



**THE CONSULTANTS' ROLES AND FUNCTIONS IN
DESIGN AND BUILD METHOD**

By

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Science

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DECLARATION

This dissertation is submitted for academic research purposes to fulfill the requirement for the award of Bachelor Science of Housing, Building & Planning (Hons. Quantity Surveying), University Science Malaysia. All the information submitted in this research project is my own work unless it is stated otherwise.

This dissertation has not been submitted and received full or partially to fulfill any other degree requirement and currently it is not being presented for other degree.



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ABSTRACT

Consultants are the specialist that offered services in their area of specialisation in building construction. They can be any independent designer, advisor or quantity surveyor employed neither by the contractor nor the employer. In design and build method, the roles and the position of the consultants are quite different from the traditional method where they have the contractual relationship with the contractor but not the employer.

This research is a preliminary study to differentiate the consultants' roles, functions and the scope of the work in design and build method and compare it with the traditional method. Besides, it is aimed to study the popularity of the design and build method among the consultants in Malaysia and identify the problems that may face by the consultants when they enroll themselves in this type of procurement method.

To achieve the objectives of the study, research data and information was collected through the past document such as books, articles from journals, magazine and websites. The postal questionnaires had been sent out to check the popularity of design and build method in Malaysia construction industry and among the professional consultants. The analysis shows that the popularity of design and build method in Malaysia quite low. However, most of the respondents agreed that design and build method is suitable to implement in Malaysia even in the private sector and they are willingly to involve in this type of procurement method.

Design and build method brings advantages and disadvantages to the construction industry. From the study, the most preferred benefit is 'shorten construction period' while 'design

need to be revised early' has been chose as most barrier of the design and build method. The problems faced by the consultants in this type of procurement method are loss of the potential professional and individual identity.

ABSTRAK

Perunding adalah pakar yang menyediakan perkhidmatan mengikut bidang kepakaran mereka dalam sektor pembinaan. Mereka boleh terdiri daripada arkitek, jurutera dan juruukur bahan yang diupah oleh kontraktor ataupun klien. Di dalam cara 'reka dan bina' (design and build), peranan dan kedudukan para perunding adalah berbeza daripada cara tradisional kerana perunding adalah menandatangani perjanjian kontrak dengan kontraktor dan bukannya klien.

Penyelidikan yang dijalankan adalah kajian awal untuk membezakan peranan, fungsi dan skop kerja para perunding yang terlibat dalam cara 'reka dan bina' dengan cara tradisional. Selain itu, ia juga bertujuan untuk mengkaji kepopularan cara 'reka dan bina' di antara perunding di Malaysia dan mengenali masalah yang mungkin dihadapi oleh perunding yang terlibat dalam 'reka dan bina'.

Untuk mencapai objektif kajian ini, data-data dan maklumat-maklumat dikumpulkan melalui dokumen-dokumen yang lepas seperti buku-buku, petikan-petikan dari jurnal, majalah dan laman web. Soal selidik dikirimkan kepada para perunding di dalam Malaysia untuk mengkaji kepopularan cara 'reka dan bina'

Analisis dari disertasi ini menunjukkan bahawa kepopularan cara 'reka dan bina' di Malaysia adalah agak rendah. Akan tetapi, kebanyakan responden bersetuju bahawa cara 'reka dan bina' adalah sesuai dijalankan di Malaysia mahupun di dalam sektor swasta. Mereka juga rela untuk melibatkan diri dalam cara pembinaan tersebut.

Cara 'reka dan bina' ini mempunyai kebaikan dan keburukan kepada sektor pembinaan. Daripada kajian ini, kebaikan yang paling digemari ialah 'pemendekan tempoh pembinaan' manakala 'rekaan perlu disemak awal' telah dipilih sebagai halangan bagi cara 'reka dan bina'. Masalah yang dihadapi oleh para perunding dalam cara pembinaan ini ialah kehilangan keupayaan kepakaran dan identiti individu.

