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A FRAMEWORK FOR IMPROVING PRE-PROJECT PLANNING

By

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**A Doctoral Thesis submitted in partial
fulfilment of the requirements for the award of
Doctor of Philosophy of Loughborough University**

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ABSTRACT

In recent years there has been a general concern over the performance of the UK construction industry. This has been reflected in the reports of Latham (1994) and Egan (1998) stating that the UK is still suffering from underachievements and low productivity. Clients criticise the industry for not always achieving what they need and the majority of them are not satisfied with the quality of the construction industry.

Many of the problems encountered in the design and construction phases originate from the pre-project planning phase. The main problems are frequently attributed to poor planning and poor identification of client needs which act as contributory factors to poor project performance. These problems have led to the need for a change in the construction industry by focusing on the roots of the problems attributed to poor performance. One approach that could help to improve construction performance is to pay more attention to the pre-project planning phase since major decisions concerning the project are made during this phase.

The pre-project planning phase represents the best opportunity for clients to achieve their objectives because it is the phase where they can express their needs. Despite its importance to the construction industry, it has been subject to little examination and attention when compared to the other remaining phases of the project life cycle. For example, most of the research has been directed mostly to the design and construction phases of the project.

The main aim of the research is to develop a framework for improving pre-project planning to enable construction clients overcome the problems that they encounter with other project participants. Such a framework would assist construction clients to identify and communicate their needs more clearly to other stakeholders. The framework provides a comprehensive tool to help solve problems that occur during pre-project

planning with respect to project objectives and goals of the construction project to enable performance to be measured and improved. The objectives of the research were to:

- gain an understanding of the current pre-project planning practice and associated problems;
- identify the tools that help improve pre-project planning;
- identify the factors that inhibit improve pre-project planning;
- map the pre-project planning process;
- develop an assessment tool for measuring the pre-project planning progress; and
- develop an assessment tool for measuring pre-project performance.

This thesis presents a framework for improving pre-project planning of construction projects. The methodology adopted to conduct the research involved a comprehensive literature review. Critical pre-project planning functions have been presented and tested through the questionnaire survey and case interviews to determine how clients perform pre-project planning. The framework was tested and validated and found to be useful and applicable by six construction clients through questionnaire interviews. The main achievements of the research are:

- the development of a pre-project planning process map;
- the identification of tools that deal with cultural and process issues;
- the development of assessments tools for measuring pre-project planning progress and improvement; and
- implementation of tools to guide and solve the problems that occur during pre-project planning.

CERTIFICATE OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this thesis, that the original work is my own except as specified in the acknowledgements and that neither the thesis nor the original work contained therein has been submitted to this or any other institution for a higher degree.

..... (Signed)

.....(Date)

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CHAPTER ONE
GENERAL INTRODUCTION

CHAPTER ONE

GENERAL INTRODUCTION

1.1 INTRODUCTION

This chapter introduces the research reported in this thesis. It describes the background, aim, objectives, methodology, and significance of the research. It also presents summary of the research achievements.

1.2 BACKGROUND

In recent years there has been a great concern over the performance of the UK construction industry. This has led to many reports being published criticising construction, stating that it is characterised by low achievement and low productivity and offering solutions to overcome some of the stated problems. According to the reports of Latham (1994) and Egan (1998), the UK is still suffering from under achievements and low productivity and made clients criticise the industry for not always delivering what they need and the majority of them are not satisfied with the quality of the construction industry.

If the construction industry is to realise its full potential as an important sector to the general economy, there is a need to identify specific actions and good practices, which would help achieve timelines in delivery and value for money. Egan (1998) stated that construction industry is failing to satisfy the majority of customers, who want their projects delivered quickly, cost effectively and without defects. Failing to achieve a satisfactory level of performance may result in confrontation leading to expensive litigation. The need for improving construction performance and the efficiency of the construction industry formed the motivation of this research. One approach that could help to improve construction performance is to pay more attention to the pre-project planning phase since major decisions concerning the project are decided during this phase.

The primary focus of this research is the early stages of the project, which are often referred to as the “pre-project planning phase”. Many individuals within the construction industry believe that planning efforts during the early stages of a project's life cycle maximises the chances of project being successful (Ahuja 1994; and Gibson et al. 1996). The pre-project planning phase is considered to be the most significant phase of the construction project since it provides valuable input to the forthcoming phases. Although there are numerous views that have been put forward about the importance of pre-project planning, few models that focus on this phase have been developed, with the exception of the work of the Construction Industry Institute (CII). In addition, existing models do not provide an integrative framework for improvement, for instance, the CII model was developed and tested on industrial projects and also lacks the tools that facilitate communication among project participants.

This research emphasises the importance of the pre-project planning phase and stresses that improved pre-project planning should lead to improved construction performance and achievement of the project objectives, thus leading to greater client satisfaction. The research has examined pre-project planning and the activities associated with it. A framework for improving pre-project planning has also been developed.

1.3 SIGNIFICANCE OF THE RESEARCH

In current models of the design and construction process (RIBA 1980; British Federation 1983) and (CIRIA 1995), pre-project planning has been given less attention compared to later stages of a project. In addition, most of the literature related to pre-project planning do not directly deal with the process, only referring to it through general discussions and highlighting various management aspects relating to it.

Many of the problems encountered in the design and construction phase of projects originate from the pre-project planning phase. The main problems are frequently attributed to poor planning and poor identification of client needs, which act as contributory factors to poor project performance. This research contributes to the body of knowledge by establishing a link between improved pre-project planning and

project performance. The rationale for undertaking this research stems from a number of factors:

- the need to improve construction performance;
- pre-project planning is perceived to play a crucial role in the success of the project and accomplishing the project objectives;
- the research should prove extremely useful to construction clients for better approaching this important phase of the project life cycle;
- the lack of tools and techniques to aid the pre-project planning process; and
- pre-project planning provides the initial link between clients and industry and very important to provide success and ultimate client satisfaction.

The reports of Latham (1994) and Egan (1998) both called for radical changes to be achieved through the introduction of effective business processes within construction in order to meet the challenges of an evolving business environment. Pre-project planning is an important phase in the project life cycle because:

- an early consideration of key issues can affect the outcome of the project ; and
- the out put of it can reduce the amount of changes during design phase.

1.4 AIM AND OBJECTIVES OF THE RESEARCH

This research is focused on providing a clear understanding of current pre-project planning processes that characterises the construction industry to determine the key activities performed and the key planning issued involved. It examines how pre-project planning is approached and determines and identifies the factors that inhibit pre-project planning improvement.

1.4.1 Aim of the research

The main aim of this research is to develop a framework that will help clients improve pre-project planning of construction projects. This could be achieved by developing a structured pre-project planning process and providing a mechanism and tools to guide this process. The framework is a way to improve the relationship of project

participants to a more co-operative team relationship through a structured process and tools that facilitate communication between project participants.

1.4.2 Objectives of the research

The background outlined in Section 1.2 underscores the need for improving construction performance and pay more attention to pre-project planning to achieve this objective. In order to achieve this aim, the research has focused on the following specific objectives:

In order to achieve the aim, the research has focused on the following objectives:

- gain an understanding of the current pre-project planning practice and associated problems;
- identify the tools that help improving pre-project planning;
- identify the factors that inhibit improve pre-project planning;
- map the pre-project planning process;
- develop an assessment tool for measuring pre-project planning progress; and
- develop an assessment tool for measuring pre-project planning performance.

1.5 RESEARCH METHODOLOGY

To meet the requirements of the objectives, the research methodology proceeded as follows:

- comprehensive literature review;
- questionnaire survey;
- interviews;
- framework development; and
- validation.

The research methodology is discussed in more detail in Chapter 2.

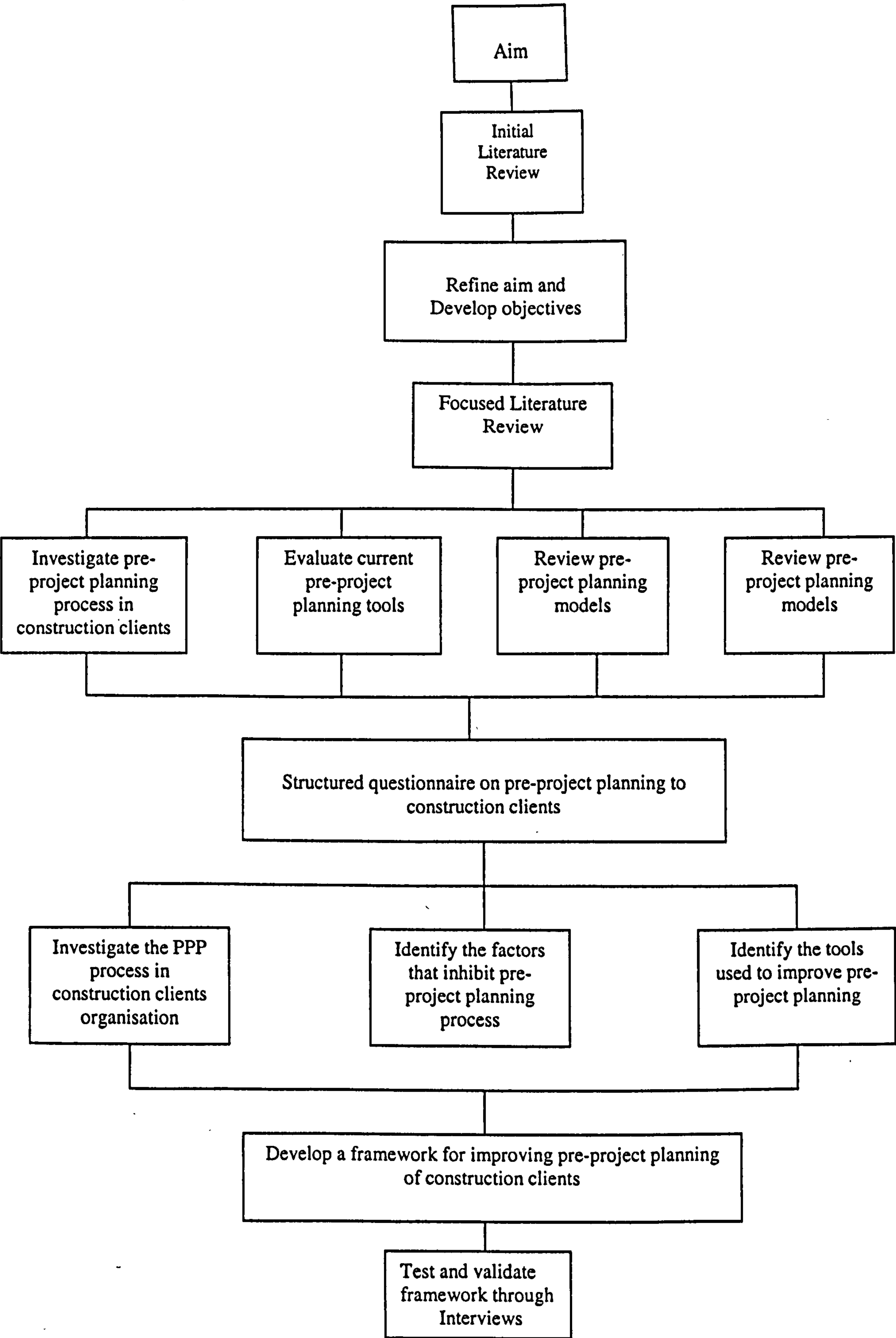


Figure 1.1: Flow diagram of research methodology

1.6 SUMMARY OF RESEARCH ACHIEVEMENTS

This research has identified the need to pay more attention to improve pre-project planning in order to promote improvement in the construction performance and achieve client satisfaction. The main achievements of this research include the following:

- the development of a pre-project planning process map;
- the identification of tools that help guide the pre-project planning process;
- the development of assessment tools for measuring pre-project planning progress and monitoring improvement; and
- implementations of tools to guide the process and solve the problems that arise during pre-project planning.

1.7 ORGANISATION OF THE THESIS

The thesis is organised into nine chapters. Summaries of these chapters are provided below.

Chapter one provides an introduction to the research. This chapter describes the background, aim, objectives, methodology, and significance of the research. It also presents a summary of findings of the research and organisation of the thesis.

Chapter two discusses the general approach to the literature review and presents an overview of the main research methods available, highlights their weaknesses and strengths. The chapter also discusses the research strategy adopted for collecting data to achieve the aim and objectives of the research.

Chapter three reviews the construction performance and highlights the factors contributing to poor performance of the construction industry. The chapter also focuses on the cultural issues as well as the processes that are thought to be important to improving performance. Tools that deal with these issues are also discussed.

Chapter four highlights the key issues that should be addressed for achieving improved construction performance. The chapter also emphasises on the importance of cultural issues as a contributor to poor performance and identifies the tools that deal with these issues.

Chapter five this chapter is mainly focused on the role of the client in the construction industry. The chapter emphasises on their role at the early stages of the construction process and emphasises on the importance for clients to adopt a structured approach and tools to improve their approach to pre-project planning.

Chapter six explores the pre-project planning in terms of its definition and significance to the construction process. This chapter also addresses the key process issues and best practices associated with this very important phase as well as investigating the existing models that have been developed.

Chapter seven presents analysis and discussion of the data that have been collected from the questionnaire survey and case interviews of construction clients and presents the qualitative data that have been elicited from construction clients and discusses the documents that have been offered by the clients.

Chapter eight introduces the framework that has been developed based on the review of literature and the data collected from the questionnaire. The chapter provides full description of how the framework works and how the tools are implemented to guide the pre-project planning. The chapter also presents analysis and discussion of the data that have been collected for validating the framework.

Chapter nine presents the conclusion derived from the research and the recommendations for further study.

Appendices consist of additional information relevant to this research. This includes questionnaire, data outputs, and a list of papers that resulted from this research. Appendices included at the back of the thesis include.

Appendix A: Workshops, seminars and conferences attended during the research period;

Appendix B: Questionnaire covering letter

Appendix C: Glossary

Appendix D: Questionnaire on client's approach to pre-project planning

Appendix E: Questionnaire and documents for evaluating the framework

Appendix F: Documents for evaluating the framework

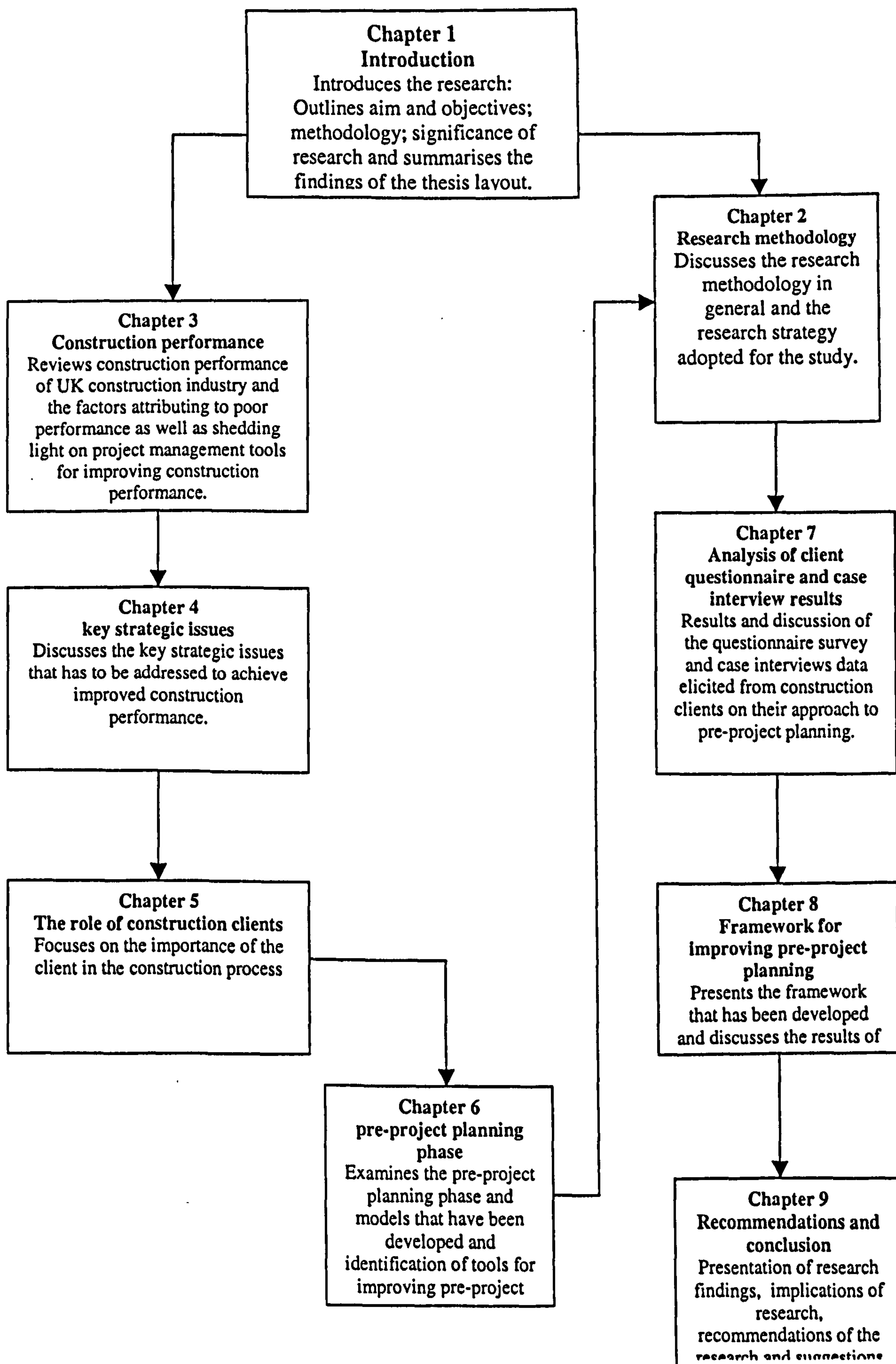


Figure 1.2: Thesis layout

1.8 SUMMARY

This chapter provided an introduction of the research. Significance and justification of undertaking this research is further given and layout of the thesis structure outlining the content of the chapters and how they relate to each other. To date, research has been mainly directed towards the design and construction phases of construction projects, little attention was given to the pre-project planning phase despite its importance to the construction process and its influence on the outcome of the project. There have been few attempts to improve this important phase and few models have been developed. However, these models lack the tools to facilitate communication and deal with the problems that occur during the pre-project planning process. The development of a framework for improving pre-project planning is aimed at mapping pre-project planning accompanied with tools that provide mechanism to the pre-project planning and assessment tools that measure progress and performance.

CHAPTER TWO

RESEARCH METHODOLOGY

CHAPTER TWO

RESEARCH METHODOLOGY

2.1 INTRODUCTION

This chapter discusses the research design and methodology and highlights the general approach of the literature review and outlines the specific methodology adopted for this research. The choice of the research methodology and the reason for its selection is provided. The sources of data and methods of data collection are also discussed.

The chapter is divided into four main sections. The first section examines the general approach to review the literature concerning the subject of interest. The second section provides an overview of the different methodologies available for collecting data. The third section describes the specific methodology adopted for this research. The final section examines the theory behind developing the framework and the approach used for validation.

2.2 GENERAL APPROACH TO THE LITERATURE REVIEW

The review of literature has helped to build up a theoretical background to the subject of the research and provided a foundation for addressing the research problems and objectives. The literature was also helpful in establishing the foundation of the research in providing the background required to carryout the work throughout this thesis. In addition, it has provided insight understanding to many of the major issues concerning the construction industry. Overall, the literature has provided the necessary skills and knowledge to design the questionnaire in a constructive manner.

The literature was aimed at: developing a complete picture of the performance of the construction industry and establishing a framework for the research questions and

methodology. A comprehensive literature review covering various related areas to the subject of interest was undertaken, namely:

- productivity;
- construction performance;
- teamwork and organisational culture;
- project success;
- client role;
- pre-project planning;
- scope definition; and
- alignment.

Although there is an abundance of literature available on the importance of pre-project planning, there is very little in which concentrated on the process aspect. Much of the literature seemed to focus on the functional side and little attention was directed toward improving the pre-project planning. Also, few attempts have been made to model pre-project planning, apart from the CII pre-project planning work, which has been discussed in detail in Chapter 6, along with other models. The review also identified the pre-project planning tools that deal with both cultural and process issues.

2.2.1 Sources of literature review

The source of articles were derived from the following:

- European Constriction Institute (ECI) Library at Loughborough University;
- Construction Industry Institute (CII) documents and publications;
- OPAC (Loughborough University's Library data base system) on journals, periodicals and text books of interest to the research subject;
- Inter library loans;
- CD-ROM based information products for identifying materials related to the subject area;
- Bids Ei compendex for data bases for conference proceedings and engineering journals; and
- discussion with staff and peers who have similar interest.

The review of literature provided a theoretical background for issues related to the subject area and formed the basis in developing the framework for improving pre-project planning.

2.3 REVIEW OF EXISTING RESEARCH STRATEGIES

Most research is a process of enquiry or examination designed to prove or disprove information. Research methodology is a crucial aspect of any research and it follows that the success of research relies heavily on the right choice of research method. The inappropriate selection of research method can have severe consequences on the outcome of the research and invalidate the results.

Before discussion of the specific methodology adopted for this research, an overview of the available research strategies is first presented. The following section will review the different methods of collecting data and highlight their weakness and strengths in order to determine the most appropriate research method that helps the objectives set for this research to be achieved.

2.3.1 Methods of data collection

The question addressed in this research is how can pre-project planning be improved? The research question directs the research to investigate the key issues such as construction performance, the key issues need to be addressed in the pre-project planning, and the importance of client involvement in the construction process. These issues have been comprehensively discussed in the literature review in Chapters 3 to 6.

A range of data collection techniques is available and each has been designed to elicit certain types of information. Kane (1977) explained that the techniques should be used to support and complement one another. Relevant literature concerning research strategy has revealed that there are several methodologies available for collecting data namely direct observation, survey questionnaire, personal interviews and case studies (Tucker et al. 1997). According to Yin (1994) there are five strategies that are

available to pursue research questions, they include exploratory, descriptive, survey, archival analysis, history and case studies. Babbie (1992) identified five methods of collecting data, they include:

- experimental research which involves taking action and observing the consequences of data collection. This method is usually related to physical science;
- field research involves the direct observation of social phenomena in natural settings;
- unobtrusive research involves investigation without the researcher intruding into whatever is being studied;
- evaluation research seeks to evaluate the impact of social intervention by using experimental and quasi-experimental methods; and
- survey research involves collecting data by asking people questions. This method is usually associated with social science.

The specific methodology adopted for collecting data for this research is survey. The following section will present discussion on types of research involved in social science, which includes quantitative and qualitative research.

2.4 TYPES OF RESEARCH

There are two major methods generally used in the survey, they are namely: quantitative and qualitative methods. Each of these two methods has advantages and disadvantages. The selection of any or both depends largely on the intention of the researcher and the objectives of the research. The advantages and disadvantages depend largely on the nature of the research and the control the researcher has over actual behavioural events.

2.4.1 Quantitative research

Quantitative research typically involves questionnaires and to a certain extent, highly structured interviews. It involves a mass of data that is greater than the number of cases studied, the more data the more accurate the study will be (Slater 1990). The effectiveness of the selected quantitative method depends greatly on the nature of the research. For instance, if the researcher is interested in the breadth of the research, that is, when the number of respondents is essential, then the quantitative method can be used to justify decisions by use of statistics.

