentation between each party that should bind together the contract with construction planning and controlling function. Integration of contract documentation with planning and controlling at design development in tandem provides a powerful tool in both the designers and the construction parties better understanding the project constraints and opportunities (Hinze, 2004).

When the exploitation of contract document for construction project planning and controlling implemented and the integration occurs, an even more powerful force is brought to bear on facilitating the project team to obtain a fuller understanding of the project plan. If this is undertaken under an integrated design and construction procurement choice then the whole project teams have a far better opportunity to understand the project more fully and hence plan the construction work more effectively (Smith, et al 2003). The potential outcomes are better planning; safer construction, less waste, lower detrimental environmental impact, better quality, and a more practical and elegant design solution. These outcomes can be reasonably assumed to facilitate outcomes of lower cost and improved construction time performance. Waste and rework has been argued to considerably contribute to higher construction cost and time (Li et al., 2000; Love et al., 2000).

1.2 Background of the Problem

Numerous prominent reports published in the 1990s that have identified the dilemma of the construction industry. The Latham (1994) and Egan Reports (1998) from the UK and in Australia the recent Australian Construction Industry Action Agenda, Building for Growth (DISR, 1999) addressed problems in the construction industry and areas where reform is required. Common threads of these reports are issues relating to the inefficiencies of traditional approach. This is evidence for the need to improve the procurement methods through the integration of contract and construction process to increase the value for the end user (Comptroller and Auditor General 2001). Table 1 combines the key performance indicators and recommendations of the Egan Report (1998) with parallel key initiatives identified in Building for Growth (DISR, 1999).

The third *key driver* has been identified as *Integrated process and teams*, among others the resolution were in the contracting parties in becoming team work driven by the integration between the contract documentation with the planning and control system. The issue has not been further apart from the Australian and UK panorama, even though specific report on construction development issues but following the news paper reviews the sickness were similar.

Key drivers	The Egan Report (1998)	Building for Growth (DISR, 1999)
	The recommendations	Key initiatives
Committed leadership	Teamwork between all parties and the elimination of confrontation	Information technology and international market development
A focus on the customer	Provide the end customer with their precise needs and at a price that reflects the product's value	Business improvements
Integrated processes and teams	For all project members to work as a team, be involved at the earliest possible stage and eliminate competitive tendering	Networks and alliances
A quality-driven agenda	A subjective issue, but should include aiming for getting right first time, every time and exceeding customer expectations	The environment
A commitment to people	No-blame culture of mutual independence, trust and respect, an environment of sustained improvement and commitment to training	Innovation and regulatory reform

Table 1-1 Key Drivers for Change in the Construction industry

Source: Smith, et al 2003

Malaysia's construction industry predicament currently revolves on the issue of defect in a major infrastructure work, where cracks appear at the column of the MRR2 fly over bridge in Kuala Lumpur (Strait Times, Jan 2006). The contracts between the parties involved do not clearly identify their roles in the Design and built contract resulting in poor construction and management (Berita, Feb 2006). The delay of Durin Bridge a mega project in Sarawak resulting in 6 numbers of extensions of times amounting to 34 months was awarded to the construction consortium. The enormous amount of time including contract termination and re-award of contract to a new contractor is a clear indication of mismanagement of planning and controlling of what ever the other reason given for the delay and contract problems (Berita, Feb 2006).

Further down the history of construction industry since 1980's the government was concerned with the project management in particular of planning and controlling of construction project (Utusan, May 1982). This was further discussed and elaborated by Nation Central Production Force (Pusat Daya Pengeluaran Negara) in various

articles to promote a better understanding of the contractor in project planning and control (Utusan, October 1984, Utusan August 1985, Berita November 1985, Utusan February 1986, Utusan August 1986).

Late 1980's and early 1990 shows the emergence of the new procurement system and the era of transfer of technology that integrate local and foreign contractor in the construction of Daya Bumi, LUTH Building, PNB building, Menara May Bank and others (Strait Times, April 1987, Strait Times, January 1990, Utusan March 1990). This is further lead into the introduction of Design and Built project, Package Deal, Turn Key, Project Management Consultant and others for local project for the local contractor. With this new procurement system and contractual documentation, high hope vested upon the industry to increase the performance of the construction project. Few projects were successful for example the construction of government clinic by the Ministry of Health through the 7th Malaysians' Plan from 1995 to 2000 (Lim, 2000).