CHAPTER 1 - INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 Background of Study:

Consultants are the specialist that offered services in their area of specialisation in building construction. Janssens (1991) stated that “Consultant is any independent designer, advisor or quantity surveyor employed by a contractor or employer.”

In the traditional method, consultants such as architects, engineers and quantity surveyors have separate contracts with the employer but they need to work with the contractor who also has the contract solely to the employer. A communication gap between consultants and contractor will definitely occur. This has led to the fragmentation of the construction industry into design and construction functions not only because there are distinct specialists in each, but also due to the functions performed by different organisations which exercise limited control over one another. (Turner, 1986)

However, in the design and build method, consultants’ roles are slightly different where they are now on the same team with the contractor. According to Turner (1986), “The effect of design and build is to move the consultants from the gap position between employer and contractor and place them under the sole authority, and possibly within the permanent organisation, of the contractor, whom they alone advice.”

Consequently, communication link between the consultants and contractor is now establish and bridge the gap between design and construction functions. "The integration of different parties into a single design and build team helps to foster cooperation and eliminate the 'us and them' syndrome which prevails in the Traditional Arrangement."
(Low, 1992)

Under design and build method, the contractor may has his own in-house design-team or appoint design consultants and surveyor to develop the client brief into details design and prepare the tender. (Ferry, 1999) However, on the employer side, employer may then engage further consultants to give him independent advice on certain issues such as prepare the project brief (or needs statement) and the pre-bid document; or assess the building contractor's design and monitor the work on site.

1.2 Problem Statement:

This dissertation presents a study on the roles and functions of the consultants (mainly on architect and quantity surveyor) in design and build method implemented in the Malaysia construction industry. The study will focus on the consultants' roles, functions and the scope of the work in design and build method and compare it with the traditional method.

Besides, it is aimed to study the popularity of the design and build method among the consultants in Malaysia. This research is also dedicated to identify the problems that may face by the consultants when they involved themselves in this type of procurement method.

1.3 Aim

The research aim is to conduct an exploratory research studying the roles and functions of the consultants that involved in this procurement method.

1.4 Objectives

The objectives of the dissertation are as listed below:

1. To differentiate the roles, functions and the services of the consultants between the traditional and design & build arrangement.
2. To study the popularity of the design & build method among the consultants in Malaysia.
3. To identify the problem that may be face by the consultants in design & build method.

1.5 Research Methodology

1. Formulation of the research problem

- Problem statement will be defined and the suitable topic selected after several discussions with the supervisor.
- Preliminary research will be conducted; aim, objectives, scope & research limitation and the dissertation proposal will be written.

2. Determination of research design

- The research design used in this dissertation is Surveys Method
- Types of the surveys used is Sample Surveys
- Sample design used is stratified sampling.

3. Selection of data collection method

- References books, journals, reports, published and unpublished papers and computer-based materials (surfing from internet), publication of professional institution and unpublished thesis regarding to the topic will be selected to read
- Questionnaire will be constructed by postal questionnaire with the selected relevant consultants' firm.

4. Data collection & processing, and data analysis

- Analysis will be done on the information and data from the primary data and secondary data.

5. Conclusion & Final Research Report

- After analysis all the data that gathered in the research, conclusion and recommendation will be constructed to answer the research aim and objective of this dissertation. At last final research report will be structured and written out.