2.4.2 Qualitative research

Unlike quantitative research, qualitative research places less emphasis on statistics and counts. It produces descriptive data by expressing peoples' opinion. Patton (1992) defines qualitative research as "the research method consisting of detailed descriptions of situations, events, people, interactions and observed behaviour". Qualitative research has several advantages. For instance, it allows in-depth study, produces overwhelming detailed information with a smaller number of people and provides a great understanding of the topic under study. There are weaknesses involved most qualitative methods. For example, data collection by interviews and observation takes a great deal of time. However, the greatest disadvantage is that the results require some degree of interpretation and the research may be subject to bias and subjectivity.

2.4.3 Combining quantitative and qualitative research

Although many researchers conduct either quantitative or qualitative research, combining both methods has proven to be effective (Lee 1991). Semi-structured interviews combine both structured questions and open-ended questions. A combination of posted questionnaire and case studies allows for both quantitative and qualitative analysis, which is seen useful in building a wide picture of the phenomenon under study and enable validation of the findings of the literature review.

Cavaye (1996) supported a combined approach of research methods and added that it is possible to collect both types of data. In addition, Lee (1991) and Parth (1993) both argued that a single approach on its own might not provide an in depth understanding of company approach to a certain process of performance. A combined approach, however, often proves to be more powerful than a single approach. Gavaye (1996) further supported a combined approach to research method. Table 2.1 presents a comparison of quantitative and qualitative research.

Table 2.1: Comparison between quantitative and qualitative research

	Qualitative Research	Quantitative Research
Objective/purpose	<p>To gain understanding of underlying reasons and motivations.</p> <p>To provide insights into the settings of a problem, generating ideas and/or hypothesis for later quantitative research.</p> <p>To uncover prevalent trends in thought and opinion.</p>	<p>To quantify data and generalise results from a sample to the population of interest.</p> <p>To measure the incidence of various views and options in a chosen sample</p>
Sample	<p>Usually a small number of non-representative cases.</p> <p>Respondents selected to fulfil a given quota or requirement.</p>	<p>Usually a large number of cases representing the population of interest.</p> <p>Randomly selected respondents.</p>
Data collection	Unstructured or semi-structured techniques.	Structured techniques.
Data analysis	Non-statistical	<p>Statistical usually in the form of tabulations.</p> <p>Findings are conclusive and usually descriptive in nature.</p>
Outcome	<p>Exploratory and/or investigative.</p> <p>Findings are not conclusive and can not be used to make generalisations.</p>	Used to recommend a final course of action.

To meet the requirements of the objectives set for this research, the following approach was adopted:

- comprehensive literature review;
- survey questionnaire;
- interviews;
- develop conceptual framework; and
- validation through structured questionnaire.

The methodology of the research has been outlined in Figure 2.1

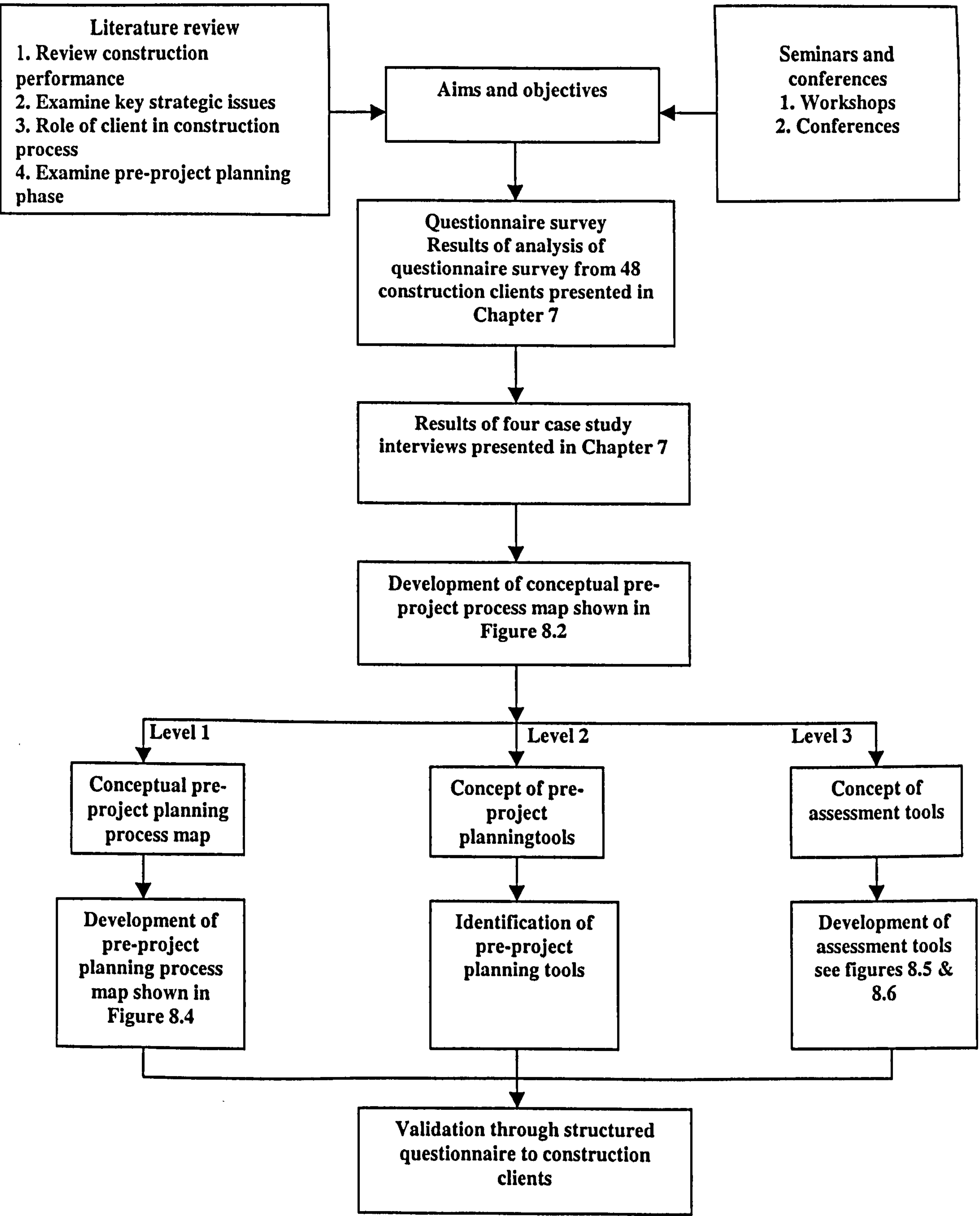


Figure 2.1: Research methodology flow diagram

2.5 STRATEGY ADOPTED FOR THIS RESEARCH

In the process of selecting a suitable research method for the research, several considerations specific to the problem associated with data from construction clients were considered. Selecting the most suitable research method depends largely on the intention of the research objectives and the type of data needed for the research. For example, Yin (1994) introduced summarised the relevant situations for different research strategies as shown in Table 2.2.

Table 2.2: Different situations for research strategies

Strategy	Form of research question	Required control over behaviour events	Focus on contemporary events
Experiments	How, why	yes	yes
Survey	Who, what, where, how many, how much	no	yes
Archival analysis	Who, what, where, how many, how much	no	yes/no
History	How, why	no	no
Case study	How, why	no	yes

2.5.1 Survey approach

Surveys are a widely accepted technique and often used because they are relatively inexpensive research method. Survey research includes eliciting information from respondents, which can be achieved by means of postal questionnaires, telephone

interviews and personal interviews. Galiers (1992) argues that that surveys are a good means of looking at far greater number of variables than is possible with experimental approaches. Survey research normally deals with studies on how people perceive and behave and the object is to determine how these variables are related.

2.5.2 Types of survey

Survey is a technique that requires the systematic collection of data from samples through the use of self administrated questionnaires or interviews. Although, Gibson and Hamilton (1994) pointed out that questionnaires and personal interviews are among the basic procedures used to collect data, they are they are known as methods that can be characterised under the concept of research approach. The following is a brief description of each of these three methods.

Questionnaire is a self-administrated measuring instrument consisting of questions to be answered by respondents. It can contain open ended or closed-ended questions as well as structured questions.

Personal interviews can be structured like questionnaires or interview guides, which provide general statements and question areas for the interviewer to present to the respondent.

Telephone interviews are similar to personal interviews except that they are conducted by telephone rather than a face to face encounter. Telephone interviews are beneficial if respondents are geographically spread out by cutting down the costs of travelling to interview the respondents in person.

Both types of survey, questionnaire and interviews have common features namely:

- information is elicited by asking people questions;
- both need instructions for clarity;
- both are concerned with sampling;
- both are concerned with design (i.e. when and how often); and

- both are concerned with the processing, analysis, and interpretation of the collected data.

2.6 ADVANTAGES AND DISADVANTAGES OF SURVEYS

A considerable amount of information is available stating the advantages and disadvantages of these research strategies.

2.6.1 Advantages

The main advantage of questionnaires is that they can be distributed to a large sample in population scattered in a wide geographical area. The data can also be generalised to represent the total population. In addition, it is time and cost effective. Gibson and Hamilton (1996) stated that questionnaires have the advantage of being cost efficient and allowing the respondent to answer in a convenient way.

2.6.2 Disadvantages

One of the main disadvantages of the survey approach is that the important variables have to be known in advance. Thus it can only be used in well-understood situations where the purpose, problem and objective are clear and well defined. To overcome this problem, a pilot survey can be used to confirm the nature of the major variables and clarify any confusion. An another disadvantage of the questionnaire survey is low response rate, which is another crucial factor. In many cases the response rate varies between 20 – 40 per cent (Frankfort et al. 1992). Another problem that contributes to the weakness of questionnaires is that they are sent to respondents who may be busy and end up passing them to someone who lacks the knowledge to answer the questions properly and therefor will not be able to provide the information required.

Table 2.3 summarises the weaknesses and strengths of the different types of survey methods.

Table 2.3: Strengths and weaknesses of survey methods

Method of research and description	Strengths	Weakness
Questionnaire: Involves obtaining information directly from participants.	Relatively inexpensive Ability to reach respondents at widely dispersed addresses. Low cost of processing.	Low response rate. Subject to bias. No opportunity to correct misunderstandings or to offer explanation.
Personal interviews	Flexible Good communication between interviewee and respondent High response rate	High cost Time consuming Possible interviewer's bias
Telephone interviews	Less cost Good communication	Loss of face to face contact with respondent
Case studies	Covers large amount of ground for an acceptable cost Provides looking in depth at complex problems	Usually restricted to a single event or organisation Data collection and analysis rely on the researcher's interpretation of events

2.7 QUESTIONNAIRE SURVEY

The first stage of the data collection used the postal questionnaire. A questionnaire survey was selected as a means of collecting data because it is more suitable when collecting data from a large sample in a population scattered over a wide geographical area. Questionnaires are one of the most efficient methods of collecting data (Hayward and Broad 1995). They are easy to use, for example they can be sent via postal services, distributed by hand or presented, by fax or on the Internet for respondents.

2.7.1 Aims of the questionnaire

The main aim of the questionnaire survey was to establish a general industry wide perspective on the construction client approach to pre-project planning and the tools they use to improve it. This relied on the frequency of a phenomenon under observation as an indicator of common behaviour. The aims of the questionnaire was to:

- define the nature of the respondents;
- identify the current approach to pre-project planning;
- determine the extent to which pre-project planning is utilised;
- gain a clear understanding of the pre-project planning approach of client organisations;
- validate the concepts for developing the framework
- validate the concepts and terminology and processes associated with pre-project planning obtained from the literature review; and
- identify the areas of improvements that may have in place a formal structure.

2.7.2 Design of the questionnaire

An important aspect of designing any questionnaire is to ensure the largest possible return, which enables meaningful analysis. It must also provide a wide coverage pertaining to the subject of concern. The success of questionnaire depends on how effectively the instruments could be handled. The accuracy of the data collected largely depends on the questions asked as well as how the respondents perceive to them. The questionnaire design was based on an extensive review of the literature dealing with pre-project planning. Very important factors were considered when designing the questionnaire. These factors included the awareness of the limited time of the respondents and their heavy schedule was considered when designing the questionnaire. Hoinville (1977) provided the following guidelines when designing questionnaire, they include:

- questions have to be designed in a clear and easy manner to allow the respondent to answer the questions;
- use a simple language and short questions and avoid naive questions and bias questions;
- questions must be easy to administer; and
- keep the respondent interested by making a good flow of structure and reasonable length of questions.

A survey was used as the method for collecting data to determine the extent to which a formal pre-project planning practice is being used. A postal questionnaire was considered appropriate for the investigation, as the total population of organisation involved is reasonably high (170). To ensure stability of the questionnaire and maximise the chance of reasonable rate of return, several important steps were taken as suggested by Fellows and Liu (1997), they include:

- primary contact of the respondent prior to sending the questionnaire by telephone;
- use up to date addresses to all respondents from FAME (1999);
- restriction of the questionnaire to six pages;
- accompany the questionnaire with a cover letter explaining the purpose of the questionnaire;
- enclose a stamped and returned envelope; and
- follow contacts were made for respondents who did not return the questionnaire past the specified date.

The questionnaire is designed to establish a general industry-wide perspective on construction clients' approaches to pre-project planning. This relied on the frequency of a phenomenon under observation as an indicator of common behaviour. The more frequently a variable for practice or process occurred, the more likely it was non-random and important hence representative of practice for construction clients.

2.7.3 Content of the questionnaire

The questionnaire essentially included the following information:

- personal details of the respondent covered general information about the respondents;
- section two dealt with pre-project planning process;
- section three included questions regarding scope definition;
- section four investigated alignment and overcoming barriers of alignment; and
- finally, section five dealt with construction performance.

2.7.4 Pilot study

Pre-testing (pilot) is a trial run for the data collection strategy using a small sample of population. Its objective is to identify unclear questions and provide preliminary test of validity and reliability of the collection method. It was decided to pre-test the questionnaires before they were sent. A pilot survey was conducted and covered a limited number of respondents. The objectives of the pilot study were to insure that adequate time and careful thought were expended in wording of the questions as well as testing the appropriateness of the data collection instrument prior to sending it to large number of respondents. The pilot survey was also used to check the following:

- the length of the questionnaire;
- the clarity and simplicity of the language used and make sure it is understood by respondents; and
- identify any defects that might exist in formulating the questionnaire.

The pilot questionnaire was sent to nine construction clients. Five responded to the questionnaire survey supplemented with ideas and suggestions that contributed to the improvement of the final version of questionnaire. The pre-testing helped refine the final draft of the questionnaire. Analysis of the responses further developed an improved structure of the content of the questionnaire and further details were added.

2.7.5 Scales and measurements

Scaling is an inherent part of a structured questionnaire as it enables the research to measure the immeasurable answer. Generally, numbers are used to convert the statements into scale responses. A five point scale often employed because it is convenient when dealing with respondents who are busy and often receive many requests for data (Kervin 1992) and more preferable as it has a mid point (Chan and Kumaraswamy 1997; Tummala et al. 1997). The propose of rating scales is to allow respondents to judge items and assign specific numeric values reflecting their opinion about the item along a continuous scale. Numerical values were assigned to ordinal scale. The results from individual responses can be combined and collectively presented. This involved rating the measuring instrument as follows.

5= always

4= very often

3= sometimes

2= rarely

1= never

2.7.6 Survey sample of construction clients

Construction is widespread and consists of many clients, so it was decided that the most appropriate way to target population is a list of construction clients taken from various sources as mentioned in Section 2.2. The sample frame targeted medium and large sized private and public clients who had established business in the construction industry. The characteristics of the medium and large clients provided the ideal basis of the company approach to performing pre-project planning since it allows comparisons among them.

2.7.7 The covering letter

A covering letter was used to accompany the questionnaire to establish the following objectives:

- allow respondents to know the aim of the research;
- provide further clarifications to the content of the questionnaire;
- assure confidentiality of the information and documents provided by respondents;
- provide respondents of the corresponding address i.e. email, fax and telephone number; and
- encourage the respondents to fill the form of the questionnaire by giving average time of the completion of the questionnaire.

The completed questionnaire document is shown in Appendix B.

2.7.8 Method of analysis

Analysis of the data has been categorised under two headings. The first one was the descriptive of data, which involves the central tendencies, measuring the spread of data and plotting distribution exhibited by the sample. Statistical analysis was undertaken using the computer software package SPSS.

2.7.9 Dealing with missing data

It is very usual that respondents fail to answer some questions. This can create a problem when analysing data especially in index construction, which is part of the methodology of this research. This research encountered this problem and the strategy used for handling missing data was that suggested by Babbie (1973). This method is simply treating the missing as one of the available responses. For instance, the items or questions were assigned scores of 1, 2, 3, 4 and 5 as previously mentioned. The missing data were assigned 0 score. However, only complete responses were used in the questionnaire analysis.

2.8 CASE INTERVIEWS

The second phase of collecting data was the use of personal interviews. The decision to use personal interviews was made purely because it most suitable in collecting comprehensive and detailed information from a small number of organisations. However, the selection of the interviewees was based purely on the outcome of the questionnaire. The interviewees added valuable and detailed information to the client's approach to pre-project planning that was not possible to obtain from the questionnaire alone. In summary the interviewees provided means for validating the data collected from the questionnaire survey.

2.8.1 Types of interviews

Patton (1980) identified four major types of interviews they include:

- informal conversational interview;
- interview guide approach.
- standardised open-ended interview; and
- closed quantitative interviews.

The three different types of interviews are shown in Table 2.4.

Table 2.4: Types of interviews

(adopted from Coomb 1999.)

Type	Characteristics
Structured	Wording of the questions and the order in which they are asked which is the same from one interview to another. Respondents are expected to choose an answer from a series of alternatives given by the interviewer.
Semi-structured	Interviewer asks certain major questions the same each time, but free to alter their sequence and probe for more information (Fielding 1993).
Unstructured	Interviewer prepares a list of topics that they want the respondent to talk about, but free to phrase the questions as they wish, ask them in any order that seems sensible and even join conversation by discussing what they think of the topic themselves

It was decided to choose semi-structured interviews because they allow the flow of information as much as possible and in depth discussion could be conducted freely which will encourage the interviewee to participate in his maximum ability. The main problem lies in the interpretation of data, as it is generally unsystematic.

2.8.2 Design of the interview

Personal interviews were selected to get feedback and more details about the construction client practice of pre-project planning. The time constraints and the availability of personnel to be interviewed restricted the number of the interviewees to just four interviews. The interviews included four client organisations namely: NHS hospital, a supermarket and a university estate office. Despite this limited number of

interviews, the ideas expressed and amount of information along with the documents provided by the interviewees added valuable and useful information of the client's approach to pre-project planning and was fruitful in further developing the framework.

2.8.3 Objectives of the interviews

Detailed interviews were used in order to develop an in depth understanding of the attitudes and perceptions of the people involved in the pre-project planning process.

The interviews were focused to achieve the following:

- to provide an insight into the process of pre-project planning and clarify some of the aspects of the questionnaire;
- to identify additional information on specific areas of the questionnaire; and
- to assist in the development of the framework.

2.8.4 Content of the interviews

The interview questions grouped as follows.

1. Background information, aimed at collecting the following information:
 - name of the organisation;
 - number of years in business; and
 - number of employees and turnover.
2. Pre-project planning practice of the organisation.
3. Tools used and their effectiveness.
4. People involved.
5. Limitations of the current process.
6. Actions for improvement.

This information provided a clear picture of the samples specific details. The questions of the interviews and accompanied letters are included in Appendixes C.

2.9 THE APPROACH OF VALIDATING THE FRAMEWORK

The following approaches were considered for validating the framework.

The first option considered was to conduct four case studies with selected client organisations to compare the framework to their actual processes undertaken in their projects. To perform this approach, requires that the framework should be thoroughly explained in detail and in depth in a face to face interviews with specialised people.

The second option considered was to meet with a group of professionals from the construction industry who has the knowledge concerning the subject to discuss with them the framework. This would require reviewing and comparing the framework to specific projects.

The third option was developing a structured questionnaire for interviews with clients to evaluate the effectiveness of the framework using a five-point scale.

The approach that was selected to validate the developed framework was to meet with individuals from the client organisations and demonstrate to them how the framework works which comprises three sections. The first section is the pre-project planning process, the second section is the assessment tool for measuring pre-project planning progress, and the third part is an assessment tool for measuring the factors that inhibit pre-project planning improvement. The validation of the framework is presented in Chapter 8.

The document also included illustrative examples of how alignment tools such as the agreement matrix and alignment thermometers as well as the project definition rating index (PDRI) tool are implemented in the pre-project planning process. The document also included demonstrations of how to use these tools where explained to the interviewees by showing them illustrative calculations of measuring degree of agreement, the evaluation of completing scope definition and the alignment of project team on the project objectives. The respondents then were asked to validate the framework based on structured questionnaire consisting of two scales. The first scale

is to allow the respondent to rate his/her opinion in the framework. The second scale is to allow the respondent to rate his/her degree of confidence on his /her answer.

This first scale was from 1-5 where as follows.

1 = Poor

2 = Average

3 = Good

4 = Very good

5 = Excellent

Basis of the evaluation were:

- applicability;
- efficiency; and
- usefulness.

Validation documents is shown in Appendix D

2.10 SUMMARY

This chapter has reviewed the available methodologies and outlined the research methodology adopted for this to formulate the aim and objectives of the research. The chapter has described how the research was undertaken and justified the methodology adopted for this research. Combined methods enable a deeper understanding of how pre-project planning is practised and help identify the factors that inhibit its improvement. For example, the questionnaire survey used to verify the findings of the literature review and provided information on the extent to which construction clients approached pre-project planning. On the other hand, personal interviews provide more detail information about the degree of formality behind pre-project planning.

It was decided to use questionnaire survey and case study interviews to elicit information on how pre-project planning is practised by construction clients. The questionnaire and interview contents, scales and measurements used and the pre-testing

of questions are also discussed in this chapter. The next chapter will present and analyse the data obtained from questionnaire and case interviews of construction clients' approach to pre-project planning.

CHAPTER THREE

REVIEW OF CONSTRUCTION PERFORMANCE

CHAPTER THREE

REVIEW OF CONSTRUCTION PERFORMANCE

3.1 INTRODUCTION

This chapter examines the performance of the construction industry for the purpose of understanding the barriers that contribute to poor performance and to establish methods for improvement. The chapter highlights the factors contributing to poor performance and the key actions required to improve construction performance. The chapter also reviews cultural issues as well as process issues that are thought to be important to improving performance and identifies the tools that deal with these issues. The purpose of addressing these issues is to draw a clear picture of the factors influencing the performance of the construction industry and find ways to improve it.

3.2 THE IMPORTANCE OF CONSTRUCTION INDUSTRY

The construction industry is an important contributor to the UK economy both in terms of the employment and products. For example, construction employs fourteen per cent of the UK workforce, and the industry represents over ten per cent of the Gross Domestic Product (GDP) (Kawkye 1997; and Cox 1998). It also accounts for over forty per cent of the Gross Domestic Fixed Capital Formation (GDFCF) in dwelling and other new buildings (Hillebrandt 1984; Bennett et al. 1988; and Egan 1998). Despite its importance to the UK economy, the industry is still troubled with poor performance and litigation which characterises it in relation to other industries (Naoum 1997).