In contrast, most of the construction projects are often plagued with delays and cost overruns, revealing this shows that most of the construction of Government School Projects initiated by Ministry of Educations especially for the School Computer Laboratory Projects, were 100% delays and Housing Quarters for Teachers only 412 units completed out of 1900 units targeted in the 7th Malaysians' Plan from 1995 to 2000. (Utusan, January 2002, Berita, March 2002, Utusan, September 2002).

The contractual liabilities of the new procurement system did provide control with no emphasis on planning process bring about the government decision not to use the new procurement system and reverted to the relevant agencies such as Public Work Department (PWD) and ministries to oversee new projects with the normal traditional method (Ismail, 2005).

Envisage the more secure ground for construction contracting, following the above mention government decision, University Teknologi Malaysia (UTM) has been using some Design and Built and Project Management System in their project delivery system. Most of the construction projects were contracted out using traditional method, which was Contract Document with or without bills of

quantities. Most of the projects were delayed with certain amount of variation order increasing the original value of the contract sum. The significant of the study would be on the total value of all projects in the excess RM70 million with 16 numbers of projects reviewed during the period of the 7th Malaysians' Plan from 1995 to 2000.

With the general background of the problems in the construction industry and the specific problems within the UTM construction scope, the researcher are insinuating the idea of exploitation of the contract document for construction planning and controlling for the future benefit of UTM upcoming construction project.

Construction contract document were tedious, with all and everything in it except Planning & Controlling function contracted jointly. The whole thing of related to the construction project were there, including correspondent letters, standard specification which covers everything including unnecessary and unrelated work to a complete set of drawing making the document as thick as 300mm, weighing more then 4kg.

As the Contract document were bulky, user unfriendly and was treated as holy and sacred their usage for planning and controlling function was not to its fullest potential. Client has no control, as there is no proper plan contracted together until delays and cost overshoot are inevitable

Exploiting the current Contract document by launching a new section of planning and controlling function bills would greatly enhance the contractual power to better manage a construction project

1.3 Objective of the Research

The objectives of the research are systematically divided in 3 stages in consecutive sequence.

1.3.1 First Stage Research Objective

The first stage is to perform a Document Study. It is an aggregate in depth study of Review, Analyze, and Synthesis of the Contract Document content. In the various

sections of the Contract Document the degree of important relationship study of the construction planning and controlling functions variable will be identified. The variety array of the recognize construction planning and controlling functions will then be organize and assemble in tabulation form according to their important rating. The planning and controlling functions are to be further classified into their scale of important. The highly important functions are selected to be promoted and utilized in the next stage.

1.3.2 Second Stage Research Objective

The promoted, highly important construction planning and controlling functions variable are then put to test in their utilization function of the contract document. This is simply to identify the usage of the selected construction planning and controlling functions within the studied Contract document. Structured interview and questionnaire will be employed within the Client organization primarily and Consultant and Contractor organization secondarily to discover the extent of usage of the selected construction planning and controlling functions. Where face to face structured interview were not possible, to further reinforced the data, telephone interview with selected relevant contractor and the consultant will be conducted. Matching construction planning and controlling functions variable will reveal the various sections of the Contract Document utilization significant. The highly related and significant sections of the Contract Document are then exposed to the next stage of exploitation.

1.3.3 Third Stage Research Objective

The final stage of the study is to identify the exploitation made and the exploitation that can be made for the construction planning and controlling functions variable within sections of the Contract Document. Similar methods were employed as in previous stage by conducting structured interview and questionnaire within the Client organization and the telephone survey with the consultants and contractors organization. The proposal of exploitation of construction planning and controlling functions variable within sections of the Contract Document will be made accordingly. The researcher will develop and proposed extra exploitation that can be

incorporated within the sections of the Contract Document to complement furthermore the construction planning and controlling functions.

1.3.4 Objectives of the Study Summary

1. To identify the construction planning and controlling functions within the content of the Contract Document.
2. To identify the usage of the Contract Document for construction project planning and controlling
3. To propose exploitation to the Contract Document for construction project planning and controlling functions

1.4 Theoretical Framework

A theoretical framework is a collection of interrelated idea, like a theory but not clearly refined. A theoretical framework guides the research, determining what things to be studied, and direction of the research within the boundary. Theoretical frameworks are obviously critical in inductive and deductive modes of inquiry. Theoretical frameworks were the foundation of this research formation. Two Theoretical Frameworks were proposed:

- Primary Theoretical Framework
- Conceptual Theoretical Framework

The Primary Theoretical Framework deal with the common universal predicament and enhancement in the construction industry and the Conceptual Theoretical Framework will abstractly deal with the recognized problems, reorganizing it towards a possible solution and improvements with reference to the research objectives.