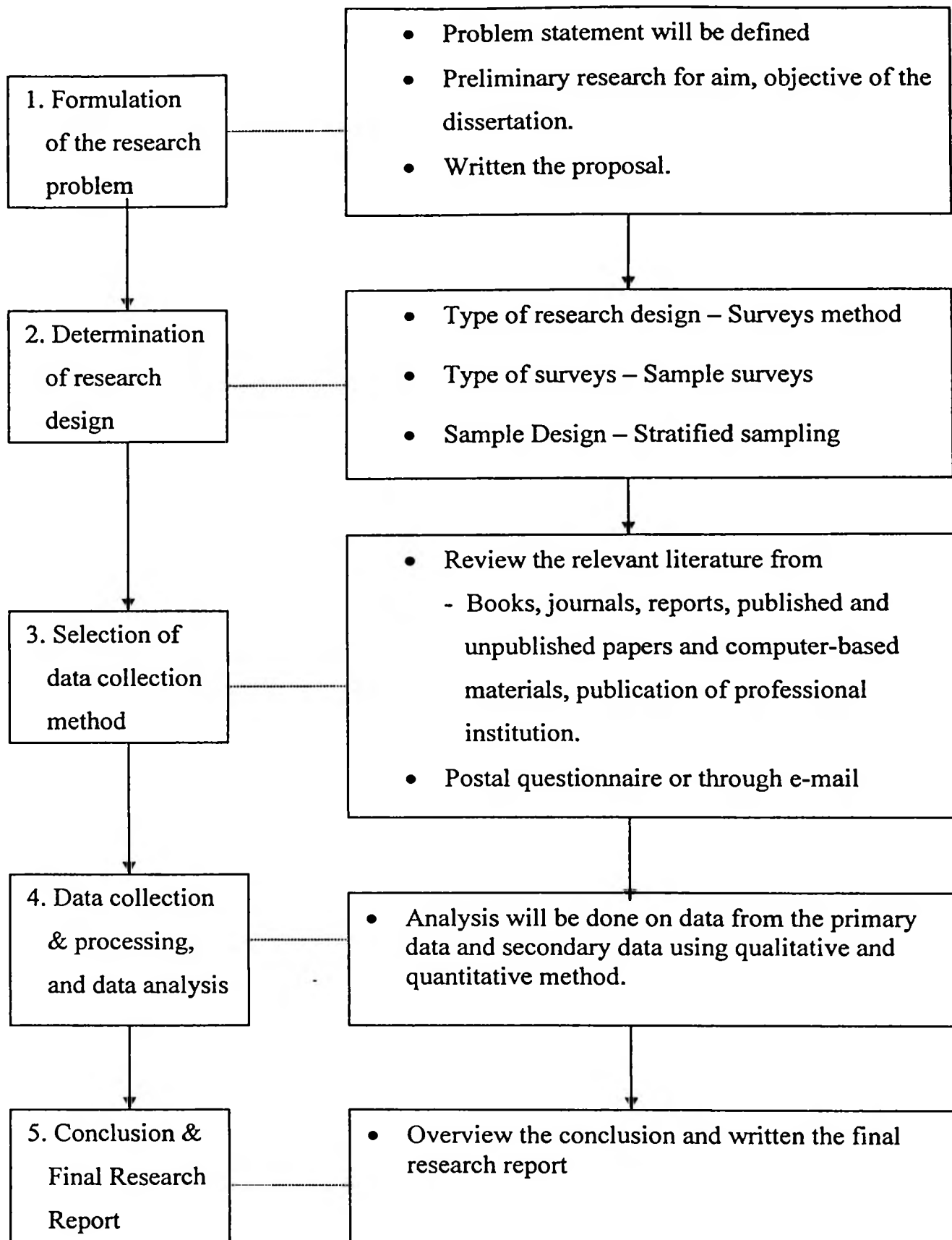


Figure 1.5: Research Methodology Diagram (Adapted from Tan, 2001)

1.6 Organisation of The Dissertation

Chapter 1: Introduction

In this chapter, research background, problem statement, aim, objectives, scope & limitation, research methodology and thesis structure will be cover in.

Chapter 2:

Chapter 2 will be an overview of design and build as procurement method in Malaysia construction industry. Definition, pros and cons, problem in design and build will be further discussed in this chapter. Besides, a comparison between traditional and design and build method will be included in this chapter.

Chapter 3:

This part of dissertation will focus on the roles and function of the consultants (architect, engineer, and quantity surveyor) that involved in design and build method. It is aim to study the problems that may face by the consultants as well as the popularity of the design and build among these consultants.

Chapter 4: Research Methodology

In this chapter, research methodology structure and process will be discussed in detail. Besides, research approach and research methods and the criteria for setting up the questionnaire will be discussed in this chapter.