3.3 THE NATURE OF CONSTRUCTION INDUSTRY

Construction projects are widely accepted as complex in nature. This complexity is evidenced in a number of different ways, such as: size of the project; technical

complexity; contractual arrangements used; and the range of client-consultant-contractor relationships. This view was also expressed by (CIRIA 1983).

The construction industry is also characterised by the involvement of different parties such as clients, contractors, subcontractors and consultants. The interaction of these parties, who have their own objectives which differ from the others in the same supply chain and consequently often lead to conflict and litigation. Their performance has a great impact on the outcome of the project. Disparities between project objectives and the objectives of the participating organisations play an important role in this. This is attributed to the fragmentation of the construction industry (Burati et al. 1992; Sanders and Eskridge 1993; and Latham 1994).

3.3.1 Conflict

The complexity of construction projects often contributes to schedule growth, which in turn can lead to costly disputes. Although both the client and contractor aim to complete the project on time and within budget, the client is always exposed to possible delays and additional costs for which there is no compensation (Kwakye 1995). There are often conflicting objectives among the project participants which result in low performance (Kwakye 1995). One of the problems traditionally associated with the construction industry is extensive conflict among individuals and groups. It is a critical element, which is ignited by the differences among project participants.

Conflict sometimes occurs when people perceive the same thing differently. Conflict in construction is often attributed to time pressures groups with different interests and communication laps (Singh and Vlattas 1991). Conflict is defined as “a form of interaction among parties that differ in interests, perceptions and preferences” (Sing 1998). Potential conflicts often remain hidden in construction projects until the budget starts to build up. The reaction of the client could be either to accept a contractor's claim or getting engaged in long hard and expensive courtroom battles. Conflict is frequently attributed to: time pressures; groups with different interests; and communication lapses (Sing and Vlatas 1991). Mohsini and Davidson (1992)

explained that conflict in the construction industry could adversely affect project performance. Singh (1998) classified conflict as follows:

- conflict of difference in interest;
- conflict of values; and
- conflict of opinion.

(Singh 1998) identified the general sources of conflict as follows.

- **Relationship conflict** resulting from differences in responsibilities. This type of conflict can be based on conflicts of values and opinions.
- **Task conflict** involves disagreement about how to fulfil the organisation's mission.

Abudayyeh (1994) summarised the most frequent causes of organisational conflicts as shown Table 3.1.

Table 3.1: Sources of conflict
(source: Gardner et al. 1998)

Source of conflict	Result of conflict
Task interdependency	Conflict resulting from dependency upon others like information feedback.
Organisational differentiation	Conflict due to different groups or people perceiving the same thing differently.
Values, interests and objectives	Conflict arising from misalignment of personal goals with the project goal.
Tension	Conflicts resulting from unsolved and mounting interpersonal tensions.
Personality traits	Conflict escalation due to the lack of understanding or inability to manage personalities encountered.

According to Kharabanda and Stallworthy (1990), Porter (1996) and Krug (1995), the characteristics that influence disputes are people, process issues and project issues. The conflict could occur in different situations as suggested by Handy (1983), they are namely:

- formal objectives overlap;
- role definition overlap;
- unclear contractual relationship;
- simultaneous roles; and
- hidden objectives.

3.3.2 The reduction of conflicts

It can be concluded that managing conflict at the early stages of the project is a critical element for improving performance. One widely accepted tool that has proven to be effective for reducing conflict is team building (Kharabanda and Stallworthy 1990; Porter 1996; and Krug 1995). Singh (1998) reported from the work of Rahim and Brown (1992) a method for reducing conflict described as “an adequate conflict diagnosis” and it includes information such as:

- sources of conflict;
- conflict frequency;
- conflict management style; and
- the group’s position on the conflict balance.

Heisler (1994) outlined that potential conflict can be overcome by sufficient discussion among project personnel and its management so that the problem is fully identified and the inputs of the personnel are clearly understood.

3.4 PROJECT CHARACTERISTICS

One characteristic of construction projects is their continuous growth in size and complexity as technology advances. Another characteristic is the involvement of different people in the development of the project and their different roles and responsibilities. There are many types and sizes of projects, they range from small domestic projects which may only take minimum effort and time to prepare to the

large international projects which involve much higher cost and effort. However, although many organisations allocate appropriate managerial resources for their large projects, they fail to do so for their smaller projects, which in turn make proportionally greater losses. Each project has its own characteristics, but they have also have a common life cycle, which needs to be defined. Projects also have beginning and end, are made up of a large number of tasks, and demand resources to execute them. Most projects have the following features:

- a start and finish;
- a life cycle;
- a budget with an associated cash flow;
- activities that are essentially unique and repetitive;
- a team of people;
- use of resources, which may be from different departments and which need co-ordination; and
- a single point of responsibility (i.e. the project manager).

3.4.1 Definition of a project

According to Rosenau (1998), projects have a three a three dimensional objectives, are unique, involve resources and accomplished within an organisation. There have been many attempts to formally define what a project is. The different definitions of a project are shown in Table 3.2.

Table 3.2: Definitions of a project

Contributor	Definition
Lewis(1995)	An on time job that has a definite starting and ending point, clearly defined objectives, scope and budget.
Turner (1993)	An endeavour in which human, material and financial resources are organised in a novel way to undertake a unique scope of work of given specification within constricts of time and cost.
Ahuja (1994)	A unique undertaking for essentially a single purpose which is defined by scope, quality, time and cost objectives.
Anderson et al 1998	A unique set of activities that require a variety of resources and limited time.
Healy (1997)	An on-off change achieved by a finite time ordered set of tasks. The time-ordered set of tasks is called the project sequence.
Burke (1999)	A temporary endeavour undertaken to create a unique product or service.
Meridith and Mental (2000)	A specific finite task to be accomplished and identify purpose, life cycle interdependencies, uniqueness and conflict as attributes that characterises projects.
PRINCE (1996)	A management environment that is created for the purpose of one or business products according to specified business case.

A notable point that should be mentioned about these definitions is that they have common themes, a group of activities involving time, cost and resources that are interacted to achieve specific goal; a human activity that achieves stated objectives against a time scale. This traditional view of a project implies that there are three aspects of a project represent the ultimate objectives of any client to achieve namely: cost, time and quality product. Each is dependent upon each other to some degree

(they are interrelated). For example, a reduction in project cost may result in a poorer quality product. The same principle applies to project time. For instance, improving project time may lead to an increase in project cost.

3.4.2 Project objectives

Although the management of projects is all about dealing with compromises, it is very difficult to concentrate on one of these objectives without affecting the (objectives), because they are interrelated. The integration of time, cost and quality was presented as a triangle of balanced requirements. There should be balance between these project objectives since a change in one of them will lead to a change in another, the client and the project team must understand the balance between time, cost and quality that is to be sought for the project (Wittaker 1997). The implication here is that for example, to improve the project costs (complete the project within budget limits) may be in the expense of project quality or to complete the project earlier may lead to an increase in cost. These criteria can be graphically represented by project triangle shown in Figure 3.1, which illustrates the relationship between these interdependent variables.

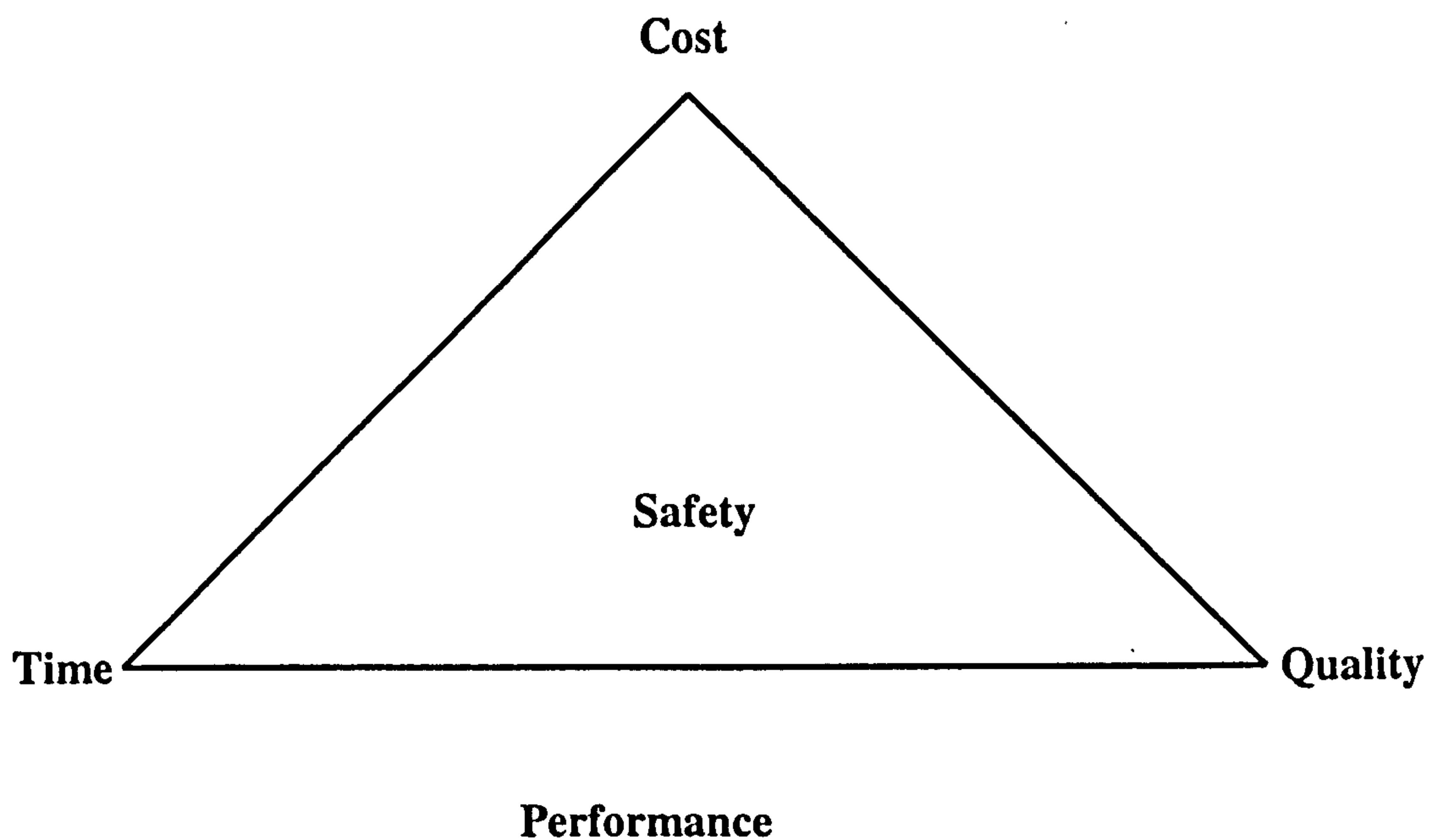


Figure 3.1: Time, cost and quality
(source: Burke 1999)

Lewis (1997) outlined that certain industries like airlines, mining and railways, where safety is a main factor, safety is considered to be quality. Rosenau (1992) represented this by a diamond figure shown in Figure 3.2 that shows the important criterion.

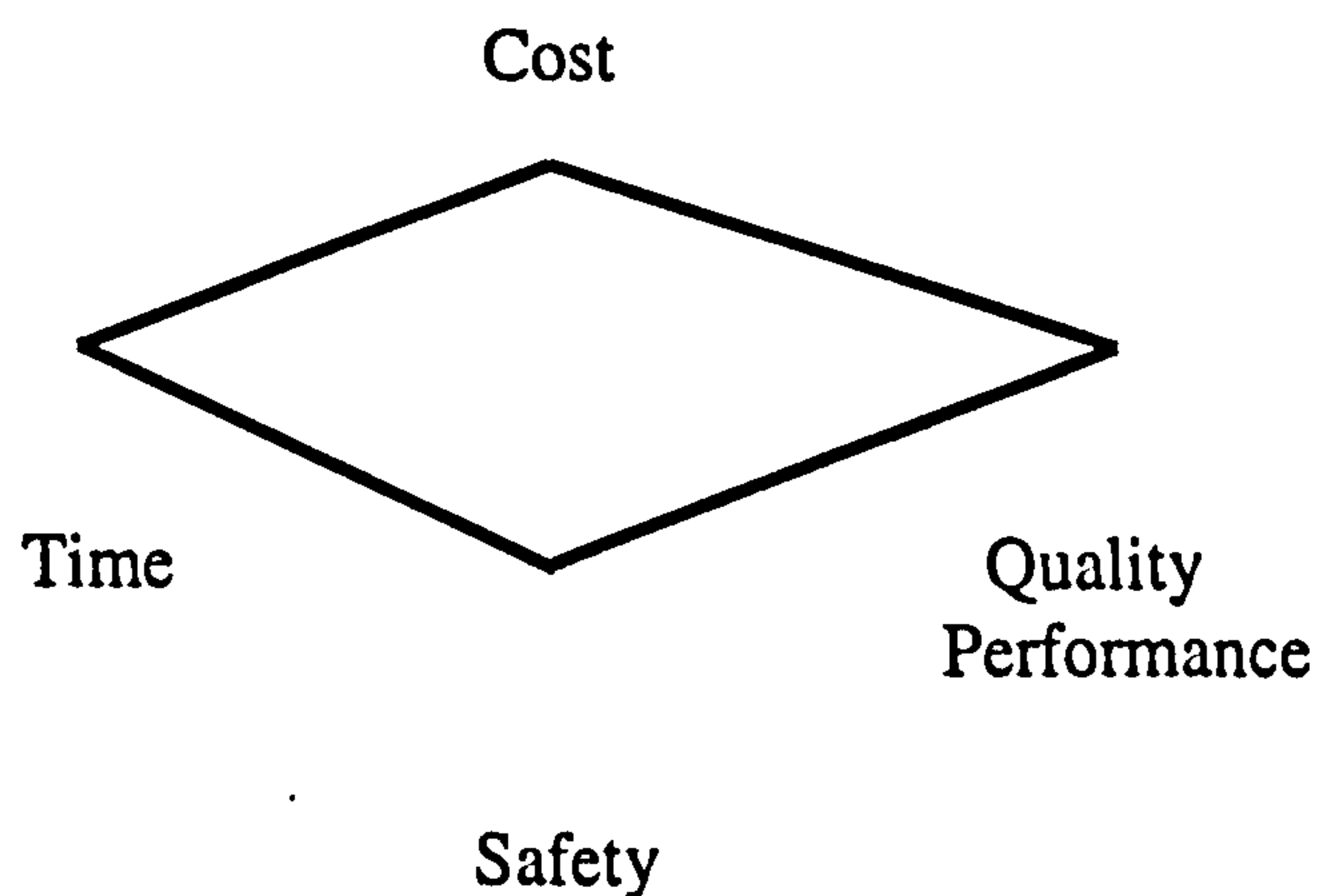


Figure 2.2: The aspect of safety
(source: Rosenau 1992)

Quality could be considered to be the same as performance even though some organisations refer to it differently. Rosenau (1992) identified the triple constraint as

a very important concept as it defines the project performance, times schedule and money. He outlined that the triple constraints are difficult to satisfy because most of what occurs during any project activities tend to affect performance below specifications and cause project delays which in turn lead to delay in schedule and consequently extra cost.

According to Ahuja (1994), most construction projects have four common objectives: time, cost, quality and good will. They are the primary and the traditional construction performance measures on most construction projects (Ward et al. 1991). Although there have been many attempts to improve performance, limited success has been achieved (Egan 1998). For example, during the 1970's, construction performance in the UK reached such a low ebb as to dominate the execution of all large projects. More of this problem than was generally recognised at the time was the result of poor management and the lack of properly developed project strategy.

Quality is an integral part of scope, budget and schedule and the source of many projects associated with projects is the failure to define the project scope (Oberlender 1993). This is because all too often the focus is just on budget or schedule. One reason for not achieving performance specification is poor communication between the contractor and consumer as they have different perceptions of specifications. For example, security for a military contracting officer may mean a secret classification, whereas, a person working on a military software project might mean data protection (Rosenau 1992). Figure 3.3 illustrates the practical relationship between the triple constraint parameters. At a given level of performance, a particular schedule will result for a particular budget. According to Rosenau (1992), if more budget is available, more effective may be applied to the project and as a result the schedule can be shortened.

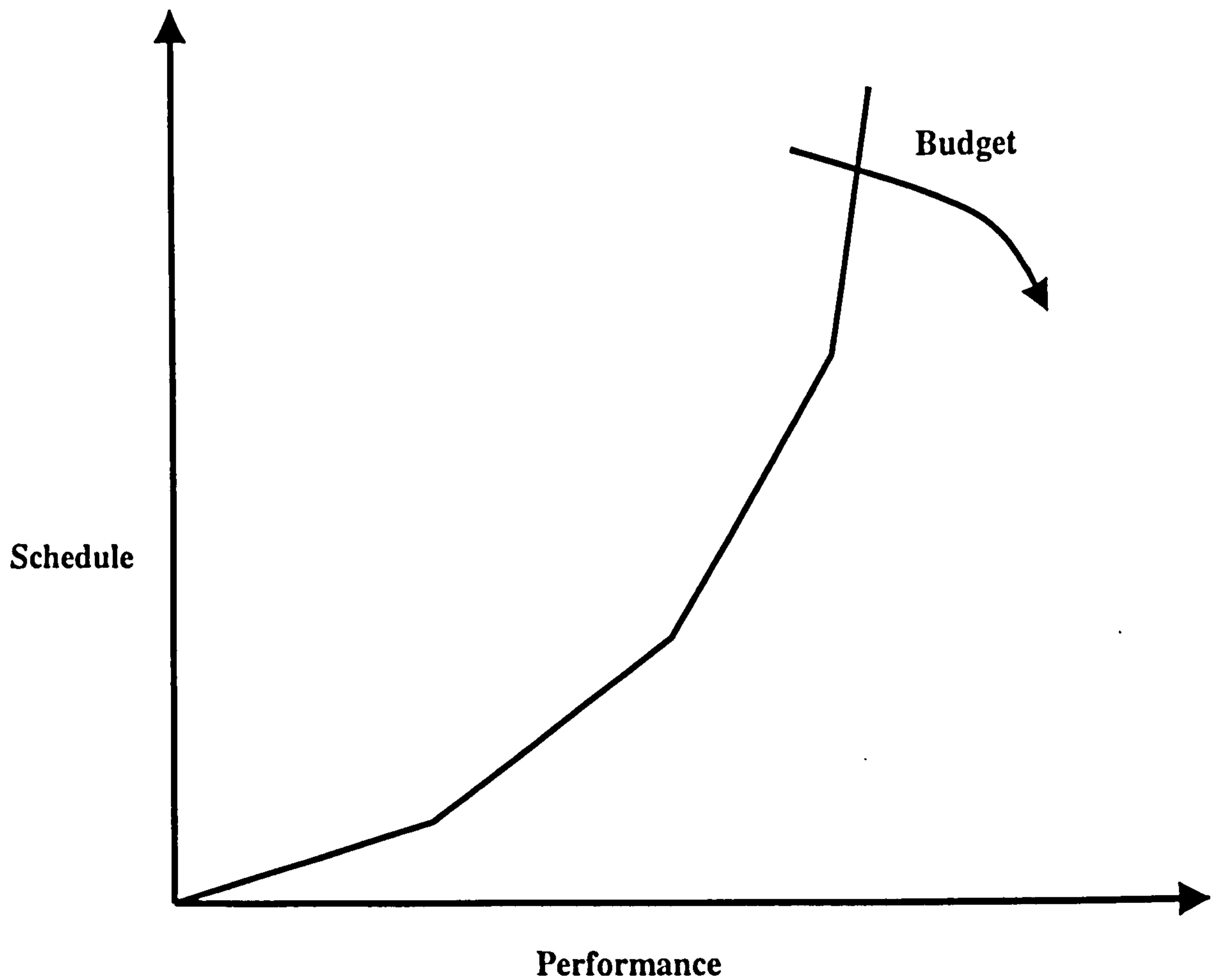


Figure 3.3: The triple constraint trade off.

(source: Rosenau 1998, p.17)

Figure 3.3 illustrates that the triple constraint is very difficult to satisfy because of most of what occurs during the course of a project tends to pull the performance below specification and cause schedule delay which in turn makes it exceed budget. The figure demonstrates that at given level of performance a particular schedule will result for a particular budget. If more budget is available (Shown in the figure as a lower curve), make effective resources may be applied to the project and consequently schedule can be shortened. The triple constraint is an important concept because successful projects means achieving performance specifications on time and within budget cost. The concept illustrates the need to simultaneously satisfy these independent objectives not just one.

3.5 PERFORMANCE OF THE CONSTRUCTION INDUSTRY

Before discussing what needs to be done to improve construction performance, it is essential to shed some light on the problems that cause poor performance and identify those factors that affect improving construction performance. The construction industry faces many barriers to achieving high quality performance, as a result of the complicated nature of the industry.

Literature reveals that productivity, value for money and overall client satisfaction in the construction industry is low compared to other industries. There appears to be no single factor that is responsible for this. This view was expressed by Cox et al (1998) who argued that "a range of factors is more realistic conclusion to the factors contributing to the insufficiency of the construction industry". They identified some of the problems and barriers to achieving value for money they include:

- low and discontinuous demand;
- frequent changes in specifications;
- inappropriate contractor/consultant selection criteria;
- inappropriate allocation of risk;
- poor management;
- inadequate investment;
- an adversarial culture; and
- fragmented industry structure.

In his report, Latham (1994) reaffirmed the conclusion of several previous studies on the subject. The Latham report focused on the fragmented nature of the industry as a major factor that contributes to poor communication between all parties working on a construction project. The main recommendation within the Latham report was the need for significant cost savings by utilising the formulation of effective construction processes, which will in turn lead to increased project performance.

Additionally, the recommendations of the Latham report were again reaffirmed in a recent report by Egan (1998) who reported to the then Deputy Prime Minister, John Prescott, on the scope for improving the quality and efficiency of the UK

construction. Egan also identified the following five key drivers of change that need to set the agenda for the construction industry at large:

- committed leadership;
- focus on the customer;
- integrated processes and teams;
- quality driven agenda; and
- commitment to people.

Proposed changes include better integration of project processes, sustained culture changes, design for ease of construction, more use of standard components and processes, and an end to competitive tendering in favour of long-term relationships. Within the focus of integrated processes and teams, four key elements were identified: product development; project implementation; partnering the supply chain; and production of the component. Furthermore, the Egan report (1998) called for annual reduction of ten per cent in construction cost and time and 20 per cent in project defects. This total performance improvement of 30 per cent requires significant improvement in the way that the construction process is enacted. It requires significant reengineering of the construction process and sub-processes involved in undertaking construction work (Kagioglou et al.2000).

3.6 PROBLEMS IN THE CONSTRUCTION INDUSTRY

The poor performance of the construction industry has resulted in clients criticise the industry for not delivering what they want. The majority of clients are still not satisfied with the quality of the construction process both in terms of waste and defects (Egan 1998). Karbu and Landenpera (1999) and Tucker and Ambrose (1998)) suggested that the inefficiency of the construction process is the main contributor to the underachievement of the construction time (Carpenter 1981; Egan 1998).