1.4.1 Primary Theoretical Framework

The Primary Theoretical Framework that overview the general study of the research is The Latham (1994) and Egan (1998) Reports from the UK and Australian Construction Industry Action Agenda, Building for Growth (DISR, 1999) that categorize problems in the construction industry and areas where improvement is essential.

The key drivers identified from Table 1.1 are:

- Committed Leadership
- Focus on Customer
- Integrated process and teams
- Quality driven agenda
- Commitment to people

1.4.2 Conceptual Theoretical Framework

The conceptual theoretical frameworks were developed within the primary theoretical framework with the purpose to unravel part of the frequent problems recognize in the primary theoretical framework.

Narrowing down to the Construction Contract Document Conceptual Theoretical Framework where UTM were using JKR Standard Form of Contract according to Clause 1(a) of the JKR Form 203A (Rev 10/83) defines the term contract document to mean, the document forming the tender and acceptance which include:

- Article of Agreements;
- Form of Tender;
- Letter of Acceptance of Tender;
- Condition of Contract and the appendix annexed thereto;
- Contract Drawings;
- Bills of Quantities;

- Specifications ; and
- Treasury Instructions are set out in the appendix to the condition of the contract.

Finally, the 2nd Conceptual Theoretical Frameworks are the constructions planning and control functions. The functions can be elaborated as follows:

- Construction works or activities
- Construction Cost
- Construction quality
- Construction Time
- Construction Resources

The UK and Australian reports are regarded to be The Primary Theoretical Framework of the 3 main reports and encompassing 2 Conceptual Theoretical Framework that is the contract document and the planning and controlling function. In this study, the core theory is the merging and integrating both of the Conceptual Theoretical Framework with the process of exploitation shown in figure below.