Chapter 5: Results Analysis

The results from the primary data collection, postal questionnaire will be process and analysis in this chapter.

Chapter 6: Conclusion and Recommendations

This is the last chapter in this dissertation, where it will conclude all the literature and the results from the data collection. In addition, some recommendation will also be generated from this research for the future research.

CHAPTER 2

LITERATURE REVIEW

CHAPTER 2

DESIGN AND BUILD:

AN OVERVIEW IN MALAYSIA CONSTRUCTION INDUSTRY

2.1 Introduction

Nowadays, design and build is becoming increasingly popular and extensively used among the developers in the construction industry as a procurement route that helps to deal with the problems associated with the traditional system such as cost overrun and excessive delay. (Chan, 1999)

It has been accepted as a new approach in the construction industry in many parts of the world. In United States, one-third of the current construction projects is using the design and build approach (Yates, 1994). In Japan, about half of the construction projects were built under this type of procurement method.

Design and build projects can be found all over the world where there are public-private partnerships for the construction of bridges, tunnels, highways, water-supply systems and the others. The design and build approach is used to lower the risk and cost to the public sector and also for the projects that require rapid implementation of public work schedules. (Yates, 1994)

However, in Singapore, according to Low (1992), design and build method had been singled out as a potentially useful method that will help to boost productivity in the construction industry.

2.2 What Is Design & Build Method?

According to the Songer & Molenaar (1996), design and build is “a procurement method where one entity or consortium is contractually responsible for both the design and construction of a project.”

However, Janssens (1991) stated “Design and Build is a form of building procurement whereby the contractor who constructs the works, also undertakes all of, or a proportion of, the design of the works.”

Willis (1987), concur that Design and Build is a procurement method that linking together the design and construction functions with a single organisation which is generally the building contractor.

Therefore, the client, instead of approaching an architect for his design service, chooses to go directly to the building contractor. He may choose to retain the services of an architect or quantity surveyor to access the building contractor’s design or to monitor the work on site. (Willis, 1987)

Contractually, design and build offers the owner a single point of responsibility for design and construction services. Portions or all of the design and construction may be performed by a single design and build entity or selected specialty work, or in some cases, all may be subcontracted to other companies. (Konchar, 1998)

2.3 Design & Build in Malaysia

Government procurement policies and procedures are governed by Treasury's Instructions under the Financial Act 1957 pertaining to financial and accounting procedures. Public Work Department as the biggest implementing agency for the government projects will interpret the Treasury Circulars and adapt it in the work process to complement with the policies and guidelines as set out by the Treasury.

According to Laili in QSs National Convention 2001, the general principle of good governance for procurement is to have good public accountability, be transparent, to achieve best value for money and tender on a fair basis. The objective of government procurement is to get best value for money, getting quality product and works from the contractor and suppliers, promoting and achieving stated government policies, to encourage the growth of local industries and the transferring of new technology to the country.

The recession which has dominated the Malaysia construction industry has brought about a slow down in projects and has resulted in a steady growth in the procurement of buildings via design & build route. (Chong, 2001) The design and build was first introduced by Public Work Department (JKR) in Malaysia. In 1983, a Turnkey Section was set up in the JKR to implement the Government's project based on the design and build method.

The Technical Works Contract Committee was set up in the late 1996 on the recommendation of MAMPU to draft the standard conditions of contract for works implemented on a design and build or turnkey basis. This standard form has been forwarded to Treasury for endorsement and for the circulation to be used by other government agencies. (Laili, 2001)

In the design & build projects, JKR through its Turnkey Implementation Unit will prepare a need statements in the form of a set called 'pre-bid' documents. The tenderer basing on these documents submits complete proposals on a fixed cost fixed time basis. After the project has been awarded, the contractor will proceed to implement the project with the minimum interference from the client.