3.6.1 Factors attributing to poor performance

Kawkye (1997) explained that fragmented industry is considered to be the main contributor to the poor performance of the industry. The fragmentation of the

construction industry is often caused by the lack of co-ordination between disciplines involved in the construction (Ashworth 1991; Anumba and Evbuomwan 1995; and Kamara et al. 1996b). Higgin and Jessop (1965) supported this argument which is seen as the main reason for to litigation.

The fragmentation of construction has resulted in several problems such as the lack of adequate co-ordination of the project participants involved in the construction activities. This resulted in rework and changes in design, which led to extra cost and time and consequently disputes and litigation (Ashworth 1991). The characteristic features of the construction industry as a whole are given as the reasons why such problems occur (McGeorge and Palmer 1997, p.121):

“The argument is often made that the construction industry is highly compartmentalised, highly fragmented, under capitalised and operates on a single project by project basis, and so on”.

According to Bennett et al (1988), Latham (1994), Atkin and Potheary (1994), CIT (1996) and Egan (1998), the underachievement of the construction industry, is reflected in the following:

- little investment in research;
- unreliable rates of profitability;
- poor training and shortage of skills; and
- inadequate selection of designers and contractors by clients on the basis of tendered price.

The increased awareness of the present position has been driven by the Latham review published in 1994 and the reports of the construction task force undertaken by Egan at the request of the Development of Trade and Regions (DETR). The previous discussion has shown that poor construction performance can be attributed to two main aspects, namely:

- people issues or soft issues that deal with people and cultural aspects; and

- process issues, which deals with tools, techniques, procedures etc.

3.6.1.1 People issues

Gibson and Griffith (1997) emphasised that people are the most important asset in construction, therefore managing people is important in any attempt to improve the performance of construction industry. However, the theme of the people is more difficult to measure and define due to various reasons. Among these reasons are that people usually perceive things differently. These different objectives are seen as a main cause of conflict by many researchers. It is often difficult to bring together adverse relationships and in a co-operative environment because each party involved have their own objective.

Most construction projects involve many different separate parties such as the client, contractor subcontractor suppliers (Bryant et al.1969; and Cherns and Bryant 1984). The presence of these different professionals in construction projects could cause difficulties due to lack of communication among these different parties. Higgin and Jessob (1965) described the relationship between the construction parties as “problematic, devise and litigation”.

3.6.1.2 Process issues

The process issues include tools, techniques and procedures. It is important to adopt effective processes that lead to improved performance. Low (1998); and Tucker and Ambrose (1998) emphasised that insufficient construction process is the cause of the underachievement of the construction industry.

3.7 THE NEED TO IMPROVE PROJECT PERFORMANCE

From the 1960s to the 1990s, a succession of the UK government sponsored reports have exhorted the construction industry to work better in order to improve productivity. Recent reports from Latham (1994) and Egan (1998) suggest that there is room for improvement. Incentives for improved performance include those that relate to cultural aspects as well as to process issues. The pressures to the way construction processes are executed can be classified into internal and external

driving forces. Research into improving construction processes have been examined by many studies such as (DETR 1998). Table 3.3 summarised these driving forces.

Table 3.3: The driving forces
(adopted from: Gichuri 2000, pp.10)

Internal forces	External forces
<ul style="list-style-type: none"> • Cultural changes within the construction industry. • Client expectations and values have changed. • Realisation of technology solutions not addressing the primary processes characteristics of the construction industry. • Legislative and regularity control changes 	<ul style="list-style-type: none"> • Awareness of changes in other industrial sectors. • Awareness of other industrial use of time based competition expression to reduce the production life cycle duration and to improve the quality of their products. • Awareness of other industrial sectors moves toward being globally competitive.

Improved performance is generally associated with the adoption of best practices (Lake and Ulrich 1992; Latham 1994). Many studies have concluded that something needs to be done to improve the construction performance in the UK. Among these studies are the reports of Latham (1994) "Constructing the Team", CIB 1997), Egan (1998). All have addressed recommendations for change. The need for improving construction performance can not be over emphasised especially with the increasing complexity of construction projects. However, achieving high levels of performance requires radical changes and improvement in construction, which is suggested by Egan's report "*Rethinking Construction*". The need for change in construction can be justified by two reasons. Firstly, the nature of the industry of not being competitive and secondly, its inability to fully satisfy clients' objectives.

There is a world-wide drive to improve efficiency and construction costs. Table 3.4 shows the performance improvement targets that have been set within the UK

construction industry. These UK targets come from a government drive to reduce the infrastructure costs and suggested by the Latham report (1994) and Eagan report (1998).

Table 3.4: Construction sector performance improvement targets
(source: Riley 2001, pp. 149)

Performance metric	UK Government ESPRC
Total project delivery time.	Reduce by 20%
Lifetime cost (operation maintenance energy).	_____
Productivity and comfort levels of acceptance.	Improve by 20%
Occupant health and safety costs.	_____
Durability and flexibility in use over a lifetime.	_____
Construction worker health and safety costs.	_____
Costs.	Reduce by 30%
Construction quality.	Zero defects

The need for change in the construction industry has focused at improving the following.

- The process, including alternative procurement strategies (Ashworth 1991) which sought to improve communication between the different parties involved (Naoum 1994; Turner 1996).
- The efficiency and quality, which included the introduction of new tools and techniques which involved the adoption of a wide range of concepts and tools such as partnering and total quality management (CIB 1997b; Bennett and Jays 1998). Total Quality Management and partnering will be highlighted later in this chapter.

Furthermore, culture change and client satisfaction are essential for construction performance improvement. They are discussed in detail in Chapters 4 and 5.

3.8 PROJECT SUCCESS

Before further discussion is pursued, it is important to understand how the participants of the project perceive project success. To establish this, a definition of project success must first be established. Literature has revealed that the degree of success depends on many factors. To a large extent, it is a function of the perspective of the people involved on the construction project. Thus it is essential to understand both the client's perspective as well as the team's perspective.

3.8.1 Definition

To achieve client satisfaction, minimise the risk of any changes during the construction period and ensure project success, the early phase in the project life cycle is recognised as being very important. During this phase, the involvement of the client is critical in order to ensure that all of the requirements are taken into consideration.

A review of literature on project success has demonstrated that project success has been the focus of many studies. But noticeably, much of the research concerning project success focused on identifying the critical success factor that lead to the project success, mainly cost, schedule and time performance (Ashley et al.1987, Pinto and Slevin 1988). Many other studies related project success to teamwork and emphasised the importance of teams to the success of a project. Larson (1995) stated that project success could only be achieved if owners and contractors work as a team and establish common achievable objectives. Table 3.5 demonstrates the various contributions to the identification of critical success factors.

Table 3.5: Comparison of different success factors

Contributor	Success factors
CIIA (1995B) report	Goal orientation.
Ashley et al (1987)	Planning effort, commitment, team motivation and scope definition.
Gibson et al (1994)	Effort expended during pre-project planning.
Morris (1994)	The client is the source of project success or failure.
Larson (1995)	Client and contractor co-operation as a team.
Clark (1994)	Team commitment.
Griffith and Gibson (1997)	Alignment during pre-project planning.

3.8.2 Measurement of success

The success of a project can be measured in terms of different variables such as, cost, time, quality and safety (Turner 1993; Ashley et al. 1987; and Sanvido et al. 1992). Further, Beale and Freeman (1992) outlined that success can be measured in three ways, “sponsor (customer or user) measure, project manager measures and sponsor internal project manager measures”.

3.9 PRODUCTIVITY

Businesses within the construction industry have, for many years, been implementing new initiatives to improve productivity and attain quality gains (Sarshar et al. 1998, British Quality Foundation 1996). Despite the attempts to improve productivity, the targets set by Latham Report (1994) have not been met yet. Egan (1998) called for productivity improvement and urged the industry to focus in particular on construction process. Productivity is an extremely important measurement tool within the construction industry, as well as the economy as a whole. According to Lowe (1987), “the impotence of productivity growth to an individual enterprise, an industry or an economy is something on which most economists would agree”.

3.9.1 Definition of productivity

The Oxford English Dictionary defined productivity as “productiveness in an industrial production”. The later edition of the same dictionary defined productivity as “the capacity to produce the rate the output for unit input. The Collins Cobuild Language Dictionary (1987) defined productivity as “ a measure of efficiency of company which is calculated by comparing the amount or value of goods produced with the time and money spent on producing them and the number the number of workers produced them”. The British Productivity Institute defined productivity as “the ratio of output to input of materials, labour, energy and capital equipment”.

(Wild 1995) defined productivity as “ a relationship between the output generated by a production or service system and the input provided to create this output”. This is referred to as total productivity. Olomolaiye et al (1998) define productivity as “the rate to measure the output of the factors of productivity over a defined time period, a measure of how well the resources are utilised as well as the factors behind the production itself”.

3.9.2 Measurement of productivity

Productivity is widely known as a relationship between the inputs and the outputs, often expressed as the outputs divided by the inputs. The basic level of productivity is that of the consumption of resources on the project such as labour, money, time, materials and plant (Sanvido 1988; Barrie and Paulson 1992; Fox 1993). The measurement of productivity varies depending on the purpose of measurement. For example, time and cost are the measurement of productivity in the project level (Sanvido 1998; Ireland 1992; and Jaggar and Martin 1994). The difficulty of measuring productivity in the construction industry as been expressed by both Logcher and Collins (1978) who stated:

“Construction productivity is difficult to study because the factors that affect it are never constant, varying from job to job. In addition, construction contractors who deal directly with labour are generally limited in their ability to devote time and money to the formal assessment of productivity”.

Lema and Price (1996) stated that, in practice, it is often difficult to quantify all inputs and outputs of the production process. That implies that productivity is a ratio of output to input. In the construction industry, measurement of productivity and efficiency tends to be more output oriented as opposed to input oriented. The definition of productivity as output per unit input is one of the most widely used definitions. This definition of productivity considers the use of partial measures, which gives a misleading picture of the whole concept of productivity. Gold (1990) points out that such partial measures do not provide an adequate measure of productivity as a whole. Bishop (1968) links productivity to the utilisation of resources. He asserted that “productivity is taken as the optimum utilisation of resources to obtain an acceptable goal”.

3.10 QUALITY

3.10.1 Definition

The dictionary defines quality as “degree of excellence”. Quality is meeting the needs and satisfaction of the ultimate end user of the project, the owner (Oberlender 1993). It is the responsibilities of all the project team. Quality is about meeting the general customer requirements both now and in the future. Quality is the ratio of what is offered versus of what is expected (Thiry 1997).

3.11 TOTAL QUALITY MANAGENENT

Total Quality Management was founded on the principles advocated by Deming, Juran and Crosby. Deming was famous for his role for turning Japan into a giant and dominant economic power after the end of the war. Figure 3.4 illustrates the evolution of the philosophy, practices and techniques of TQM.

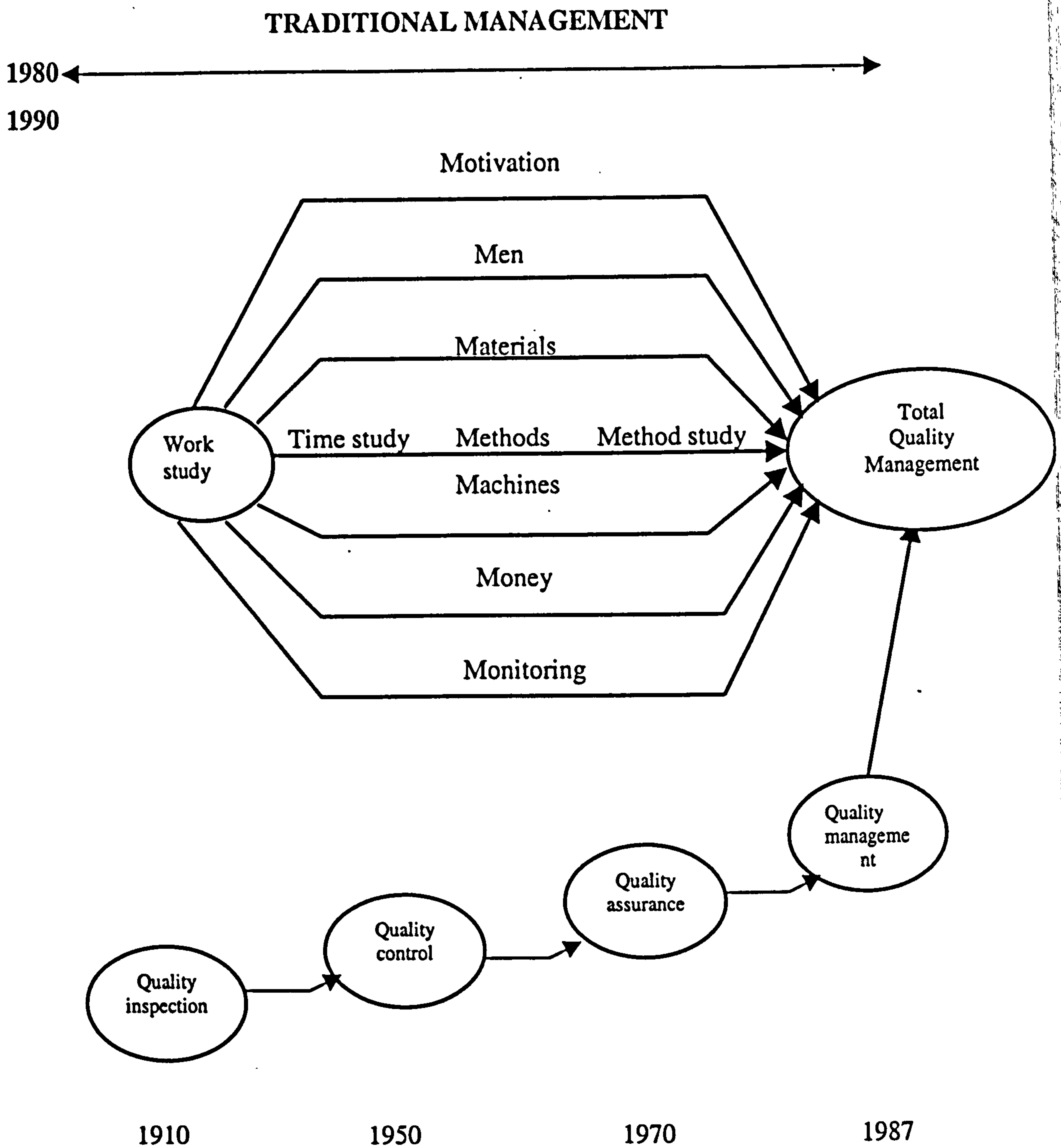


Figure: 3.4: The evolution of techniques and philosophy leading to total quality management
(adopted from: Hearld 1993)

3.11.1 Definition

There is no generally agreed definition of TQM. Literature suggests that it is a management philosophy and a set of techniques and procedures which targets continuous improvement and total customer satisfaction. However, the generally accepted definition of quality is that of “conformance to the established requirements”. It emerged as comprehensive project management technique emphasising on the importance of the clients, continuous improvement and teamwork (Burke 1999).

Saylor (1992) stated that “TQM is a philosophy that relatively absorbs earlier proven systems, tools and practices that will ensure continuous improvement and total customer satisfaction”. Although there are many different definitions for TQM, satisfying the customer need is the main in all these definitions. It is therefore important to identify these needs early on in the project life cycle. Being a philosophy, TQM management accepts the tools that enhance continuous improvement. TQM management includes ideas that participants should work together for a common goal that includes partnership with suppliers and customers (Oakland 1994). Saylor (1992) stressed that TQM principles are based on the following:

- orientation: customer satisfaction;
- emphasis: continuous improvement of quality;
- measurement: establish priorities and quantification;
- human resources: respect for employees and their ability to improve the quality of business process;
- teamwork and leadership; and
- organisation issues: company wide support of TQM principles, starting at top cross functional approach to managing business process.

3.11.2 The principles of TQM

Total Quality Management targets improvement and customer satisfaction (Saylor 1992). Its tools and practices secure continuous improvement and total customer satisfaction stated the following are the main principles of TQM:

- customer relationship at each link within the delivery system;
- prevention rather than detection of defects means that there is an emphasis on identifying the origin of the defects and continually improving the capacity of preventing from accruing;
- leadership: total commitment of top management to the principles of TQM;
- change in organisational structure: attitudes and expectations about ways of working must change in line with philosophy of TQM;
- emphasis on teamwork: problem solving requires cross boundary communication and co-operation; and
- the use of social tools: methods for measuring improvements must be developed.

3.11.3 The importance of TQM in the construction industry

Total Quality Management can be applied to improve construction processes. Potentially, TQM offers techniques that can reduce construction problems, lower costs and reduce delays in project completion. However, a TQM programme requires a certain level of effort by client organisation.

Griffith (1992) asserts that in the construction, TQM and similar management techniques have focused on the complete problem. Rather, He adds, the focus should be on how to lead people to develop a system that will continually improve the construction product. Previous work on TQM seems to suggest that many of Crosby's approaches to quality fit the construction industry well.

3.11.4 Linkage between productivity and quality

The traditional view that links productivity to quality in order to achieve high quality, productivity has to be sacrificed and vice versa. One of the key issues examined by

Latham was that of the productivity of the industry and it is clear that he considers that this linked to the quality of design preparation and information (Cooke 1998).

It can be argued that Total Quality Management with its focus on process and teamwork provides a link between improving performance and cultural issues. Customer satisfaction and continuous improvements are the fundamental goals of total quality management and therefore are the principles upon which is based. In that perspective, TQM can be seen as a management philosophy that effectively determines the needs of the client.

3.12 REVIEW OF PROJECT MANAGEMENT TOOLS

Project management tools played significant roles and contributed to performance improvement in manufacturing and business sector. Although all these practices may not be directly applicable to the construction industry, many construction partitions have reported some degree of success.

Increased interest in tools and techniques for improving efficiency and quality learned from other industries, including benchmarking, value management, and total quality management. There are several tools that have been developed in the construction industry. They have been proved as important tools for improving project performance and teamwork. Gibson and Griffith (1997) identified the following tools:

- risk management and control software;
- historical information regarding lessons learned;
- partnering agreement with outside supplier or contractor;
- scope definition checklists;
- project team in progress;
- work process flow diagram; and
- constructability, concurrent engineering and design and build.

3.12.1 Risk management

No construction project is risk free, in fact all construction projects carry with them to a certain extent an element of risk. Risk and uncertainty are inherent in all construction projects irrespective of project size. This risk encompasses time, cost and quality as well as risk allocation. Any attempt to manage or reduce risk has to take into account the trade off between these performance measures. Risk management plays an important role in construction as it can be used as a tool for solving the problems associated with risk. For example, contractors wish to analyse and control risk in order to make a profit.

3.12.1.1 General risks

Risk has been defined in various ways. There is no single correct definition of risk. In order to emphasis the major objectives of risk management. According to many commentators, the construction industry is subject to more risk and uncertainty than any other industry. According to Gould et al (2000), the general risks that occur on any project are classified as follows:

- financial risk where the cost of the project exceeds the money that has been allocated for the project;
- time risk where the project is not completed on the time originally planned;
- design risk where the project will perform the function for which it was intended; and
- quality risk where poor quality materials or workmanship or work will be incomplete in someway.

Table 3.6 summarises the types of risks and allocation of those risks.

Table 3.6: Construction risk allocation to participants

(source: Fisk 2000)

Type of risk	Contractor	Client	Engineer	Comments
Site access Subsurface conditions Quality variations Weather Acts of God	• •	• • • •		Can be transferred to the contractor. Contractor can assume risk up to 15 to 25%. Normal weather for the time and location only.
Financial failure Subcontractor failure Accident at site Defective work Management incompetence	• • • • •			Sharing of escalation risk should be limited 12 to 18 months span. Usually the contractor's risk; however owner could incur some liability.
Inflation Economic disasters Funding Materials and equipment Labour problems Owner furnished equipment Delays in the work	• • • •	• • • • •	•	
Environmental control Codes and regulations Safety at site Public disorder Union strife	• •	• • •		
Errors and omissions Conflicts in documents Defective design Shop drawings			• • • •	

3.12.1.2 Definition

The term risk management is usually defined as the product of the possibility of the occurrence of a hazardous event and the economical impact of this event (Smith 1999). Risk may be identified as “the exposure to loss or injury as a consequence of uncertainty” or as the chance of an adverse event occurring (Cox et al. 1998).

3.12.1.3 The process

The risk management process is a formulised planning process that identifies both obvious and obscure risks. Risk management is a systematic process and complementary methodology contains of five phases: identification; analysis; evaluation; response and monitoring. Risk management is not a once for all activity, it should be applied continuously the life of the project.

However, the results of risk management are most useful at the decision points for the client where crucial decisions concerning the project are made. According to Al-Baha and Grandall (1990), risk management is defined as “a formal orderly process for systematically identifying, analysing and responding to risk events throughout the life of the project to obtain to the optimum or acceptable degree of risk elimination or control”. Whittaker (1995) stated that the project management process includes the following:

- identify risk factors;
- analyse their effects; and
- respond to risk.

It is important to identify risk early because risk is high during the early phase of the project life cycle, where there is the greatest degree of uncertainty about the future of the project (Burke 1999). Furthermore, Buttric (1997) suggested that risk should be addressed at the early at the start of the project since risk uncertainty is high. Figure 3.5 shows the risk development through the project life cycle.