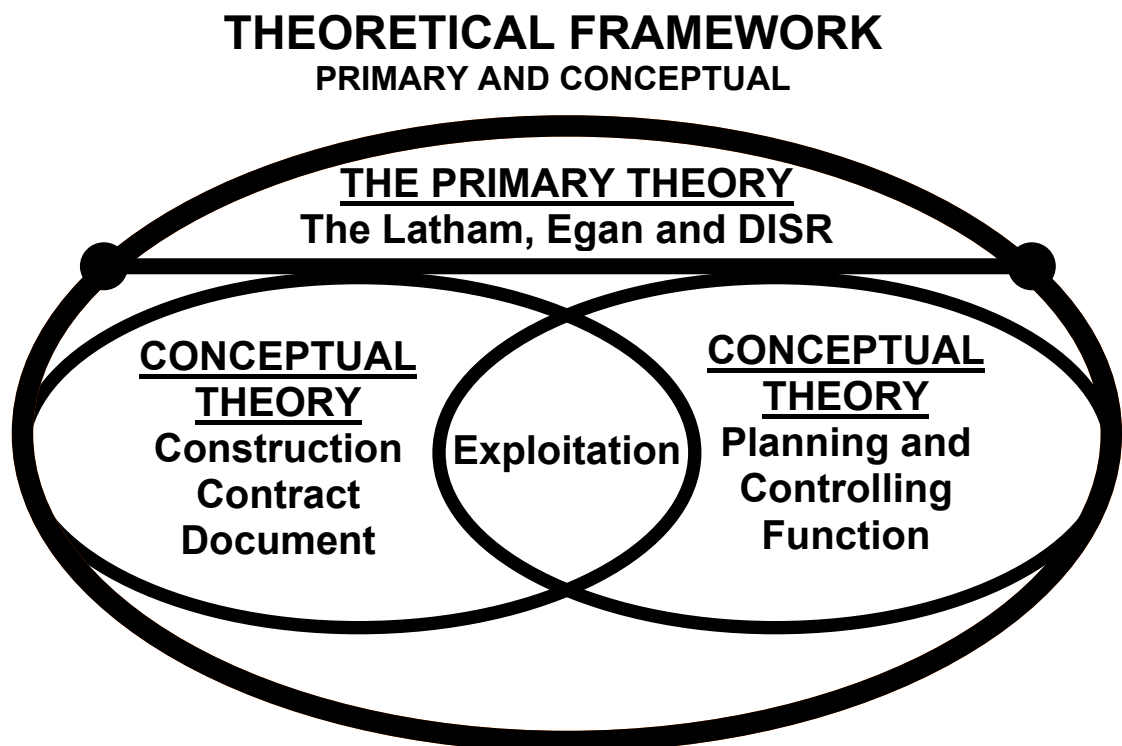


Figure 1-1 Theoretical Framework: Primary and Conceptual Theory

The comparison of inductive and deductive modes of inquiry for all of the above theoretical frameworks will give points of critical appraisal used to evaluate the appropriateness, cohesiveness, and consistency of the theoretical framework. Where the purpose and nature of theoretical framework in the beginning are to clarify and sort out troubles in the construction industry sector where advancement is necessary (Latham 1994, Egan 1998 and DISR 1999). The theoretical frameworks of the Contract Document are hope to be the answer to the tribulation when it is exploit to its' best with the integration of the constructions planning and control functions theoretical frameworks. The framework will offer guides to the research leading to the achievement of the study purpose. The different between conceptual and theoretical framework will be clearly described and discussed in the literature review. Finally the relationship between theory and research will be in synergy in the chapter of research design.

1.5 Statement of Hypothesis

Hypothesis statement for this research are the summary of the functional assessment that include the description of an educated guess of any suspected cause(s) of a process, procedure, or service that may exhibit problems, defects, or errors.

1.5.1 Hypothesis statement 1

- The content of the Contract Document are very important to construction planning and controlling

1.5.2 Hypothesis statement 2

- The usage of the Contract Document are very important for construction project planning and controlling

1.5.3 Hypothesis statement 3

- No exploitation were made to the Contract document for the purpose of construction project planning and controlling

1.6 Research Question

The proposed research question represents the central theme of research project and it is every aspect of the project coordinated in an effort to identify a substantive answer to the question posed by the researcher at the beginning of this process. The research question clearly frames the issues under investigation and provides the basis for the construction of an effective research strategy and the development of meaningful conclusions that advance scientific understanding of the phenomenon.

Thus, the research questions were created to provide a clear direction for the project and establish a definitive standard for measuring the overall success of achieving the mentioned objectives. The breakdown structures of the research question are within these 4 major regions of study:

- General
- Contract Document
- Construction planning and controlling
- Contract Document Versus Construction planning and controlling

1.6.1 General Research Question

How, Why, Who, When, What Is Exploitation? Manipulation? Mistreatment? Misuse? Usage? Practice? Custom? Tradition? Procedure? Convention? Habit? Treatment? Handling? Of Contract Document for Construction project planning and controlling?

What is a Project? Construction? Construction Project?

What are the relationships of Construction Project with Contract Document?

What are the relationships of Construction Project with Construction planning and control?

What are the relationships of Construction Project, Contract Document, Construction planning and control?

1.6.2 Contract Document Research Questions

What is Contract Document?

What are the types of Contract Document?

What are the contents of Contract Document?

What are the important of Contract Document?

Who are responsible for the development and the usage of Contract Document?

Can Contract Document affect construction planning and control process?

1.6.3 Construction Planning and Controlling Research Questions

What is planning? Planning functions? Construction planning? Construction planning functions?

What is controlling? Controlling functions? Construction controlling? Construction controlling functions?

What is Construction planning and controlling? Construction planning and controlling functions?

1.6.4 Contract Document Versus Construction planning and controlling Research Questions

Can the content of Contract Document used for construction planning and controlling?

How much of the content of Contract Document used for construction planning and controlling?

Is there enough information in Contract Document for construction planning and controlling?

How important is the relationship of Contract Document to construction planning and controlling?

To what extend the usage of Contract document for construction planning and controlling?

Who are using the Contract document for construction planning and controlling?

What are the exploitations or manipulations that were made to the Contract document for construction project planning and controlling?

What are the exploitations or manipulations that can be made to the Contract document for construction project planning and controlling?

Can Contract Document become a master plan for construction planning and controlling?

Can Contract Document be modified to become a master plan for construction planning and controlling?

Can construction planning and controlling function be contracted in the Contract Document?

These research questions previously developed and evolve from the initial stage of the research process and it is imperative to identify the questions that give efforts to some direction at the beginning of this process. These research questions lend itself into a directed method of inquiry and has been exhaustive enough to refine the research question accordingly to the research objective achieve as follows:

1.6.5 The Important of Construction Planning and Controlling Function Research Questions

How important the Contract Document for construction planning and control?

How important the information in Contract Document for construction planning and control?

1.6.6 The Usage of Contract Document for Construction planning and controlling Research Questions

What is the rating scale for the general usage of Contract Document for construction planning and control?

What is the rating scale for the usage of information in Contract Document for construction planning and control?

1.6.7 The Exploitation of Contract Document for Construction planning and controlling Research Questions

Can Contract Document become a master plan for construction planning and controlling?