On completion, the project will be handed over to the client who will put the building into immediate use. Thus, the definition of completion will be a fully equipped, operational, functional and maintainable building in a state that is left for the occupants to move in. Under the defects liability period, the design & build contractor will maintain, service and repair including the provision of spare parts to all engineering installations, attend and repair all building defects. A 5 years guarantee period commencing fro the start of the defects liability period will be provided on the building, installation and equipment. (Ali, 1986)

2.4 Advantages of Design & Build

1. Single point of responsibility

Single point of responsibility is the most obvious advantages offered by design and build. There is no division of responsibility between design and fabrication, so the finished building should reflect the trade-offs made between the design exigencies and the fabrication exigencies. (Murdoch & Hughes, 2001)

2. Minimize legal entanglements

Design and build helps minimize legal entanglement. Contrary to the traditional approach where three, or more legal entities are involved, the design and build approach reduces this to two legal entities- the owner and the contractor. Legally, the owner deals with one contractual entity instead of several unrelated parties. It takes the owner out of the center of debates when design and/or construction errors or omissions occur.

The consultants are employ by the contractor whether as the in-house consultants or private consultants firm as a partnership with the contractor firm. This creates an environment where they are both working toward the same objective, and provide the owner with one entity to resolve disputes and reduce it over the project. (Yates, 1994)

3. *Reduce project cost*

The design and build approach helps reduce the administrative task of owners. There are no longer separate contracts to administer between consultants organization and the contractor. Many tasks that are traditionally duplicated need to be only performed only once. With reduced administration tasks the owner will have better management of the cash flow, which helps minimize project costs, or provide more projects for their money, and this in turn could attract new sources of funding. (Yates, 1994)

4. *Effective pattern of communication*

The communication patterns observed in design and build projects are among the most effective found in any form of procurement. Since the institutionalized roles are reduced in their importance, there is less likelihood of there being institutional axes to grind. No separate firms will be vying for ascendancy, and consequently all of the pre-litigious guarded responses within letters, memos and minutes of meetings tend to disappear. (Murdoch & Hughes, 2001)

5. *Early start on site/ Shorten duration of construction*

Since the contractor is undertaking the design work, there are opportunities to overlap the design and construction process and thus to make an early start on site. The concept allows for construction to begin even when the design is not complete. For owners, this means they can get a building in a much quicker time period. Problems are solved more quickly, since the designer and the contractor

are both on the same team. This may be attractive to those clients, particularly in the public sector, who need to start spending their budget within a short time of the money being allocated. For such clients the appeal of an early start on site is that they can spend some of the budget before the money is withdrawn in favor of departments with more urgent needs. In this sense, design and build will give the benefits that any form of fast-track that overall construction process can be speeded up by not delaying construction while the whole of the design is completed. (Murdoch & Hughes, 2001)

6. *Cost certainty*

Cost certainty for the employer is one of the advantages of design and build. It is a fixed price contract, so the risk associated with pricing is entirely the contractor's, except to the extent those fluctuations clauses apply. (Murdoch & Hughes, 2001)

7. *Lower risk*

An additional benefit is the lowering of risks associated with the control of project completion and cost overruns. Design and build reduce liability due to errors or defects, in the design and eliminates allegations over drawing clarity, completeness, and constructability, which in turn lowers the number of change orders. The probability of completing a project on time, and within the budget, increases with the design and build approach as long as the owner does not change the design criteria once the project is awarded. (Yates, 1994)

8. Collaborative decision making.

Another primary advantage of the design and build process is that it allows truly collaborative decision making. Creating an environment of collaboration helps foster innovative solutions that can be investigated early on in a project when the benefits are the greatest. Change orders are reduced by the design & build approach if owners deliver their end of the contract and do not make changes to the design, or the delivery criteria. (Yates, 1994)

9. Reduce the duplication of work.

The design and build process allows the elimination of duplicate, redundant, and exculpatory information that is created in the conventional process when the efforts of the design professional, vendors, detailers, and sub-contractors are not coordinated. (Yates, 1994)

2.5 Disadvantages of Design & Build

1. *Poor quality of work*

The reputation of design and build has suffered from criticisms by some construction professionals of projects involving building system and standardization. This type of project often leads to very poor buildings. (Murdoch & Hughes, 2001)