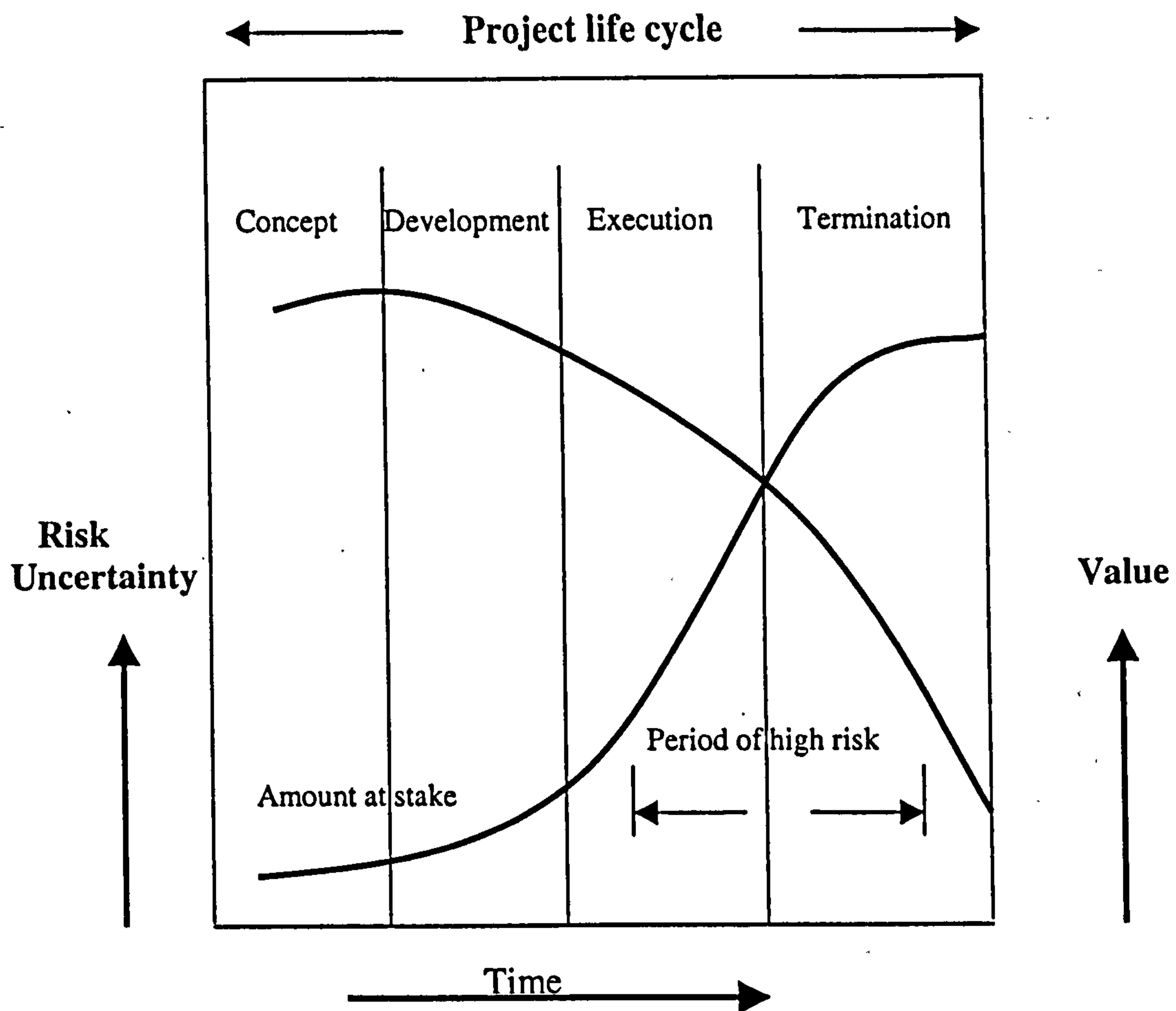


Figure 3.5 : Risk through the project life cycle
(source: Burke 1999, pp. 231)

It can be observed from Figure 3.5 that risk is highest during the early phase of the project life cycle, where there is the greatest degree of uncertainty about the future of the project (Burke 1999). This means that risk should be dealt with early to increase the probability of project success.

The basic process behind any approach to risk management is to identify the probability of certain risks occurring and their impact when they occur. The generic process of risk management is as shown in Figure 3.6.

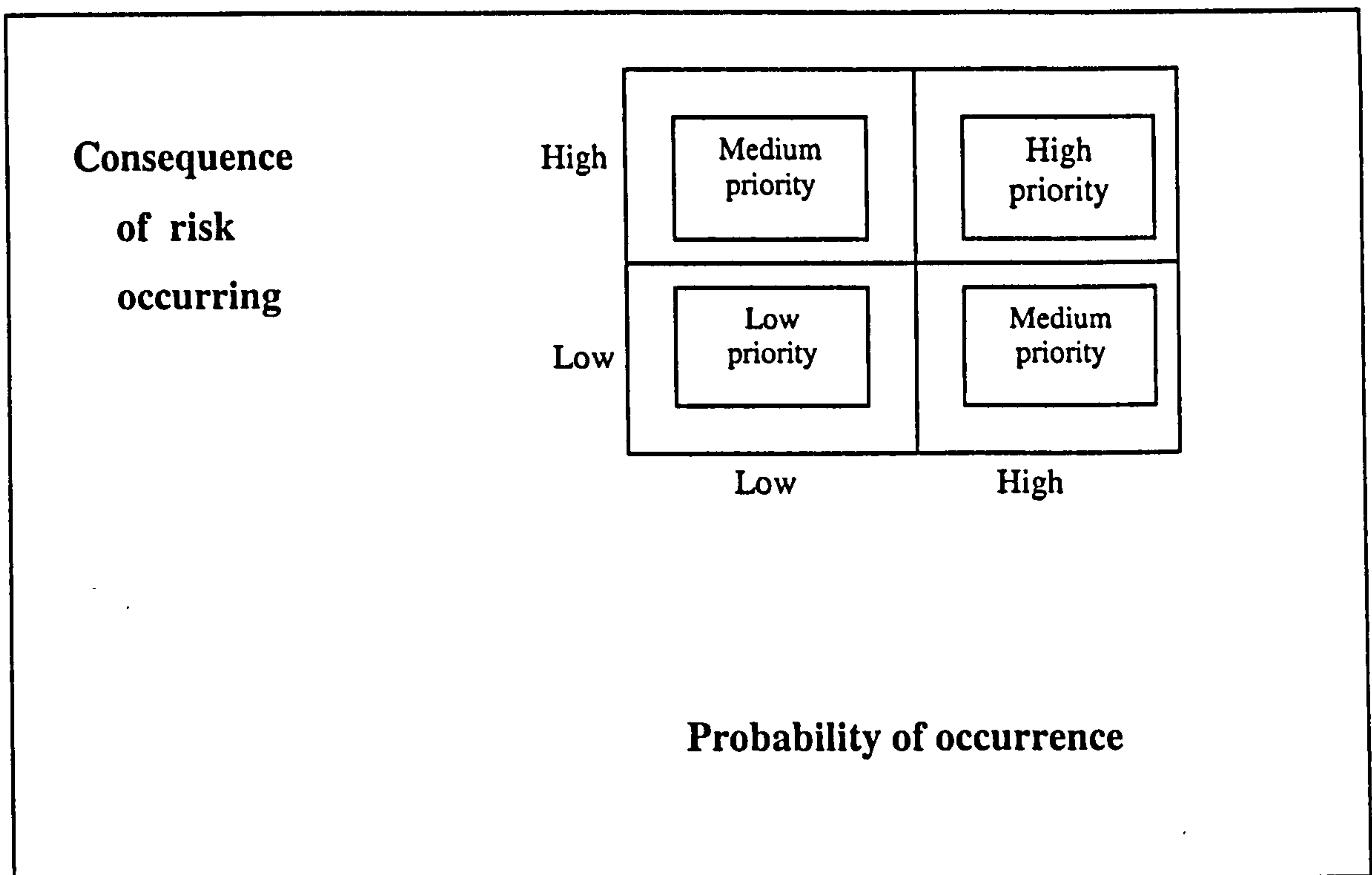


Figure 3.6: Prioritisation and management of risk

(source: Cox et al. 1998, pp. 233)

3.12.1.4 Dealing with risk

As pointed out earlier, the greatest degree of uncertainty about the future of a project is encountered at the early stages of the project life cycle because decisions made at this stage can have a very large impact on the outcome of the project. Thus, it is important that risk is identified and measured risks must be during pre-project planning, this will benefit the client by giving him a much clearer idea of the project and enable him decisions with more confidence.

There a number of phases normally associated with risk management process, these phases include:

- identification, where the risk that affect a project are formally identified;
- assessment, where the identified risks are assessed;
- analysis, where the effects of the risk on these projects are calculated;

- control, where measures and actions are implemented to control the identified risks; and
- monitoring and feedback, where the whole risk process is reviewed to ensure the risk is controlled effectively.

3.12.1.5 Risk identification

Construction projects are subject to risk, which can result from known or unknown conditions. These risks must be identified and risk checklist is helpful to identify risk. There are many attempts to identify and quantify risks encountered in engineering projects (Ashley 1980, Diekmann 1983, Russel and Ranasinghe 1992).

3.12.1.6 Risk assessment

Risk assessment involves comparing the level of risk found during the analysis process with established risk criteria and deciding whether risk can be accepted. It is important to identify and assess the risk early to determine the business risk and availability of project schedule. The Project Management Book of Knowledge (PMBOK) described the risk management as a process that follows a cycle consisting of:

- risk identification;
- risk quantification;
- response development; and
- response control.

Ward et al (1991) suggested that the successful implementation of risk management is amplified when used. Applying project risk management is used as a tool for measuring projects effectively throughout the project life cycle. According to Ward et al (1991) risk management process includes:

- identification of risks;
- determinate options of handling risks; and
- measurement of risks.

Figure 3.7 illustrates risk management as an iterative systematic process divided seven steps.

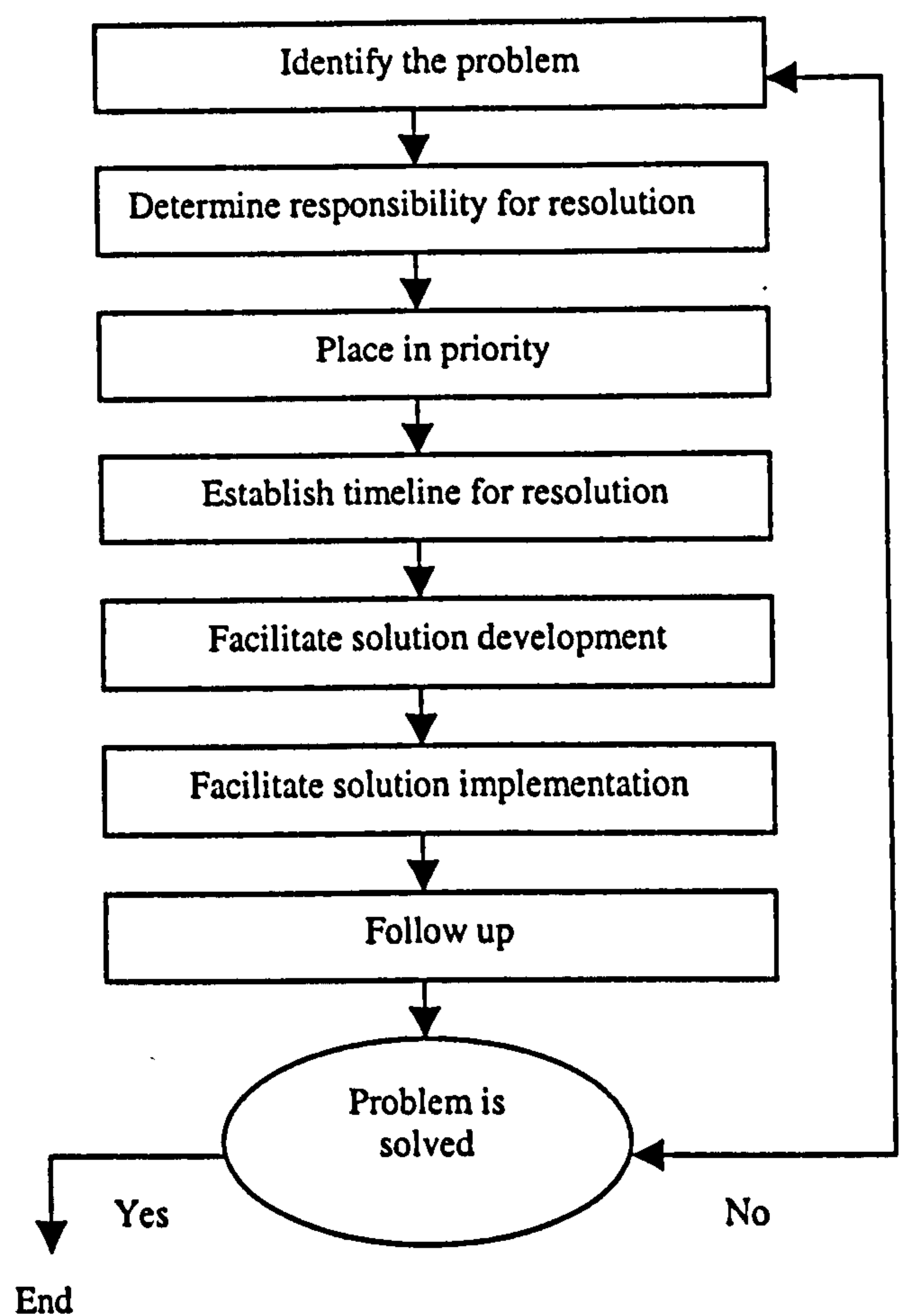


Figure 3.7: Risk management process
(source: Thiry 1997, pp. 79)

3.12.2 Partnering

The competitive environment and the rigid requirements of contracts have helped to create adverse relationships in the construction industry. Partnering is seen as an approach that focuses on making long term commitments with mutual goals for all parties involved in order to achieving mutual success. The concept of partnering based on trust and openness between parties involved, as advocated by Latham (1994). It was an attempt to reduce the adversarial attitudes of project participants in

the construction and promote co-operation between parties to the benefit of all concerned.

In the UK, the study undertaken by Latham (1994) gave the UK industry the focus it needed in order to improve the relationships between all parties involved. Partnering was seen by many as the key to achieve improvement. More recently, Egan (1998) advocated the use of partnering in his review of the UK construction industry. He concluded partnering the supply chain is a critical way that the construction industry can drive innovation and sustain improvement in performance.

3.12.2.1 Definition

Partnering can be best defined as a way of doing business with a contractor or customer that recognises that common goals exist which can be achieved through co-operation and open communication. There are many definitions given to partnering. The literature review provides several definitions of partnering (Lamming 1993; Latham 1994; Loraine 1996; and CPN Movement for Innovation 1999). For example, the New South Wales defined partnering as “a management process employed to overcome the traditional adversarial and litigation of the construction industry (CII 1996). The Reading Construction Forum related partnering to long-term communications between several organisations for the purpose of achieving specific business objectives.

The most frequently exercised definition of partnering is that provided by the Construction Industry Institute's Partnering Task Force (1991) and National Economic Development Council (1991) which defines partnering as:

“A long-term commitment between two or more organisations for the purpose of achieving specific business objectives to maximising the effectiveness of each participant's resources. This requires changing relationships to a shared cultural without regard to organisational boundaries. The relationship is based on trust, dedication to common goals and understanding each other's individual expectations and values”.

The concept of partnering involves developing a co-operative management team with key players from the organisations involved in the construction process. Partnering is defined as “teambuilding effort when parties build a co-operation relationship to develop a project (Groton 1997). The literature revealed that there are key attributers associated with partnering as summarised in Table 3.7.

Table 3.7: The key attributers to partnering

(source: Cox et al 1998, p.45)

	Primary Sources						
Key contributors	CII 1991	NEDC 1991	Partnership sourcing 1994	Baden- Hellard 1995	CIB 1997	ECI 1997	Bennett 1997
Mutual objectives (risk and rewards)	•	•	•	•	•	•	
Agreed method for early problem solution	•	•	•	•	•	•	•
Continuous measurable improvement	•	•	•	•	•	•	•
Equality in relationships	•	•		•	•		•
Open culture		•	•		•		•
Customer focus					•		
Management and stakeholder commitment	•		•		•	•	•
Trust	•	•	•	•	?		•
Long-term commitment emphasis	•	•	•				
Innovation		•					
Team approach						•	

(Fisk 2000) identified the following as the key elements of partnering, they include:

- commitment to partnering from top management;
- all of the parties interests need to be considered in creating mutual goals;
- trust;
- development of mutual goals and objectives;
- develop strategies for implementing mutual goals as well as mechanism for solving problems; and
- timely responsiveness.

The concept of partnering is based on a long-term relationship. The defined partnering as “a relationship between two or more companies or organisations which is formed with the express intent of improving performance in the delivery of projects”. It is designed to achieve specific business objectives and improve the performance of the people involved through a set of processes and procedures to use their resources and experience more efficiently.

3.12.2.2 Key principles of successful project alliances

Partnering and alliance are keys to improved performance in construction, they underpin processes and technical innovations that contribute to better project, improved value for clients and higher return for the industry. The success of partnering depends on many factors. It requires early implementation and the commitment of all members at all levels. Most successful alliances display a number of key elements that lead to successful implementation of partnering. The ECI (2001) stated the following as key features of project alliances:

- early involvement of participants;
- equitable relationship;
- managerial commitment;
- commercial alignment; and
- integrated team.

Partnering has been considered as a method designed to improve contractual relations as well as communications (Bennett and Jays 1995) and then transferring the contractual relations into a co-operative aligned teamwork (Cowan et al. 19992). It is obvious from the different definitions of partnering that its success depends primarily on communication, commitment, trust and mutual goals and objectives.

3.12.2.3 The benefits of partnering

There several benefits to partnering that includes improved communication, reduction in cost, improved performance higher quality and improved safety (Bennett 1995). Partnering can also reduce risks of cost overrun (CII 1996). The benefits of partnering can be summarised as (Ahuja 1994):

- improved ability to respond to changing business conditions;
- improved quality and safety and fewer errors;
- reduced cost and time and improved profits; and
- more effective utilisation of resources.
- efficiency and less bureaucracy;
- cost certainty;
- quicker construction;
- fewer disputes
- better quality and safety standards; and
- reasonable profits.

Some other cited other benefits include the following:

- Larson (1995) concluded that partnered projects achieved superior results in controlling costs.
- CIB (1997) cited five case studies that partnering benefits included reducing costs and programme times.
- Bennett et al (1998) in their study of six case studies outlined that each case study gained benefits seen as reduced costs and programme times.

Despite the stated benefits of partnering it is still criticised and has been called into doubt within the construction management literature.

3.12.3 Constructability

Constructability or buildability as in the UK has been widely adopted in the USA and Australia as a mean to increase cost efficiency. The Emmerson Report (1962), was one of the first to examine constructability in the UK with regard to the lack of close relationship between the architect and constructor. The concept of constructibility evolved from studies into how improvement can be achieved to increase cost efficiency and quality in the construction industry. It is basically an approach that links the design and construction process.

3.12.3.1 Definition

Many definitions have been given to constructability, the most widely accepted being the one produced by the American Construction Industry Institute (CII 1983) defined constructability as “the optimum use of construction knowledge and experience in planning, design, procurement and field operation to achieve overall project objectives and promote potential cost and savings”.

3.12.3.2 Principles of constructability

The principles of constructability have been developed for improving the level of constructability achieved on a project. Their effectiveness depends on their inclusion in the project procedures. That puts on the involvement of the project team right from the start of the project. According to Eldin (1998), a project can benefit from a constructibility program performed at the beginning of the conceptual design. The principles of constructability represent the best practices that are aimed at encouraging the project team to apply them where appropriate to their projects. They are the cores of the system. The principles include the following:

- integration;
- construction knowledge;
- team skills;
- corporate objectives;
- available resources;
- external resources;

- program;
- accessibility;
- specifications;
- construction innovation; and
- feedback.

Although constructability has a positive impact on construction performance, its programs evolved from the lack of a formal comprehensive approach (Anderson et al. 1995). There are several barriers to implement constructability one of which is related to the client by being reluctant to invest money and effort in the early stages of a project and through the lack of understanding of its concepts (O'Connor and Miller 1994). In addition, Moore (1996) identified a number of reasons why constructability has not been accepted in the UK. One reason is the inconsistent approach to both defining and applying constructability. Furthermore, Eldin (1997) identified results of five case studies in five different companies that barriers to implemented constructability cab be employee related, management related and process related. Table 3.8 illustrates the results of the case studies.

Table 3.8: Barriers to constructability
(source: CII 1996)

Employee related	Management related	Process related
<ul style="list-style-type: none"> • Lack of skills • Lack of training 	<ul style="list-style-type: none"> • Lack of support from top management • Insufficient budget to meet project requirements • Lack of willingness to take risk 	<ul style="list-style-type: none"> • Lack of training programs • Lack of continuity due to movement of personnel from one project to another • Lack of understanding the process

In addition to the previously stated barriers, other barriers include:

- traditional form of contract limits the inclusion of output;
- reluctance to invest money and effort in the early stages;
- unwillingness to disclose too much information prior to the award of contract;
- lack of construction experience in design organisation; and
- lack of qualified personnel to implement constructability.

It can be concluded that although constructability has a positive impact on construction performance, its success depends heavily on the degree of understanding its concepts and effort to overcome the barriers mentioned above.

3.12.4 Benchmarking

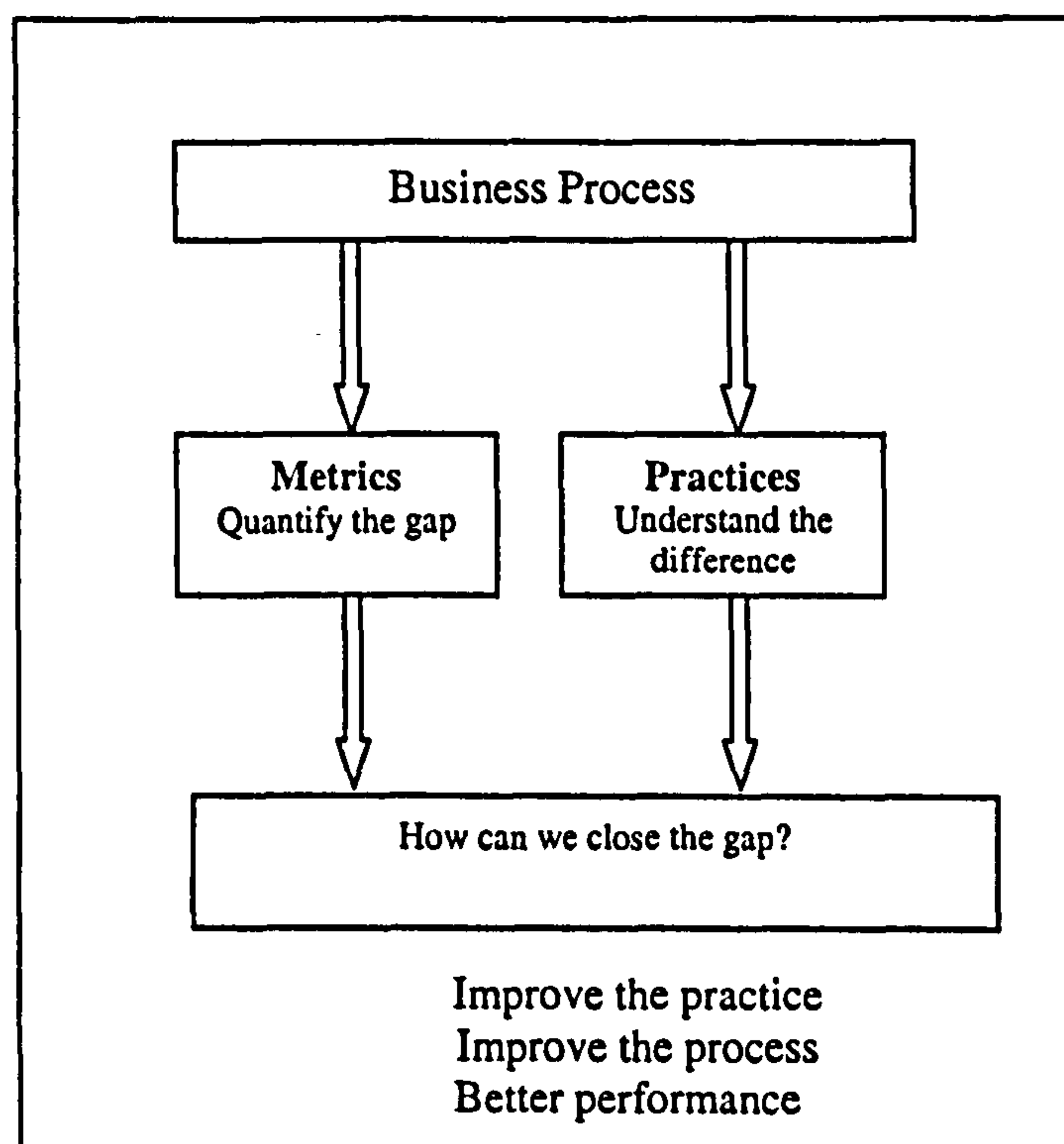
Benchmarking is a tool that has been applied to many industries with notable success. It is about companies and organisations comparing their practices and performance in key activities. It is a useful tool based on the belief that it is possible to identify and examine the best practices of other organisations and then make constructive changes in one's own organisation. Benchmarking as a planning tool originated with Xerox Business Systems in the late 1970's. Benchmarking is emerging as one of the main tools of TQM as a means of cultivating improvements and has proven success in manufacturing and services industries in the USA and Japan. Lema and Price (1994) stressed that benchmarking has been recently gained the recognition as a viable tool for TQM. Benchmarking is the practice of comparing business and performance levels between divisions, competitors or world best, as part of continuous change and improvement. One advantage of benchmarking is that it can be applied in construction to both the product and the process with reference to time, quality and cost.