Can Contract Document be modified to become a master plan for construction planning and controlling?

Can construction planning and controlling function be contracted in the Contract Document?

1.7 Significance of Study

The general significance of the study are aimed at ensuring the industry is client-focused, builds better business relationships, ethical competitive behavior, strives for continuous improvement and best practice, workplace reform, improved occupational health safety and rehabilitation and industrial relations management according to Latham 1994 and Egan 1998 theoretical framework report. The notion of continuous improvement and best practice is of particular interest and is described as being a commitment to “effective organizational systems, exceptional people management policies and practices and superior time, cost, and quality outcomes” (DISR 1999). All of these aims should form the basis for defining the better design of Contract Document by integration of construction planning and control function.

The contract documentation in a construction contract should by right induce contract participants especially the contractor and the clients to really understand the contractual needs and obligations of the parties, where the essence of team building in a proper construction planning and control function bounded in the contract. With an appropriate planning function clearly agreed by both parties in the contract document the client should have an ultimate control function of the construction project contractually. Significant gains can be achieved by looking at a construction project as delivering a set of features in teamwork scenario, rather than accomplishing a set of isolated tasks and fragmented when the consultant segregate themselves.

Nevertheless, much of the construction planning and controlling functions already exist in Contract Document but the enforcement of it are not to the fullest extend as it is not clearly specified and binding. The proposal of suitable construction planning and controlling functions in a coordinated task effort between the consultant and the contractor can be made legal at law as one of the content of the contract document. The benefit are to both of the contracting parties in ensuring the delivery of the construction project within budget, time and specified quality in overall of good value for the customer.

Noted earlier that the non-traditional procurement systems were not in favor in solving the problems of project control, the study is hope to reveal the followings:

- The important of the existing control and planning function in Contract Document
- The usage of Contract Document in planning and controlling function
- The available method of exploitation of Contract Document in planning and controlling function

In summary it is the optimum use of Contract Document construction knowledge and experience by the client, contractor and consultant in the conceptual planning, detailed engineering, procurement system and construction operations phases to achieve the overall project objectives. Based on their construction knowledge and experience, the contractor's personnel can play a major role in enhancing constructability planning and the client improving constructability controlling that decrease the likelihood of delays, contract change orders due to unforeseen conditions, and legal entanglement and claims (Nima, 2001).

1.8 Scope of Study

The important of the study scope would be reflected on the total value of all projects in the excess RM70 million with 16 numbers of projects reviewed during the period of the 7th Malaysians' Plan from 1995 to 2000, where most of the UTM construction projects were implemented during this period. The listings of the projects are as shown in Appendix 1.

The **Primary Scopes of study** are concentrated on the client organization (Harta Bina).

The **Secondary Scopes of study** are the contractors and the consultants.

The other main focus are the constructions projects by Contract document with and without Bills of Quantities including some Design and Built projects for comparison purposes.

1.9 Definition of Terms

Exploitation:

- The act of employing to the greatest possible advantage
- Utilization of something for benefit of somewhat purposes

(WordNet[®] 2.0, © 2003 Princeton University)

Contract Document:

- An agreement between two or more parties, written and enforceable by law

(The American Heritage[®] Dictionary of the English Language[©], 2000)

Planning and Controlling

- Functions of Management
- The First Function (Plan) and the Last Function (Control)

(Koontz, 2000)

1.10 Research Methodology

The traditional academic research methodology combines a retrospective summary and contextualization of the conceptualized research theoretical framework, the research question, and the hypothesis, within a proposed research methodology framework (Cryer, 1996). In summing up, the research theoretical framework defined earlier were based on 3 prominent construction report as the Primary Theoretical Framework and 2 Conceptual Theoretical Framework of Contract Document, planning and control function. The research questions were develop within 3 study regions that are the general research questions, contract document research questions, planning and control function research questions. While at the same time, the research hypotheses streamline the objective in the important of construction planning and controlling function, the usage of contract document content, and the exploitation. Finally, 3 research methodology phases are developed to elaborate the modus operandi in answering the research objective.

1.10.1 Research Methodology Phase 1

Declaring the synopsis and conceptual context of the research methodology above, the method used in conducting this research started with literature exploration of the

electronic and hard copy media within the theoretical framework in answering the research questions, hypotheses and objectives.

This is followed with **The Document Study**; that are Study / Review / Examine / Inspect / Evaluation / Appraisal / Synthesis / Scrutinize / Analyze of Contract Document content that is related to construction planning and controlling functions. The document contract are treated as Controlled Document and Limited consequently Digital Photo Study are required to be employed where the document are not to be brought out from the specified area.