2. *Problem arise from revision of design*

Too much overlapping will give rise to problems from the need to revise early design decisions, as the design is defined. If the project has already started on site by the time that these revisions are made, work may have to be undone before further progress can be made. In extreme cases, this can lead to fast tracking taking even longer to complete than a traditional method. (Murdoch & Hughes, 2001)

3. *Limited scope for variations and changes*

Variation to client requirements is a constant source of problems. They are one who wishes to reserve the right to alter requirements during the fabrication process should not use design and build. The process demands early agreement between employer's requirements and contractor's proposals. A change in either of these documents makes the agreements awkward. The valuation of variations can be difficult without a comprehensive contract sum analysis, and the

employer's insistence on time and cost targets become less convincing if the requirements are altered. Therefore, a client who needs to retain the right to make variations should either consider an alternative procurement method, or should consider allowing the subject of additional contracts after the conclusion of the project. (Murdoch & Hughes, 2001)

4. *Higher tender cost*

Design & build not necessarily cheap. Single point responsibility and fixed price contracts mean that the contractor carries more of the risk than a general contractor would. Risk attracts a premium, so it is to be expected that a design and build contractor would add a premium to a tender to allow for this extra risk. Similarly, design and build encourages economical solutions, and enable value to be considered as well as price. A truly economical approach to the employer's problem may not produce the cheapest building in terms of capital outlay. In this respect, design and build may be more expensive than traditional general contracting. (Murdoch & Hughes, 2001)

5. *Employer's requirement must be clear.*

One of the biggest disadvantages of design and build is that employer's requirements must be very clear and unambiguous. Also, they should not be subject to change during the project. Any changes will cause the work to be redone and the construction cost will be increase. This is not such a problem in

general contracting because the brief can be developed alongside feasibility studies and sketch schemes. (Murdoch & Hughes, 2001)

6. *Number of checks and balances are reduced*

In design and build projects the number of checks and balances are reduced, which mean the final project may not be up to the owner's expectations. (Yates, 1994)

7. *Design & build method need financial flexibility*

As with any turnkey project, the total project cost may not be established until construction is under way. This requires financial flexibility on the part of the owner, which many clients cannot afford especially public owner. (Yates, 1994)

CHAPTER 3

LITERATURE REVIEW

CHAPTER 3

THE CONSULTANTS IN DESIGN & BUILD METHOD

3.1 Introduction

In design & build, the contractor is the solely person that has the contractual link with the employer. He is responsible for everything includes planning, design and the construction of the building (Single point of responsibilities). The position of the consultants in design & build are quite different from the conventional method, they had moved from the position of the employer's consultant to the contractor side, whom they alone advise. Now, the consultants only enter into a contractual relationship with the contractor but not the employer. They can be engaged by the contractor as in-house consultants or external independent consultants.

However, as a counteraction, the employer may then engage further consultants to give him independent advice on some issues such as preparing the employer's requirement, or act as the employer's representative. This will be further discussed in the following section. The figure below shown the contractual relationships encounter in design & build contract.