3.12.4.1 Definition

The CII defined benchmarking as "a systematic process for measuring one's performance against results from recognised leaders for the purpose of determining best practices that leads to superior performance when adopted and utilised".

Anderson and Peterson (1996) defined benchmarking as “the process of continuously measuring and comparing one’s business process in dealing organisations to obtain information that will help the observing organisation to identify and implement improvements”. Figure 3.7 shows that benchmarking can measure business process (Love et al 1998).

Figure 3.8: Competitive Benchmarking and performance metrics and practices



3.12.4.2 Types of benchmarking

Benchmarking is classified into various types depending on the company’s strategy. Benchmarking can be divided into the following:

Internal benchmarking compares performance between departments, units within an organisation.

External benchmarking identifies the competitor’s product and then compare with own product.

Lema and Price (1994) stressed that benchmarking has been recently recognised as a viable tool for TQM. Thus inconsistency and confusion exist regarding its terminology. According to Watson (1993), the objectives of the benchmarking system is to assist participants to:

- compare the performance against others;
- provide an indication of how to improve performance;
- quantify the use and value of identified good practices; and
- identify industry norm and trends.

3.12.4.3 Benefits of benchmarking

Benchmarking has noticeable benefits and can be summarised in the following (CIB 1997):

- provides better understanding of customer's needs and their competitor's activities;
- more customer satisfaction;
- reduction in waste, quality problems and rework;
- faster awareness of important innovations and guides on how to apply to achieve profitability;
- provides strong reputation with their markets; and
- increased profits and turnover.

It can be observed that benchmarking is a powerful and useful tool to promote process changes and improvement that has been proved to be successful and could be used in construction industry to improve overall performance.

3.12.5 VALUE MANAGEMENT

Value management is a structured, systematic and analytical process which seeks to achieve value for money by providing all the necessary functions at the lowest total cost consistent with required levels of quality and performance (Burke 1999). Value management is about clarifying and satisfying customers' needs. However the goal of the value management is not to reduce costs but to establish balance of

performance with cost. Therefore, value can be reached when balance is achieved between quality and resources (Thiry 1997).

The concept of value management was first introduced to the construction industry in the USA by Alphons Dell losola. Since then it gained popularity and became widely used. It was used as a cost reduction tool. Later, it was developed to be used into more abstract entities as Process Protocol. Several value management researchers such as Green and Popper (1990); Kelly and Male (1993); Green (1997) have seen the focus of value management move further up the client's decision making process to its core strategic planning stages.

Value management addresses the overall project objectives, questioning the need for the project in the first place and seeking to clarify the client's priorities in achieving the project (Hayden et al. 1996). Value management is defined as "an organised function oriented team approach directed at analysing the functions of a product, system or supply for the purpose of enhancing its value by identifying and eliminating unnecessary costs and achieving the required performance at the lowest project life cycle cost". It can assist in creating a culture, which enhances project performance by reducing risks.

3.12.5.1 Customer value

Value like many other concepts is a subjective, however it can be measured. However, Thiry (1997) provided a formula where customer value can be measured as follows:

$$\text{Customer value} = \frac{\text{Needs} + \text{objectives} + \text{Targets}}{\text{Maximum overall resources expected}}$$

There are many types of values and their importance varies depending on the objectives of the client. (Thiry 1997) identified the following types of values.

1. **Use Value** – The amount of resources spent to realise a finished product as it was intended.
2. **Esteem value** – the amount of present resources a user is willing to spend for a function attributable to pleasing rather than performing.
3. **Exchange value** – the amount of present resources for which a product can be traded.
4. **Cost value** – the amount of present resources spent to achieve a function measured in money value (currency e.g. pound dollar etc.).
5. **Function value** – the relationship of function worth function cost.

3.12.5.2 Benefits of value management

The principles of value management are important to the improvement of the construction performance. Hayden et al (1996) outlined the following benefits:

- improved communication and team working;
- a shared understanding among the people involved;
- better quality project definition and design briefing; and
- increased innovation.

3.13 SUMMARY

The need to improve construction performance has long been emphasised by Egan (1998) and Latham (1994) in their recommendations for improving overall construction performance. Despite all the success of some management tools, which are reviewed in this chapter, the construction industry is still suffering from many problems. This chapter reviewed construction performance and identified the factors attributing to poor performance. Several project management tools that proved to be effective to improving performance have been identified. It is concluded that improved performance is the key to achieving project objectives. However, to improve construction performance, key strategic issues need to be addressed by the client organisation in which require careful assessment and evaluation before the start of the construction project. Improving performance and achieving client satisfaction can be achieved by addressing key strategic issues by the client at the early stages of

the project life cycle as well as improving cultural aspects by adopting tools that deal with the soft issues. The next chapter will address these key issues that need to be addressed as a way forward to improving construction performance.

CHAPTER FOUR

KEY STRATEGIC ISSUES FOR IMPROVING CONSTRUCTION PERFORMANCE

CHAPTER FOUR

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4.1 INTRODUCTION

Chapter 2 reviewed the performance of the construction industry and highlighted the key factors contributing to poor performance and the need to improve construction performance. The chapter also emphasised the importance of the cultural issues as a contributor to poor performance and identified some of the tools used for improving performance and assessed their benefits and use. This chapter discusses the key and strategic issues that need to be addressed for achieving improvement in the construction industry and satisfying clients needs. The chapter is focused on the following:

- project strategy;
- project execution plan;
- contractual arrangement;
- organisational culture;
- alignment; and
- scope definition.

Project definition and project strategies both are important aspects in the success of a project. It is important in the early stages of the project development that the client develops a clear project definition and a project strategy. They cannot be separated, as there is interaction between them. However, Whittaker (1997) draws a clear distinction between these two aspects by defining the project definition and scope definition as follow.

- **A Project Definition** details the scope and the nature of the plant to be designed and constructed.

- A Project Strategy states how the design and construction of the project is to be accomplished.

4.2 PROJECT DEFINITION

Arguably, if any aspect of a project is more responsible for project failure than any other, it is the lack of an adequate project definition. Clear and accurate definition of a project is one of the most important actions to be taken to ensure any project's success. The definition of a project involves a process of selecting and reducing of the ideas and perspectives of those involved into a set of clearly defined objectives and evaluated risks. The project definition document should be approved at various stages in order to allocate resources for the construction activities. According to Whittaker (1997), inadequate project definition is responsible for many project failures in recent years.

4.3 PROJECT EXECUTION STRATEGY

It is difficult to imagine a major project executed without a project execution strategy of some kind. It is important to develop the project strategy in the early stages of the project because it is crucial to the success of the project. The project strategy (sometimes referred to as the Project Execution Plan) defines in broad terms the major project activities to be executed and the time and manner of execution (Whittaker 1997). Oberlendor (1993) and Ahuja (1994) revealed that a project execution strategy should include contracting strategy, roles and responsibilities of the project team, schedule procurement and construction. It has enormous benefits to the client as it provides philosophy and can be helpful to (Hayden and Parsole 1996):

- evaluate building policy and company strategy; and
- optimise internal specifications.

The client's project manager develops the project execution strategy for the project sponsor and includes all the details the procurement approach adopted for the project. According to the CIB (1997), the project execution plan includes the following:

- procurement arrangement;
- organisational structures;

- arrangements for decision making and communications;
- health and safety plan;
- quality plan;
- risk management plan;
- value engineering and value management procedures;
- programme, including all milestone and phasing requirements;
- detailed budget and cash flow forecast; and
- procedures for PR and community relations.

In order to have an effective project strategy, certain factors have to be considered. According to Ahuja (1994), some of the factors which might have to be considered when developing the project strategy, include the following:

- objectives;
- business requirements;
- technology;
- external influences;
- resources; and
- risk.

Considerations of all of the above should lead to an effective project strategy. However, project objectives the most important factor for project strategy. Lack of adequate project objectives has been proved crucial in the development of project strategy.

4.3.1 Project objectives

The formulation of clear project objectives is the primary requirement of the strategy. The project manager or the client representatives should be present along with the business management in the development of the project objectives. The input of the project manager and business management form the preliminary information of the duration of the project time, the way the project is executed and the cost of the project. There can be considerable difficulty and conflict in getting objectives in place. This is because the objectives at the beginning are broader than the specific solution that emerges at the end of the project sequence (Heisler 1994).

4.4 CONTRACTING STRATEGY

The development of the contract strategy is an important task for the client because it comprises a through assessment of the choices available for both the design and the construction processes. The contract strategy is the general contractual framework, which must define the way the project is approached. The purpose of contract is to establish the rights, attitudes, obligations and responsibilities of the contracted parties. Perry and Hayes (1985) outlined that a contract strategy should include the following components:

- the choice of the type of the contract;
- how the contract should be selected;
- the choice of organisational structure to control design and construction;
- the choice of the content, extent and sequencing of the work packages; and
- selection and preparation of tender documents, including the conditions of contract and the allocation of risk between client and contractor.

4.5 SELECTING THE PROCUREMENT METHOD

Several reports have stressed the importance of procurement, but perhaps the most influential of all is the Latham Report (1994) “Constructing the Team”. This report was intended to identify a way to reduce conflict and litigation and encourage the industry’s productivity and competitiveness. Latham (1994) considered current procurement and contractual arrangement and current roles and performance of the participants, including the client.

4.5.1 Factors affecting the selection of procurement

The type of the contract is important because it defines the temporary formal and informal relationships among the different parties involved in the project. It is also has a considerable influence on the effectiveness and outcome of the project delivery process (Bennett et. al 1998, Turner 1996). Kwakye (1995) stated that the client’s selection of the contract arrangement depends on many factors, namely:

- the resources available to the client;

- the project control owner wishes to retain;
- the amount of involvement desired;
- the amount of risk that is shared between owner and contractor; and
- the importance of cost and schedule.

4.5.2 The method of selecting procurement

Relevant research has established that one of the principle reasons for poor performance of the construction industry is the inappropriateness of the choice of procurement system (Skitmore and Marsdon 1998). Conversely, selecting the right procurement system can lead to a successful project (Rowlinson 1999). Each route places different demands, risk allocation and responsibilities on parties involved. It is therefore essential to make an early choice of the most suitable procurement method for the project and be aware of the implications that arise from any particular procurement route.

4.5.3 Procurement approach and construction performance

There have been many research efforts aimed at examining the effect of the delivery system to construction performance measures in terms of cost, schedule and quality (Potter and Sanvido 1995; Songer and Molenaar 1996; Konchar and Sanvido 1998 and Molenaar et al. 1999). For example, according to Turner (1996), when a client is considering building a facility, a number of key strategic decisions have to be made, they include:

- selecting an appropriate strategy for managing the project,
- choosing the client's principle advisor;
- the appointment of other consultants;
- establishing the client's brief;
- obtaining the necessary finance;
- choosing how to procure and manage design and construction; and
- determining the timing of the project.

4.6 CONTRACTUAL ARRANGEMENTS

Contractual arrangements should aim to how to transfer risks between parties involved, as risk is the prominent criterion that decides the selection of a procurement method. It is therefore important that the client should examine the project risks by looking at his/her organisation realistically and assess the type of experts available as well as the time and commitment will be given to the project (Gould and Joyce 2000).

4.6.1 Contractual relationships

Contractual relationships in projects can be complex with the involvement of many players whose roles and responsibilities vary. The relationship between the project participants has an impact on the form of the project organisation that will be chosen (Healy 1997). Concepts such as partnering focus on maintaining long-term relationships to minimise the disadvantages of multi-disciplinary organisations that characterise most construction project organisations. The relationships between the parties involved in the process can be divided into two levels: the first level is a relationship with the client (usually contractual); and the second level is with other professionals involved in the project (functional relationship).

4.7 DELIVERY APPROACHES

The term delivery approach refers to the client's approach to organising the project that will manage the design and construction process. The selection process is dependent to a large extent on the risk and the perception of the owner of the best method to deliver the project within the specified time and within the budget limits. There are several strategies and each has its own distinctive advantages and disadvantages, however, the choice of either one of them is not a simple task. The next section will shed some light on the different types of procurement approaches and highlight their advantages and disadvantages as well finding the most suitable way of selecting the suitable procurement approach.

4.7.1 Types of procurement approaches

There are different types of procurement routes available to reflect the fundamental differences in the allocation of risk and responsibility to match the characteristics of different projects. The selection process must therefore take into account strategic considerations. For example, a design and build contract is commonly used for projects with well-defined scope (Oberlender 1993). A number of proven strategies are available that can be used to deliver the project. The three most common are traditional, design/build and partnering. The following section will discuss three different procurement systems namely: traditional, partnering and design and build.

4.7.1.1 Traditional procurement

The traditional procurement method is usually adopted when client's design team is appointed to prepare a design before the contractor is selected on the lowest cost basis. According to the Royal Institute of Chartered Surveyors (1994, 1996), the traditional procurement method is still the most effective procurement method. It is also supported by the research questionnaire survey, which showed (63 per cent) of clients use the traditional procurement system in procuring their projects, yet, it is the most criticised method of procurement (Tucker and Ambroce 1998).

4.7.1.2 Partnering

This type of partnering is well known in construction and a number of client and contractor relationship have developed over recent years such the alliance between Mark Spencer and Bovis. Partnering was identified in the Latham Report as a procurement option by which conflict could be reduced. A number of major clients have shifted towards partnering, this included, British Airports Authority (BAA), Railtrack and Shell. Furthermore, (Crowley and Karim 1995) outlined that partnering was seen as an attempt for reducing adversity between contracting parties.

4.7.1.3 Design and build

In the design and build method, the client usually appoints a contractor to provide the completed building or facility. In other words, the contractor is responsible for design and

construction as defined in the formal documentation. The client deals directly with the contractor for the complete building. Although the contractor has the overall responsibility for delivering the project, the client often appoints a consultant to oversee matters on his behalf, i.e. to monitor quality and cost. The contractor may be appointed after a tendering process by means of incorporating variations on the method or through negotiations. The client may appoint a consultant to oversee matters on his/her behalf.

Therefore, it can be observed that procurement strategy, through the choice of contract, is one of the single most important elements that underpin a successful project. Not only does procurement establish the functional relationships but it also dictates the way risk is appointed between the parties and transferred from the client. Table 4.1 provides comparison of the features of four procurement systems namely: traditional; design and build; management contracting; and construction management.

Table 4.1: Characteristics of the four main procurement methods

(source: CIB 1992, pp. 30)

Characteristics	Traditional	Design and build	Management contracting	Construction management
1. Diversity of responsibility.	Moderate	Limited	Large	Large
2. Size of market costs can be tested	Moderate	Limited	Moderate	Large
3. Timing of cost certainty	Moderate	Early	Late	Late
4. Need for early precise definition of client requirements	No	Yes	No	No
5. Availability of independent assistance in development of design brief	Yes	No	Yes	Yes
6. Speed of mobilisation	Slow	Fast	Fast	Fast
7. Flexibility in implementing changes	Reasonable	Limited	Reasonable	Good
8. Availability of recognised standard documentation	Yes	Yes	Yes	No
9. Ability to develop proposals progressively with limited and progressive commitment	Reasonable	Limited	Reasonable	Good
10. Cost monitoring provision	Good	Poor	Reasonable	Good
11. Construction expertise input to design	Moderate	Good	Moderate	Good
12. Management of design production program	Good	Poor	Good	Good
13. Influence in selecting trade contractors	Limited	None	Good	Good
14. Provision for monitoring quality of construction materials and workmanship	Moderate	Moderate	Moderate	Good
15. Opportunity for contractors to exploit cash flow	Yes	Yes	Yes	No
16. Financial incentive for contractors to manage effectively	Strong	Strong	Weak	Minimal
17. Propensity for confrontation	Moderate	High	Moderate	Minimal

Although Table 4.1 makes a good comparison of the strengths and weaknesses of the procurement methods, it is the client who should make a good decision for selecting the best procurement method. To do this task, the client should examine the project risks and assess his/her organisation realistically in terms of the experts available and carefully

examine his options to ensure the right choice for the project is made (Gould and Joyce 2000). Tables 4.2 and 4.3 show the advantages and disadvantages of each of the procurement methods.

Table 4.2: Advantages of the four main procurement methods

Advantages	Traditional	Construction management	Management contracting	Design & build
Pre-construction time saving potential	•	•	•	
Competitive price	•			
Public accountability	•			
Procedures well known	•			
Parallel working			•	
Easy to arrange change	•	•	•	
Competitive trade/competitive price		•	•	
Building potential		•	•	•
Less adversarial barriers		•	•	
Clarity of risk and relationships		•		
Single point contact				•
Early firm possible				•
Reduce total project time				•

Table 4.3: Disadvantages of the four main procurement methods

Disadvantages	Traditional	Construction management	Management contracting	Design & build
Adversarial	•			
No parallel working	•			
Contractor not involved in design	•			
Cost/price uncertainty		•	•	
Need for quality brief		•	•	
Need for quality team		•	•	
Need for informed client		•		•
Less competition				•
Can contain weak links				•
Difficult to compare bids				•
Expensive to make change				•
Limited design liability				•

4.8 THE IMPORTANCE OF PROCUREMENT SYSTEM

Latham and Egan reports have focused attention on the importance of selecting the proper procurement approach as his crucial to the improvement of construction projects. In addition, they both have emphasised the importance of procurement and called for the client to focus more attention in selecting the most appropriate procurement route.

According to BSRIA (CIBSE 1999), procurement is classified into four major types, namely:

- separated systems (traditional method of dividing the design and construction activities);
- integrated systems (design and build activities);
- management oriented systems (construction management/management contracting); and
- product based systems (PFI and design and build).

The various procurement methods reflect fundamental differences in the allocation of risk and responsibility to match the characteristics of different projects. It is crucial that considerable attention and caution is paid in the selection of the most suitable procurement method in order to satisfy the client's needs.

4.9 METHODS OF SELECTING PROCUREMENT APPROACHES

The methods for selecting the appropriate procurement can be simple (Frank 1990) or very complex (Skitmore and Marsden 1988; Liu 1994 and Love 1998). The selection of procurement is highly dependent on how the risk is allocated by the client organisation. Turner (1996) suggested who should bear the risks and how the right selection of the procurement method can ensure that risk is allocated to whichever party is best placed to deal with it. Kwakye (1997) suggested considering the following when choosing the most suitable procurement method for client's construction project:

- complexity and scale of the project;
- expectations and of specific performance requirements;
- level of risk client is willing to accept;
- necessity for completion on time and within budget;
- necessity for accountability on the part of those concerned in its administration;
- pre-commitment and existing relationship; and
- personal perception by management.

NEDO (1975) suggests that to ensure a successful choice of procurement method, the client's brief must be clear and comprehensive in stating the needs and objectives. However, identifying the client's needs and objective is a difficult task because it is driven by many factors such as internal politics, environmental, political and sociological factors (Kwayke 1997). In addition, in the trade off between project objectives, a

sacrifice has to be made in order to suite their corporation's particular commercial interests and technical requirements (Walker 1989). NEDO (1985) suggested a technique in which clients can list down their most important priorities of needs to eliminate unsuitable procurement methods.

As already stated, it has been established that one of the principal reasons of the poor performance of the construction industry has been the inappropriateness in selecting the procurement system (Skitmore and Marsden 1998). Alhazmi and McCaffer (2000) introduced a systematic approach for selecting the most appropriate procurement (PPSSM), which could assist clients in selecting the most suitable procurement system. In their study they tested the effectiveness of this technique in a survey and it was proved to be accessible and useful.

It is important to differentiate between private clients and public clients as they operate under different conditions (Pena-Mora and Wang 1998). Gould and Joyce (2000) explained that the dilemma of the owner in selecting delivery method comes down to price versus performance. The selection of the procurement is very important to the client to achieve project objectives in terms of completing the project on time, within budget and according to quality.

An important element that determines the client's selection of the procurement system depends on many factors, namely:

- the level of experience of implementing construction projects; and
- the client's brief (NEDO 1975).

From the previous discussion it can be concluded that selection of the most appropriate procurement method is an important aspect in achieving client satisfaction and thus clients should make a great effort to pay more attention to it during the early phase of the project life cycle. A tool that has been developed by alhazmi and McCaffer (2000) could assist in selecting the most appropriate procurement method.

Table 4.4: Clients and the selection of procurement system

(source: Tookey 2001)

Source of Report	Contribution
Contract Journal (1999a) “Prison service opts for partnering deals”	The prison service awarded Mowlen and Brow 2 year deal to provide construction management services which is the first time this client has used this procurement system.
Building (1999)	B & Q introduced partnering for its building programme. B & Q put all contractors out of the competitive tender.
Contract Journal (1999) “Sainsbury eyes Design and Build”	This supermarket moved from using construction management toward design and build
Contract Journal (1999c) “Asda’s build time cut by partnering”	Asda’s general manager of construction R&D preferred as it provided benefits to them.

The above table indicates that clients often perceive the selection of procurement system to a successful project. It also suggests that regular build expert clients are happy to apply contingency procurement approach selection. However, consultants think the clients waste resources because they do not educate themselves on how to select the most appropriate procurement system.

4.10 ORGANISATIONAL CULTURE

Earlier in this chapter people issues or soft issues, often referred to as cultural issues were emphasised as important determinants of construction performance. Cultural issues have to be considered, examined and improved along with the technical issues in order to improve construction performance. Culture is a pattern of shared basic assumptions that a group teaches to a new member as the correct way to perceive, think, feel and behave. Organisational culture provides a guide to how things are done and how people are related within the organisation (Byars 1987). Culture is described as the values and behaviours of the soft issues.

4.10.1 Definition of culture

The following are different definitions given to culture.

1. Lanvender (1996): Philosophy by which an organisation operates.
2. Tayeb (1988): A set of historically involved learned values, attitudes and meanings shared by members of a given group.
3. Robby (1994): The pattern of shared assumptions that aid a group in dealing with basic problems.
4. Byars (1987): The values and behaviour of soft issues.

It can be observed from the definitions given above that there is no single definition of culture, but they all share the same principle factor that is the soft issues that deal with people's behaviour.

4.10.2 Culture and alignment

In order to achieve alignment of teams during pre-project planning, three key cultural areas must be addressed they are mainly:

- formally identify a skilled leader for the project at the early stages of the project;
- ensure that key individuals are trained,
- use communication tools such as graphics to foster two way communication between key stakeholders and project participants; and
- developing a relationship of trust and honesty.