The Digital photo study of the contract document will be prepared similarly to the document study. Imperative aspect of construction planning and controlling functions in the Contract Document will be identified and tabulated accordingly to their significant. The summaries of research methodology phase 1 are shown in figure below.

**RESEARCH METHODOLOGY
PHASE 1**

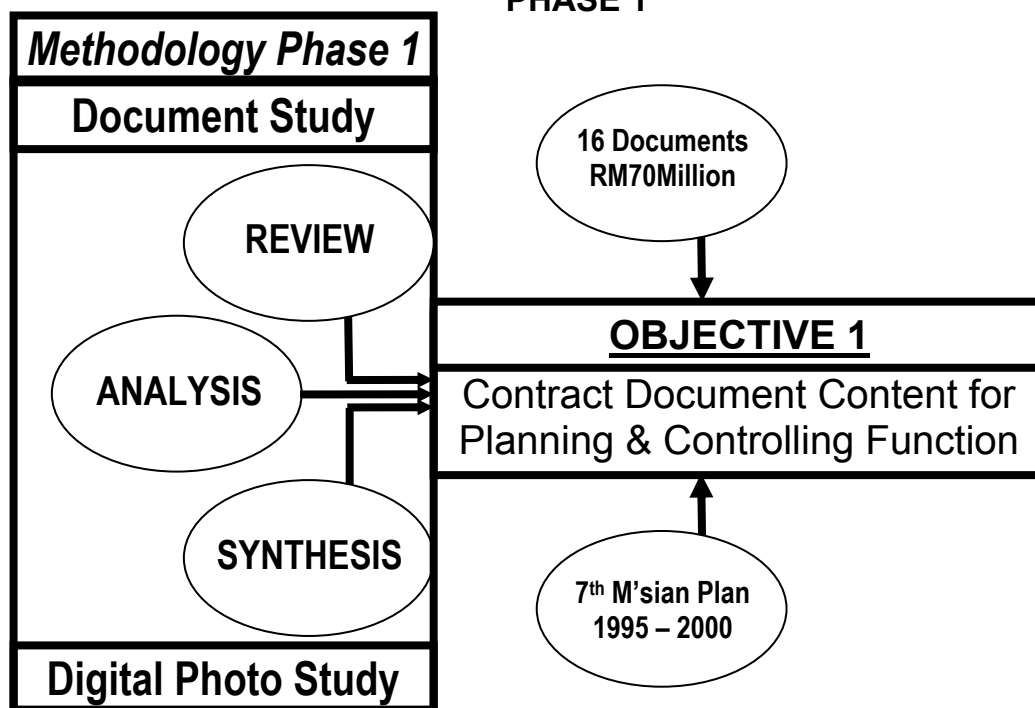


Figure 1-2: Research Methodology Phase 1

1.10.2 Research Methodology Phase 2

The focus of the research mainly concentrated at the client organization as the primary respondent where the contract document originated. Structured interviews and questionnaire (5 Scale Likert) are to be conducted with the professionals in the client organization who are involved in the construction process and contract administration. This will reveal the facts for the second objective that is the usage of contract document for planning and controlling functions. In order to strengthen the data for the secondary respondent, telephone interview with the contractor and the consultant parties will be conducted. After the telephone interview, if the secondary respondents are accommodating and supportive, postal questionnaire will be sent to them for a better specific investigation. Further structured interviews are intended for the secondary respondent where possible.

The summaries of research methodology phase 2 are shown in figure below.