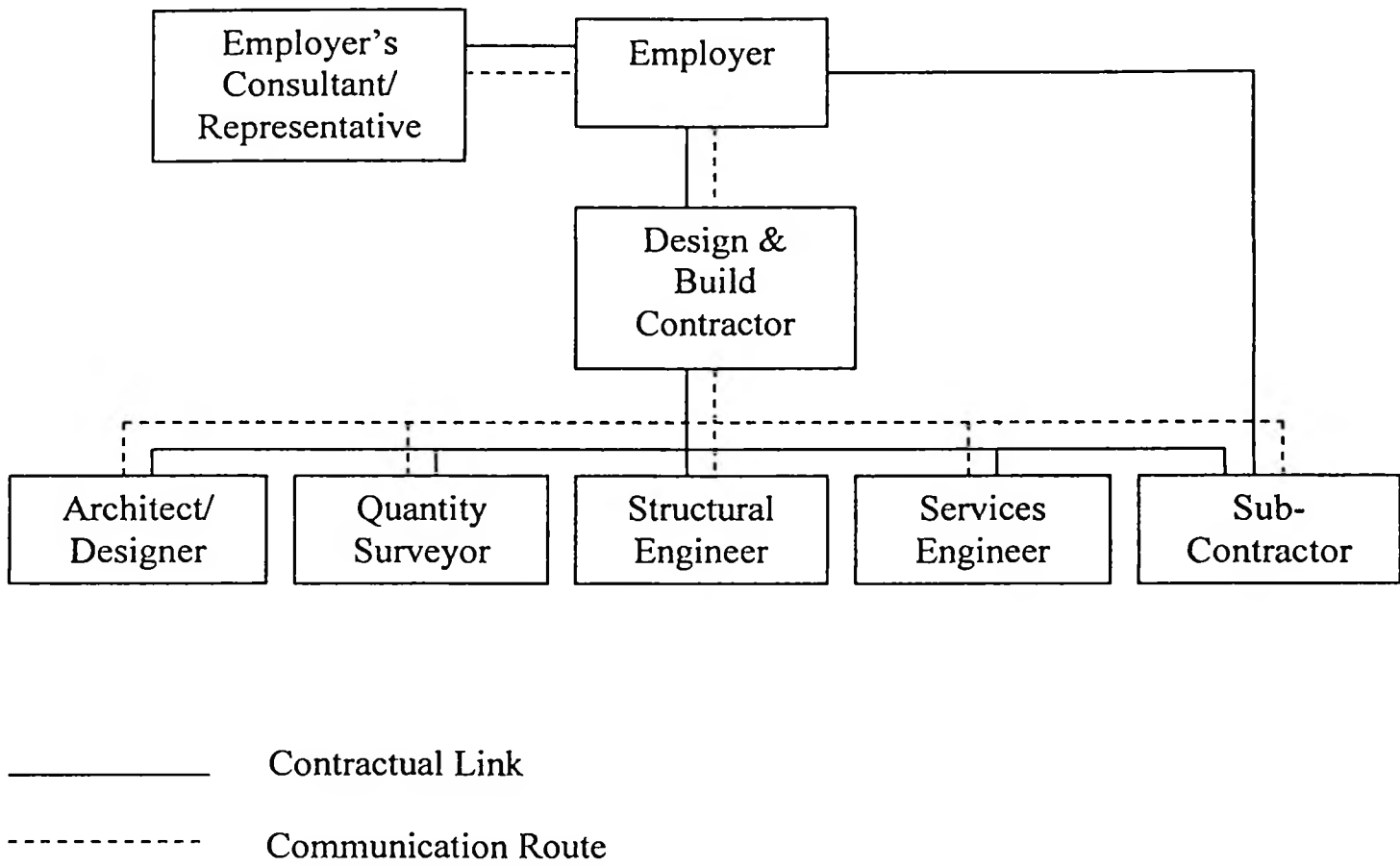


Figure 3.1 : Contractual Relationships in Design & Build (Adapted from Murdoch, John & Hughes, Will (2001), Construction Contract, United Kingdom)

3.2 The Needs for The Consultant

3.2.1 The Contractor's Need

The contractor in design & build is the key person who responsible to design and construct the building according to the employer's requirement. In fact, contractor is not capable to design and erect the building by himself even though the experienced contractor. "It is possible in a very scheme for there to be no work requiring a specialist designer, so that none is engaged. This is effectively limited to something like a small, rectangular, open plan shed with a concrete slab base on a near flat site" stated by Turner (1986).

The contractor will be aware of his needs at a lower threshold of scale, as he is producing the whole scheme and is the more likely to engage a full range of consultants. However, as the project threshold is raised and the frequency of projects increases, so he must also face the question of when it will become economic to have his own department where it is more cost benefit and saving time. More important may be is the benefits of feedback which lead to more economic and better designs which win more contracts.

However, Turner stated that if the scale and intricacy of design are too much to employ in-house consultant, the contractor could consider an architect on his staff to brief and control external design consultants. The contractor needs some liaison whenever he engages outside consultants, so that he can forge the best link between construction and design.