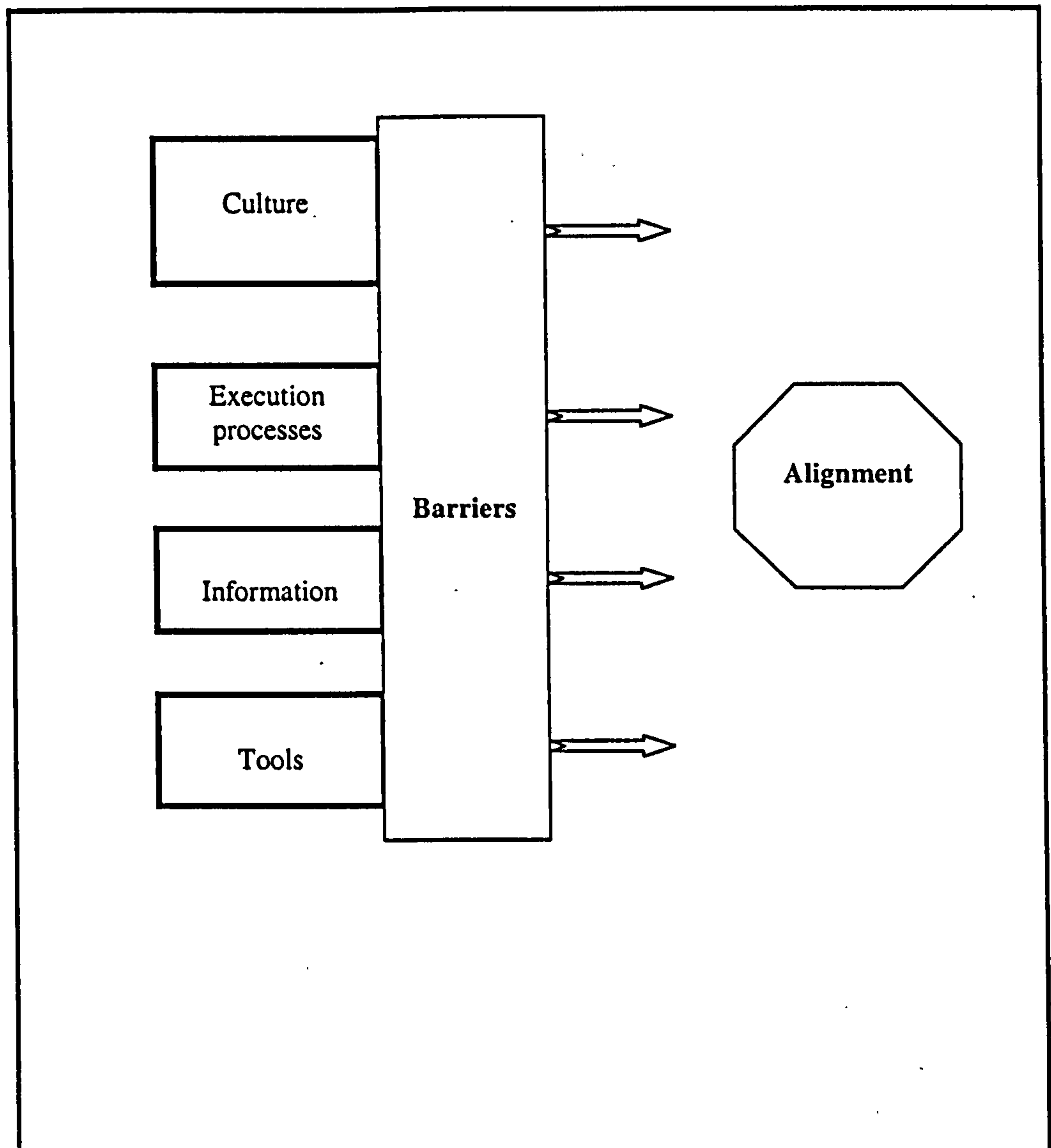


Figure 4.1 : Barriers to alignment
(addopted from: Griffith and Gibson 1997)

4.11 PROJECT ORGANISATION

In dealing with construction projects, planning and control are the key issues, but project management also involves attitudes and behaviour. Organisations are complex systems with certain characteristics (Schlesinger 1992). The cultural (soft) issues such as value and behaviour must be taken into account when dealing with construction projects. It goes without saying that improved construction performance requires better processes and new technology, however, this could not be achieved without motivated and valued people working in a culture of co-operation, teamwork and continuous improvement.

4.11.1 Culture and people

The human factor has been proven to be an important issue affecting quality (Hamza 1995). Cultural issues such as attitudes, values, trust, behaviour and environment are important factors affect the alignment of teams toward the same objectives (CII 1997). People are the most valuable asset of an organisation and it follows that the control of projects starts with the team development. The performance of the team decides the success or failure of a project.

4.11.2 Teamwork

Construction is probably generated at the earliest time. Teams and leadership has become a concern of management at present. There is also a great concern on the formation of teams. In fact the construction of the pyramids can only be accomplished through teamwork. A team must be assembled that will work in harmony and efficiently.

4.11.2.1 Definition of a team

A team is defined as “a small number of people within complementary skills who are committed to a common purpose, goal and approach” (Kezbsonm et al. 1997). In contrast, Shlesinger (1992) defined a team as “a group of people with complex relationships”. From these definitions it can be concluded that people are the real asset and it follows that every effort should be made to over any disputes resulting from differences in opinions.

Teams are usually formed with different functional groups that have values and opinions that may cause conflict (Sighn and Johnson 1995; and Abudyeh 1994). This conflict is a result of organisational internal differences, that is people perceiving the same thing differently. Pinto and Karabanda (1995) explained that teams must be cohesive to achieve the objective of completing projects on time and within budget. In order to have a dynamic team in any organisation the team need to:

- clearly state their needs and mission;
- operate creatively;
- focus on the results;
- clarify roles and responsibilities;

- be well organised;
- build on individual strengths;
- support leadership and other;
- resolve disagreements;
- communicate openly;
- make objective decisions; and
- evaluate its own effectiveness.

4.11.3 The relationship between client and project team

The relationship between the client and project team is a complex one. A successful relationship between the client and project team depends largely on the level of trust and commitment. There may be different views between client and other's involved in the team, as a result of each has a different viewpoint. This leads to the need for a method to facilitate communication to enable each member in the team to work toward the same set of objectives. One method to facilitate communication is developing a project plan. This will help communicate project objectives more effectively between the project team.

4.12 THE IMPORTANCE OF TEAMWORK

Teamwork has been regarded as a key factor leading to productivity in the construction industry (Menndelsohn 1998). The capability of teams in planning a team building and communication has a positive relationship with construction time performance (Walker 1996). Ahuja (1994) stated that interpersonal relationships are important because they allows teams to work with high productivity. Teamwork is important in achieving success. Leadership is vital in securing the success of teamwork because it provides effectiveness (Mendelsohn 1998). Furthermore, Romanik (1995) added that the effectiveness of teamwork depends on many things such as communication. Allen (1984) explained that project teams are important and beneficial and that that the team should adopt a positive a creative strategy when defining the client needs.

4.12.1 Teamwork and project success

Most construction project teams comprise three primary participants: the client, with the need of the project; the designer and the contractor. The objectives of each are understandably different. But the success of the project lies on the comprehensiveness of the stakeholders to manage the objectives and any conflict. The basic assumption of teamwork is that the whole is better than the sum of parts. Teams can produce more if there is co-operation and co-ordination. Teams are an important factor and can contribute to project success. Ashley et al (1987) demonstrated in their study that project success is achievable when there is a team satisfaction. Poter and Sanvido (1994) explained that project success depends on a cohesive team. Thamhain and Wileman (1992) identified the characteristics of an effective team contributing to successful projects. These characteristics include people oriented characteristics and task result oriented as shown in Figure 4.2.

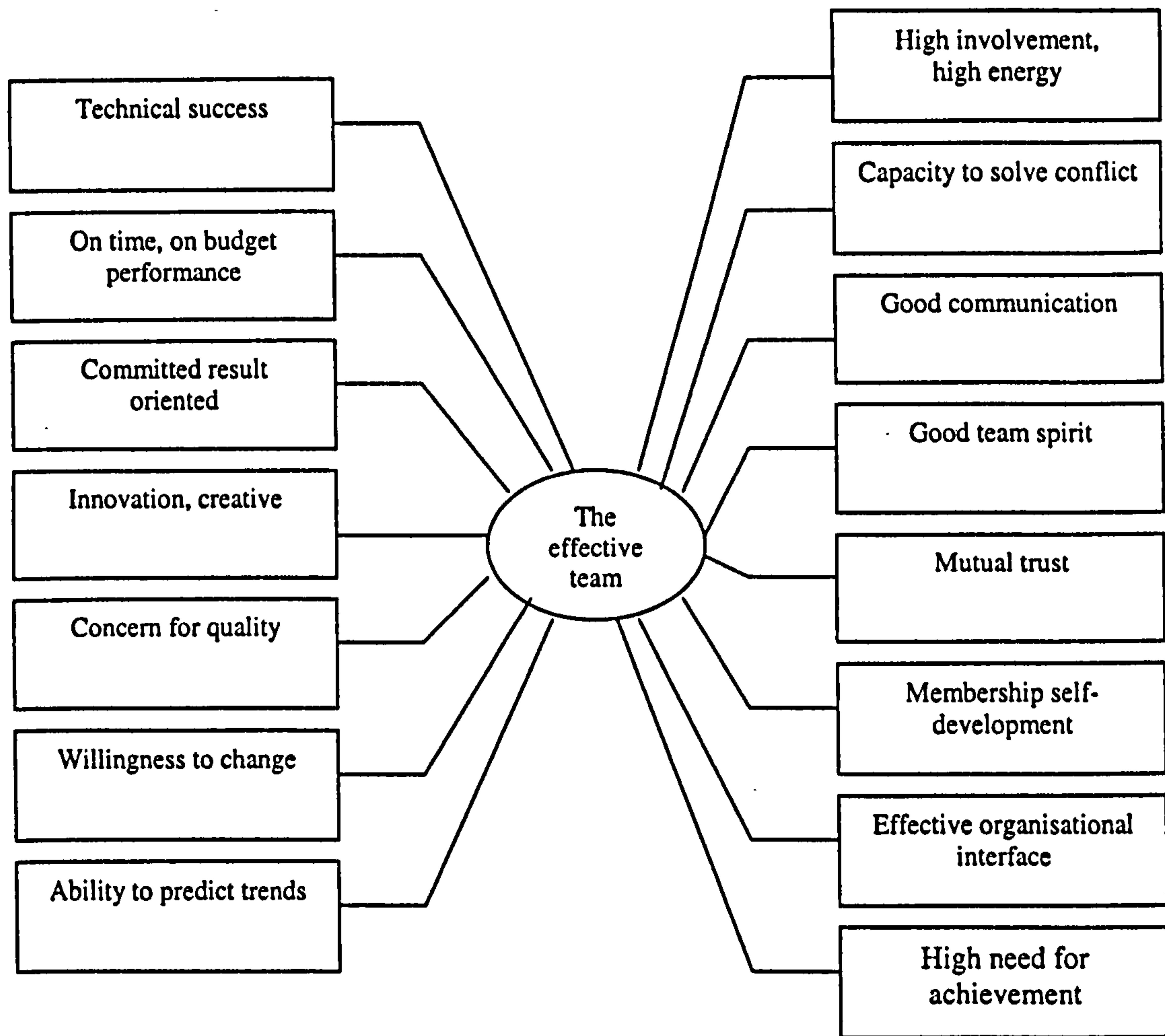


Figure 4.2: Characteristics of an effective team

(adopted from Tucker et al. 1997)

The previous discussion has highlighted the importance of cultural issues and its effects on teams. It follows that cultural issues such as values, trust and behaviour should receive the same equal attention and examination as the technical issues. There is also an urgent need for tools to align team members toward the same objectives. Previous studies of teams not only showed their importance, but also called for improving their attitude as a condition to improve overall performance.

4.13 ALIGNMENT

4.13.1 Definition

Webster's Dictionary defines alignment as "the condition of being in a satisfactory adjustment or having the parts in proper relative position". In the context of capital projects a more meaningful definition of alignment is needed. The CII (1996) defined alignment as "the condition where appropriate project participants are working within acceptable tolerance to develop and meet a uniformly defined and understood set of project objectives".

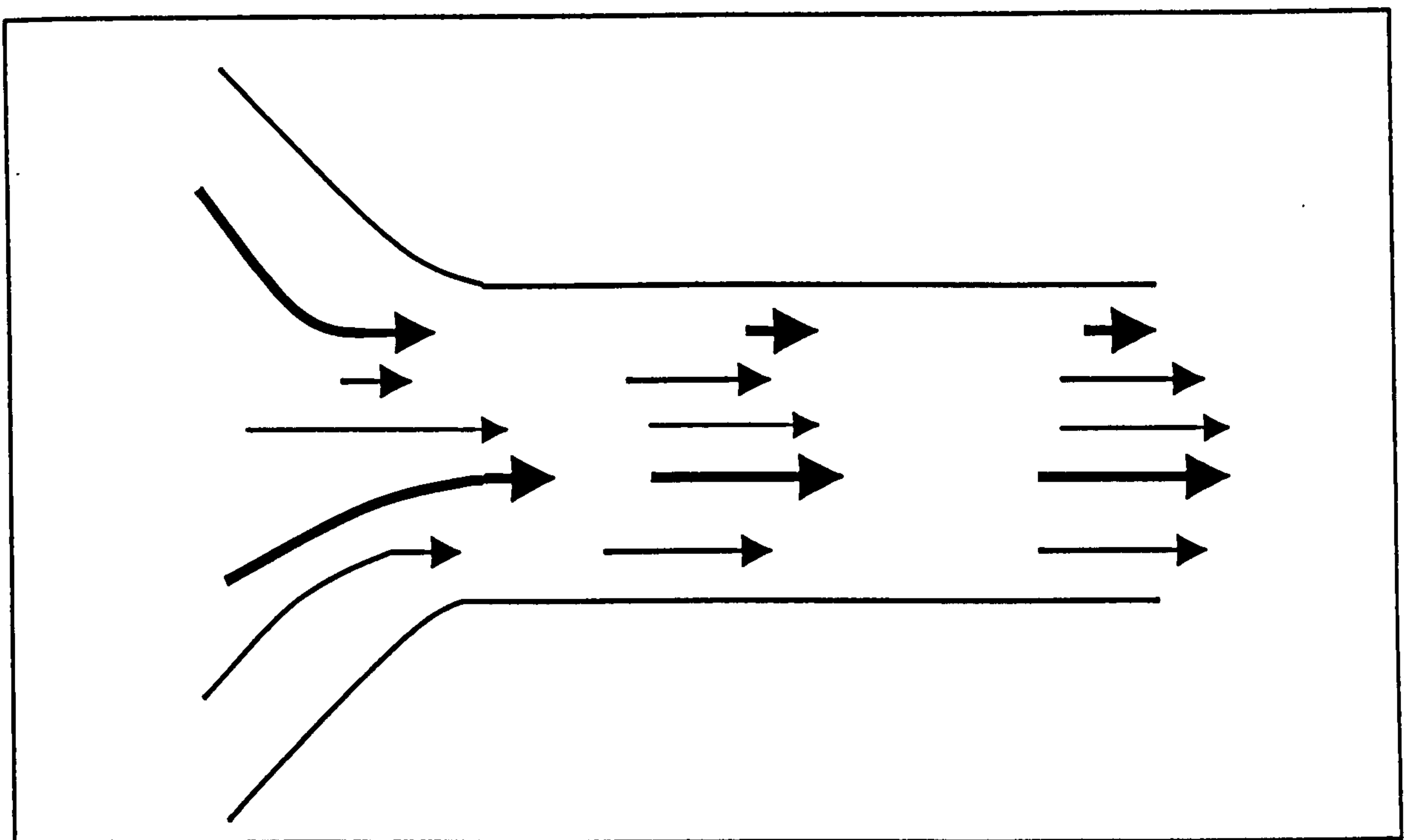


Figure 4.3: Graphical representation of alignment
(adopted from Griffith and Gibson. 2001)

3.13.2 The concept of alignment

In the project environment, alignment exists in three dimensions. The first dimension, vertical, involves top-to-top alignment within an organisation. The second, horizontal, involves the cross-organisational alignment between functional groups within

organisations. The third dimension, longitudinal, involves alignment of objectives and priorities throughout the project life cycle.

4.13.3 Factors affecting alignment

Issues that affect alignment during pre-project planning can be divided into the following five categories (CII 1997).

- **Cultural:** includes attitudes, values, behaviour and environment of the government and the pre-project planning team.
- **Execution process:** procedures, processes and project systems.
- **Information:** business objectives used to define project objectives and scope of the project.
- **Project planning tools:** software programs, checklists, and flow diagrams used to develop and manage projects.
- **Barriers:** the obstacles that inhibit maintaining alignment.

The issues stated above are summarised in Table 4.5.

Table 4.5: Alignment issues
(adopted from: Griffith and Gibson 2001)

Category	Issue
1. Culture	<ul style="list-style-type: none"> • effective project leadership • open communication • trust and shared values
2. Execution process	<ul style="list-style-type: none"> • appropriate stakeholders represented • structured and resourced pre-project planning • suitable reward systems
3. Information	<ul style="list-style-type: none"> • priority between project objectives
4. Tools	<ul style="list-style-type: none"> • timely team meetings • teamwork and teambuilding program • use of planning tools

4.14 THE IMPORTANCE OF ALIGNMENT

Alignment is critical to effective pre-project planning and can be used to ensure that team members contribute their experience and knowledge. Appropriate alignment helps decision-makers focus their attention on the project objectives (Gibson and Griffith 1997). Alignment is also closely related to the project success. Albanese (1993) revealed that among the reasons that contribute to the success of any team is their commitment to work well as the shared goals they have. Gibson and Griffith (1997) identified several performance models that focus on the topic of organisational alignment. The following is a brief description of these models.

- **An Alignment Matrix** is a model that emphasises the need for daily work to be focused and aligned with the organisational aim. This requires open communications

between all project participants. The alignment matrix is proposed to assist in improving communication and achieving alignment within the organisation.

- **A strategic and cultural path** is a model based on the belief that the condition of alignment is divided into two branches, strategic path and cultural path. Organisational alignment takes a place when strategic goals and cultural values mutually supportive.
- **Herarchical and lateral alignment** is divided into herarchical and lateral alignment. Herarchical alignment involves vision, generic code talent and environment. All of these elements must support each other and be compatible to achieve alignment (Hamilton 1994). Lateral alignment involves customers, organisations and teams serving the customer.
- **The five aspects of organisational life** in this model, alignment is viewed in terms of aligning the five aspects of organisational life: purpose, objectives, strategy, structure and culture. This model recognises that culture influences each of the other elements.
- **Organisational effectiveness variables** is a model that describes alignment as a part of fundamental shift of mind to a new paradigm that places primary emphasis (purpose, vision, alignment etc.) on the elements underlying organisations and placing secondary emphasis on more traditional variables, solution problems, agreement. The model draws a clear distinction between alignment and agreement. Alignment deals with a more inspirational aspect of purpose and vision while agreement deals with the mechanics of goals and objectives.

4.14.1 Teamwork and Alignment

Alignment is defined as “the condition where appropriate project participants are working with acceptable tolerance to develop and meet a uniformly defined and understood set of objectives” (CII 1997). The keys to alignment are that the team may have different objectives and goals, but these must be aligned and not contradict each other. Alignment is concerned with making sure that the team members are working toward the same objectives. On the other hand, teamwork involves how well the team members co-operate

together. A well defined should always adjust its goals and priorities to align the new project objectives.

4.15 SCOPE DEFINITION

Scope definition is defined as “the process by which projects are defined and prepared for execution” (Gibson et al. 1996). The information identified during this process is usually presented in a form of a project definition package. A project definition package is detailed formulation of a continuous systematic strategy to be used during the execution phase of a project to accomplish the project objectives. This package should include sufficient information to permit effective and efficient detailed engineering to proceed (Gibson 1993).

According to Burke (1993), the scope definition: outlines the content of the project, details how it will be approached and explains how it will solve the client's needs and problems. Scope definition is a formulation and documentation of the methods and resources an owner company can use to perform pre-project planning. It comprises the following:

- statement of need;
- outline of known alternatives;
- defined schedule for pre-project planning;
- defined pre-project planning resources in detail;
- defined information available and needs;
- contract strategy;
- defined deliverables;
- defined tasks for minimising risks; and
- define responsibilities for pre-project planning team members.

4.15.1 Scope definition and success

The review of literature concerning scope definition revealed that the quality of scope definition is closely related to the success of a project. The scope definition developed during the early stage of a project has a significant effect on schedule and cost features at completion (Gibson and Griffith 1997). Gibson and Dumont (1996) reported the on the

study by Smith and Tucker (1989) that the lack of scope definition is the most problematic cause of rework and lower productivity as well as well delay to project being completed on time. Proper scope definition is a critical factor that contributes to project success (Soner and Molenar 1996; Rowing et al.; 1987; and Mullholland and Christian 1998).

Rowings et al (1987) explained that one of the reasons behind incomplete scope is that time pressure generated by the market often requires construction to commence before design is complete. Gibson and Dumont (1996) support this view in which companies wish to reduce design and construction time which often results a poorly defined scope. Turner (1993) gave an example of using fast-track approach technique to complete projects faster and as a result produce risks. The reason for risk is that the design is not complete when construction begins which consequently leads to design changes and cost overruns (Taylor and Waltong 1979).

Scope definition can affect the quality of design. Gibson and Dumont (1996) reported a study by Buddus (1993) that scope definition is the highest-ranking input (i.e. design) for construction projects. The study is also showed that scope definition was found to be the most important variable affecting the quality of design and overall project success. In addition to the previous studies, Construction Industry Institute research has shown that increased efforts of scope definition during the early stages of project can improve the accuracy and estimates of a project as well as meeting the project objectives (Griffith 1996).

4.15.2 Previous attempts to define scope definition

It was established in the previous discussion that previous research on scope definition has demonstrated that attempts to complete projects earlier than initially planned might cause severe cost overrun due to rescheduling and rework (Gibson and Dumont 1996). The importance of scope definition has led to many attempts to identify the factors critical to effective scope definition. There were mainly two attempts to evaluate the completion of scope definition. The first attempt was performed by John Hackney in the mid 1960's. The second was by the Rand Corporation in the early 1980's.

14.15.2.1 John Hackney Definition Rating Index

John Hackney published the first definition rating index checklist (Gibson and Dumont 1996). This was a tool designed to quantify the degree of scope definition for industrial projects. He classified the items for a good scope definition under six main items. In his view, the most important item in the project definition package that if well defined should minimise the potential cost growth of a project. However, his checklist was not well accepted and consequently did not receive recognition (Gibson and Dumont 1996). Hackney (1992) classified the items of scope definition under six major items namely:

- general project basis;
- process design status;
- site information;
- engineering design status;
- detailed design; and
- field performance status.

The checklist of John Hackney was developed in such a way that items are assigned maximum weights in his checklist. The weights represent the relative ability of an item to affect the degree of uncertainty in the project estimate scores for each item. For example, complete definition is given a score zero and the scores increase up to the maximum possible weight as the level of definition decreases.