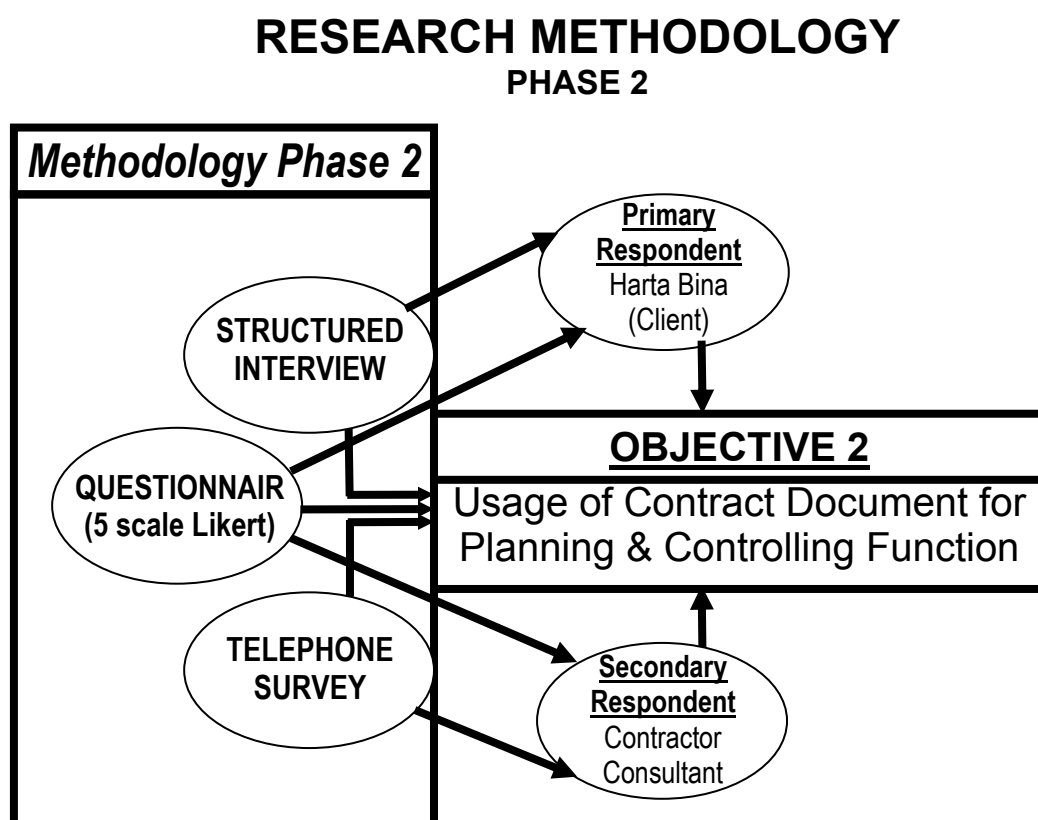


Figure 1-3: Research Methodology Phase 2

1.10.3 Research Methodology Phase 3

Finally, the research identifies the probable and extent of exploitation in the contract document for planning and controlling functions. Matching methods were employed as in previous step by performing structured interview and questionnaire in the Client organization and telephone survey with the consultants and contractors. Further analysis and synthesis of the contract document will be prepared to recognize the exploitation that can be done. The proposed exploitation of construction planning and controlling functions variable within segments of the Contract Document unveil consequently.

The summaries of research methodology phase 3 are shown in figure below.

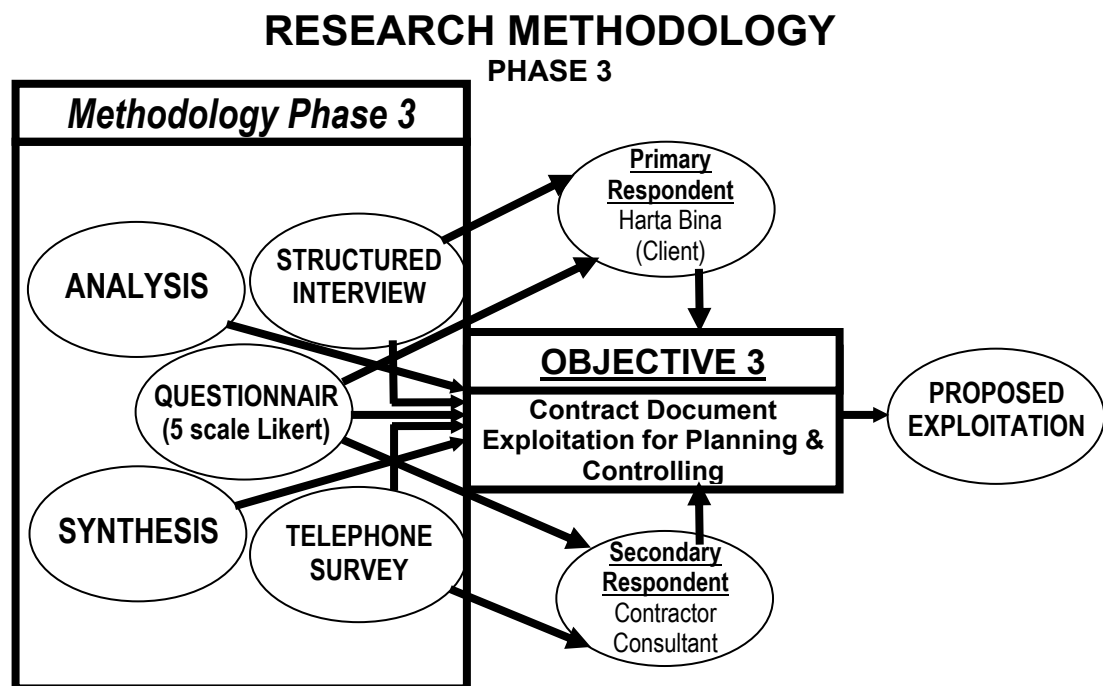


Figure 1-4: Research Methodology Phase 3

1.11 Research Methodology Chart

Research Strategy Chart shows the overall summary of research methodology.

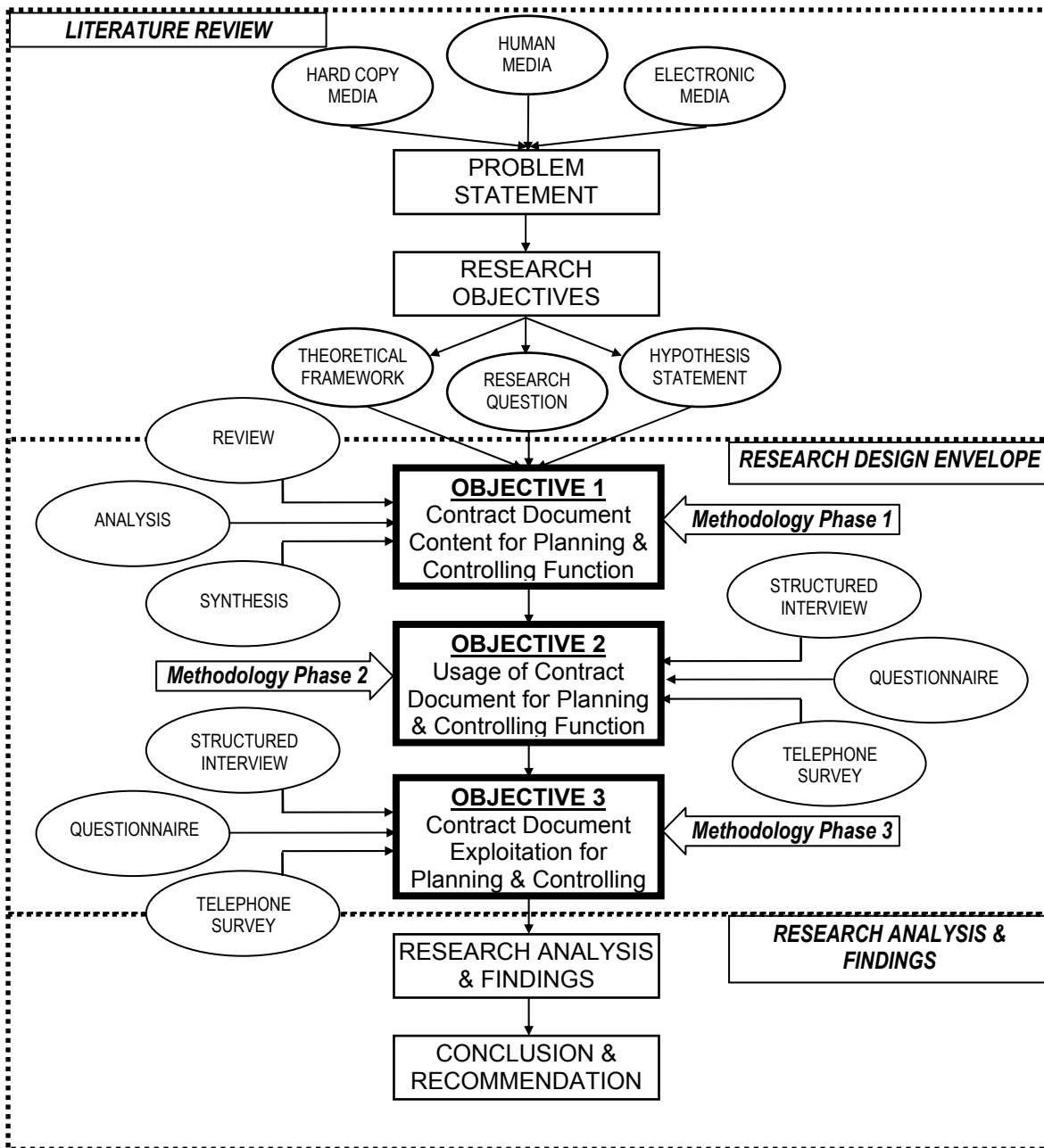


Figure 1-5 Overall Research Methodology Chart

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