4.15.2.2 Project Definition Rating Index (PDRI)

The previous section described that information regarding defining the scope of a project should be represented in a form of package containing the details. This is important because it allows the project to be executed in an effective way, since all the critical elements are identified. The tool that identifies and describes these critical elements in the scope definition is called project definition rating index (PDRI). The PDRI is an easy to use tool that enables the pre-project planning team to evaluate the likely hood of achieving project objectives (Griffith and Gibson 1996). The weighting is the same as the one performed by John Hackney.

4.15.3 The benefits of PDRI

The CII (1996) identified the following benefits:

- a checklist to enable project team evaluate the completion of scope definition;
- a tool to guide in communication between owners and contractors;
- a method to help teams reconcile differences;
- a way to monitor progress during pre-project planning;
- a training tool for companies; and
- a benchmarking tool for companies to evaluate the completion of scope definition versus the performance of past projects.

4.16 THE BRIEF

It is widely accepted that an improved briefing process could deliver a better product to the client. The Emmerson (Ministry of Works 1962) and Banwell (Ministry of Public Buildings and Works 1964) reports called for the need for the client to focus on a better briefing.

The brief is a process where the client defines his or her construction project requirements and communicates them to the architect. The client's initial brief is a statement of intent, which will normally include value for money. Briefing is defined as "the process by which a client informs others of his or her needs and desires" (CIB 1997). Briefing relies on interaction between people within and outside an organisation. It requires skills and knowledge to manage briefing throughout its stages.

Jenk (1988) outlined that inadequate briefing is the main reason for poor performance. Further, inadequate briefing of the design team by the client is partly responsible for current level of client dissatisfaction with their building in the UK (NEDO 1974; Latham 1994). Kelly et al (1992), Murray (1996) and DETR (1998) regarded the concept of briefing as being the most critical factor in determining the client's satisfaction with a building project. The interest in briefing is based on the premise that improved briefing process can deliver a better product to the client. According to Kwakye (1995), the factors attributing to good briefing include clarity; priority of requirements; consistency; completeness; realism; relevance; benefits of development; and flexibility.

One of the problems encountered during briefing is that clients, especially small clients, do not realise the importance of the concept of brief (O'Reilly 1973). Among the problems associated with brief include: client experience; representation of client interest groups; identification of client needs; interpretation of client needs; and allocating sufficient time for briefing.

4.16.1 Stages of brief

In the construction industry the briefing process continues throughout the project, from the statement of need until the evaluation of the completed construction project (Barrett 1993). The briefing can be divided into three stages, the namely:

- pre-project stage;
- project stage; and
- post project stage.

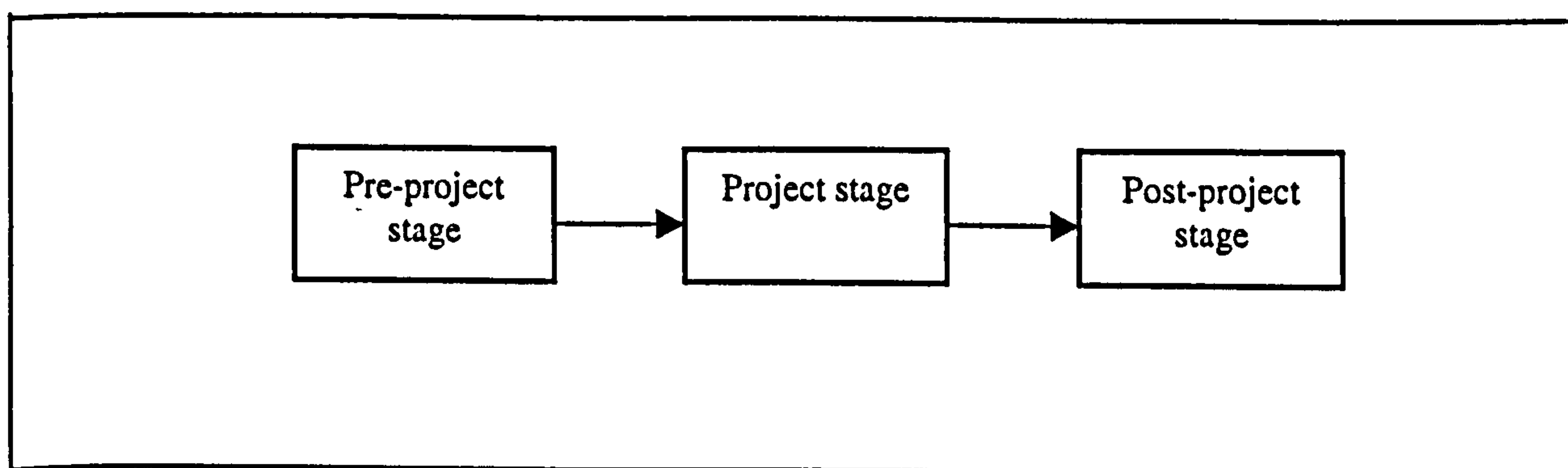


Figure 3.5 : The three main stages of the briefing process
(source: CIB 1997)

4.16.2 Pre-project stage

At the early stage the strategic brief is developed. The strategic brief sets in a broad term the purpose of the project and its key parameters, including the overall budget. To be effective, the strategic brief should provide output specifications that explain clearly what

is expected from the project (EPSRC 1998). The CIB (1997) defined briefing process at the pre-project stage as follows:

- statement of need;
- agreement and action;
- assessment of need;
- assessment of options;
- agreement and action;
- formal strategic brief; and
- action.

In the pre-project planning phase the strategic brief is developed based on the following:

- statement of need; and
- assessment of need.

Therefore, the strategic brief is an important aspect of the pre-project planning phase and clients must pay more attention to it through proper identification and assessment of their needs as well as agreement on needs.

4.17 SUMMARY

This chapter has served as introduction to the principles and concepts of the pre-project planning process. The issues that have been discussed are essential to the success of the project and to maximise the chances of a project success, these issues should be considered at the early phase of the project life cycle. The chapter examined the key strategic issues that are considered to be important to the improvement of the construction industry. Key strategic issues associated with poor performance have been identified, which are considered to be contributory factors to poor performance of the construction industry. As a way forward, construction clients should address these issues at the early stage of the project, since crucial decisions concerning the project are made at this phase. Current research does not address these issues in the context of pre-project planning, although these issues are important to the client and should be addressed early on to achieve project objectives. Chapter 6 will thus examine the pre-project planning phase,

and highlight the models that have been developed since it is the phase where clients can define their needs and key decisions concerning the project are made.

CHAPTER FIVE

THE CLIENT'S ROLE IN THE CONSTRUCTION PROCESS

CHAPTER FIVE

THE CLIENTS ROLE IN THE CONSTRUCTION PROCESS

5.1 INTRODUCTION

Chapter 3 reviewed construction performance and highlighted some of the project management tools that can help to improve construction performance. Chapter 4 addressed the key issues that need to be addressed by the client at the early phase of the construction life cycle to achieve improvement and gain value for money. Furthermore, Chapter 4 concluded by emphasising the importance of pre-project planning phase to the construction industry as it represents the main opportunity for clients to express their needs and make key decisions concerning the project. This chapter further discusses the importance of the client in the construction process and recognises that this role is vital for the success of the project and he/she is more concerned than any one else with the outcome of the project. The importance of the client was recognised as early as the mid 1960's by Higgin and Jesseb (1965) and Crichton (1966). The importance of clients stems from the fact that they are the key players and success of a project depends largely on their role. However it is difficult to satisfy clients needs as their needs vary depending on the type and experience of client. The next section will discuss the different types of clients and their classification in terms of experience.

5.2 TYPES OF CLIENTS

A construction client is "an individual or organisation who commissions a project (Chinyio et al. 1998). He/She is the key to the whole construction process from inception to completion, without him there would be no construction project. Clients vary in many ways, especially in their objectives they seek to satisfy. Differences in this respect are particularly marked between private and public clients (Walker 1997).

Naoum and Mustapha (1994) classified clients into three groups, namely, on-going, on-off and one-off clients. Flanagan and Norman (1993) stated that there are two kinds of clients, private and public. Furthermore, Kelly et al. (1992) classification of client types are based on three parameters as shown in Figure 5.1, which illustrates that the different types of clients are grouped in terms of: size (large or small); sector (public or private); and project interest (development or owner occupation).

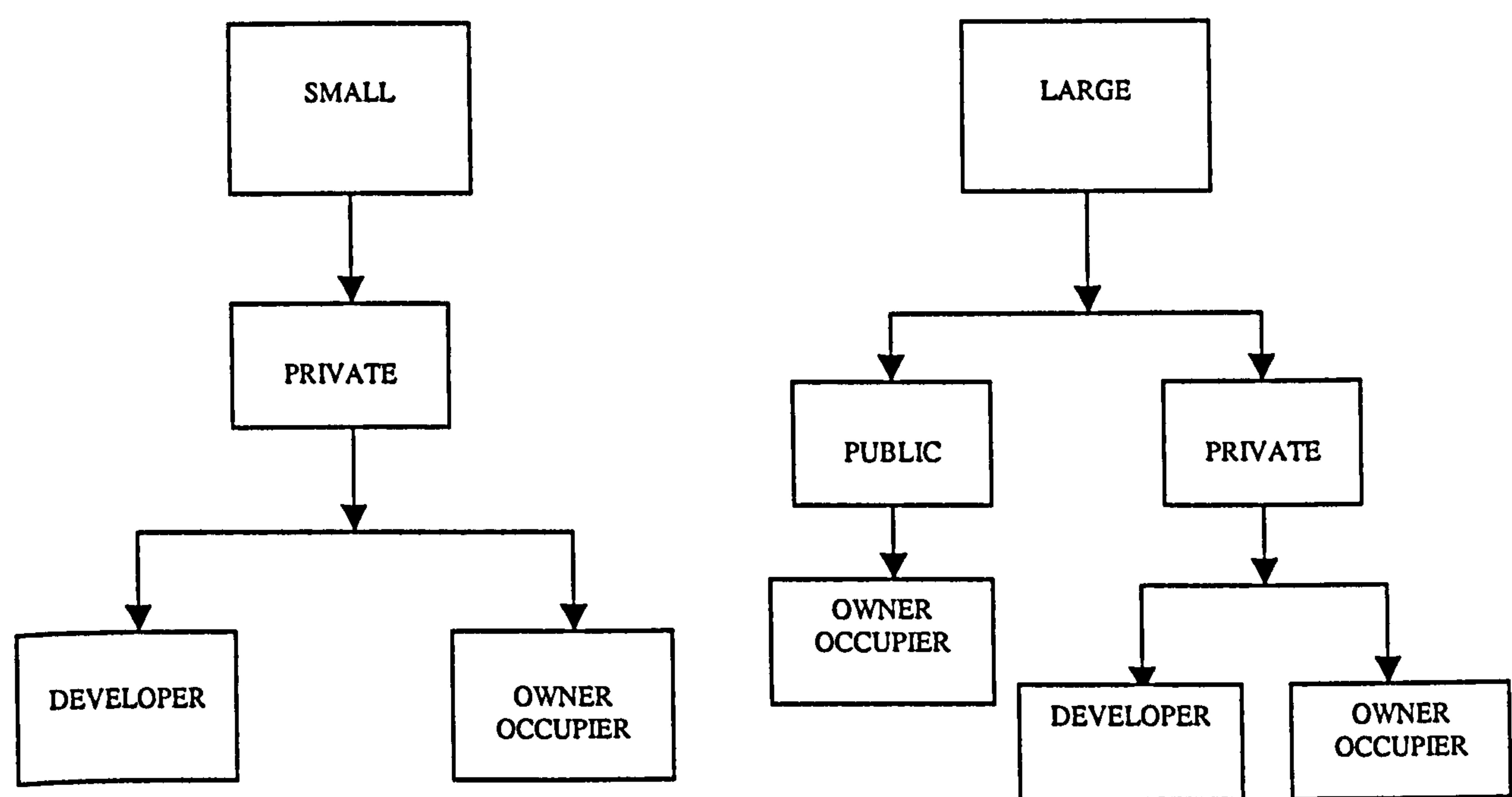


Figure 5.1 : Types of clients
(source: Kelly et al.1992, pp.16)

These different types of client classifications indicate the complexity of client organisations and that any attempt to identify their needs and requirements must first start with the understanding of the client organisation and type. Kwakye (1997) draws a distinction between public and private sector clients by stating that public sector clients are clients who act as agents for the central government who exercise control over their capital building programmes and expenditure. While private clients build for leasing, renting sale or own occupation the government has a limited control over their operations. A classification of both public and private clients has been summarised in Table 5.1.

Table 5.1: Classifications of public and private clients

Sector	Client type
Public	National public
	Local public
Private	Public corporations
	Individual domestic
	Private individual commercial
	Corporate commercial
	Corporate industrial
	Corporate developer

There are limitations to the above classifications. For example, Chinyio et al. (1998) considered that the traditional groupings of clients as public and private are insufficient indicators of their needs. Morledge (1987) classified clients as primary and secondary clients. Masterman and Gameson (1994) developed, from an earlier classification by Higgin and Jessop (1965) and Nahapiet and Nahapiet (1985), a four group classification by using the level of experience and accordingly clients are classified as follows:

- primary experienced;
- secondary experienced;
- primary inexperienced; and
- secondary inexperienced.

The following is description of the differences between the above stated types of clients (Walker 1996).

- **Primary experienced clients** include property developers whose main work and primary income derived from constructing buildings.

- **Secondary experienced clients** are clients whom expenditure on construction is a small percentage of their total turnover.
- **Experienced clients** who have relevant experience of constructing certain types of projects with established access to expertise either in-house or externally.
- **Inexperienced clients** are clients with limited experience of construction knowledge and have no established access to construction expertise.

Furthermore, Walker (1996) identified that in these classifications of clients there exist a large variety of graduations as shown in Figure 5.2 where x-y co-ordinates are used to illustrate the variations between the different types of clients.

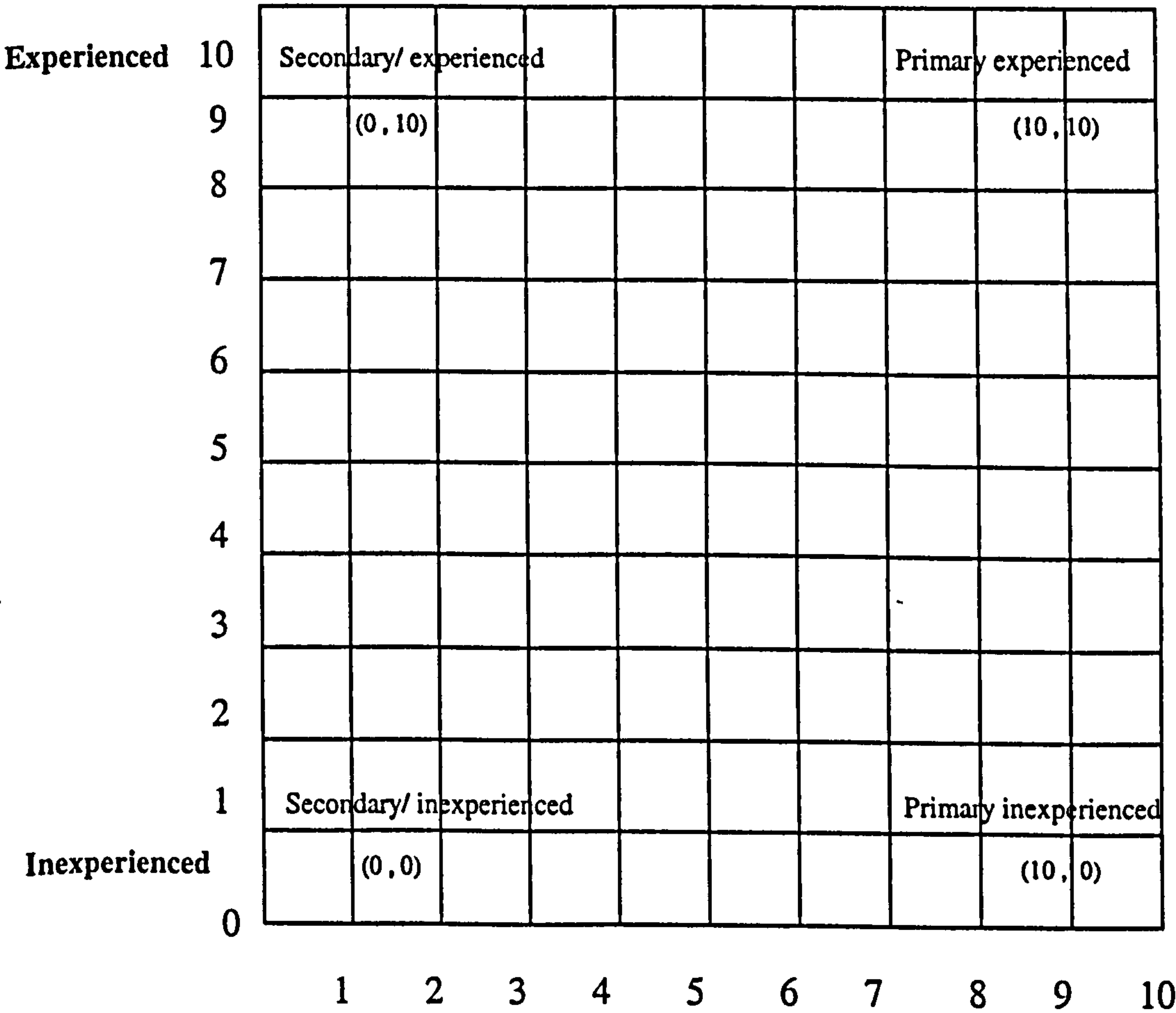


Figure 5.2: Graduation of client types
(adopted from Walker 1996, pp.89)

Chinyio et al. (1998) classified clients in such a way so that their needs can be identified easily as a basis to enable them in selecting contractors to the needs. Nahapiet and Nahapiet (1985) make a clear distinction between primary and secondary clients by stating that primary constructors include property developers whose main business and income is achieved from constructing buildings. While secondary constructors are clients who spend small percentage of their total turnover on constructing buildings.

5.3 LEVEL OF EXPERIENCE

Not all clients have the same level of construction knowledge. Some clients are well informed and have considerable construction knowledge based on years of experience and therefore know what they want and take decisive actions to achieve it. Others have limited construction knowledge and therefore seek help and guidance to formulate their wishes and match them to a suitable available budget. A study by Grey et al. (1994) regarding this matter suggests that the experienced clients account for over 75 per cent of project clients.

Table 5.2: Types of clients
(adopted from Walker 1996, pp.88)

Classification	Definition
Primary	Clients such as property developers.
Secondary	Clients for whom expenditure on constructing buildings is a small percentage of their turnover.
Experienced	Recent relevant experience of constructing certain types of buildings, with established access to construction expertise either in-house or externally.
Inexperienced	No recent or relevant experience of constructing buildings with no established access to construction expertise.

This classification of clients according to their experience is more acceptable because there is likely to be a direct correlation to the amount of involvement, which a client requires.

5.4 THE NATURE OF CLIENT’S NEED

A need can be considered as a desire that has to be satisfied. It always relates to people or organisations and often involves a discussion between the client and consultation team, which may include managers and other professionals. Usually there are too many needs to deal with, including needs from people who have interest in the project directly or indirectly, stakeholders, who produce the project and needs of the end users. Therefore the needs of all these people involved have to be taken into consideration. Burke (1999) pointed out that needs tend to intersect, as shown in Figure 5.3. In this case it is important to align all these needs and establish priorities as well as good effective communications to overcome the problems that might arise as a result of conflict caused by these different needs.

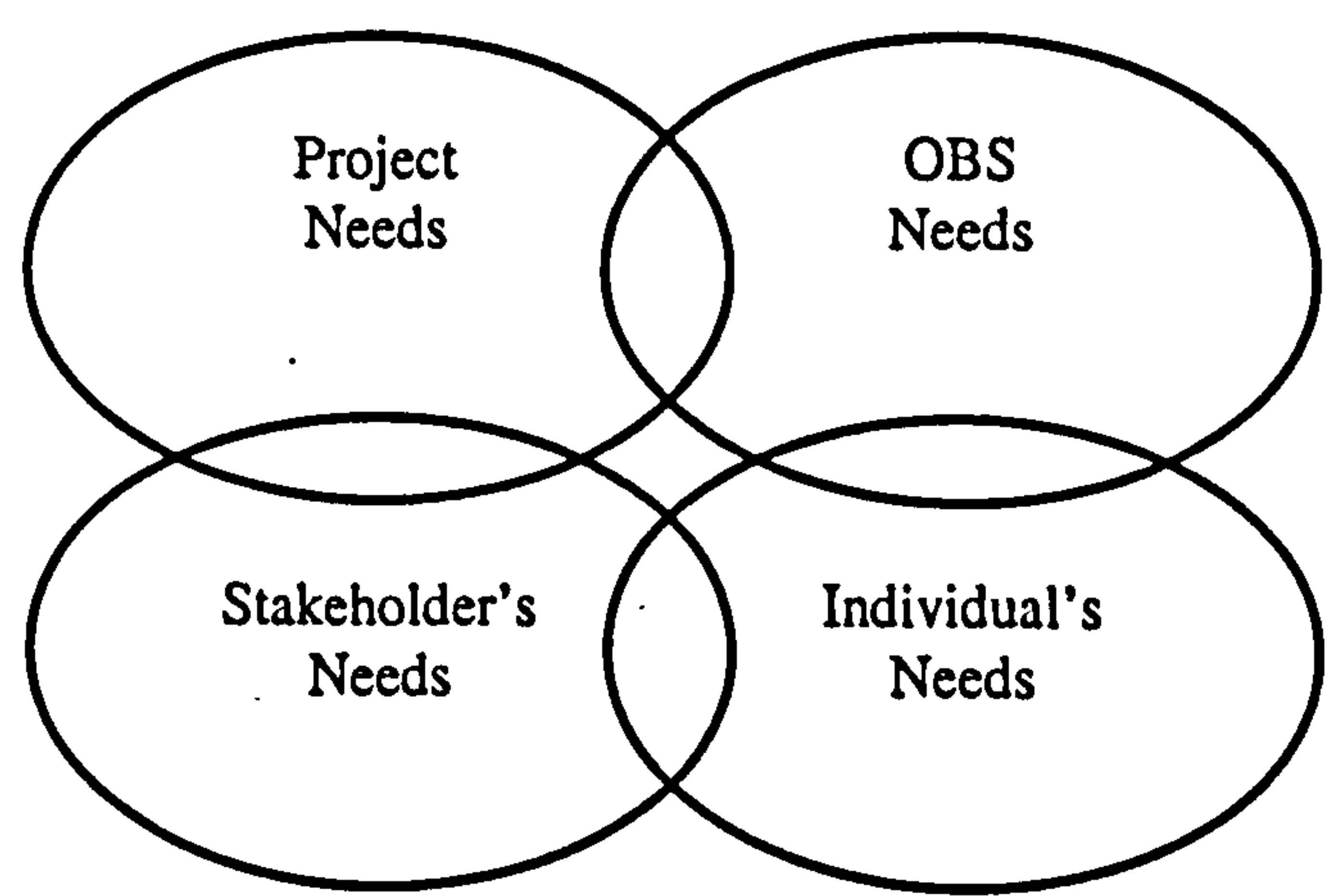


Figure 5.3: Intersecting needs
(source Burke 1999, pp.2)

5.5 COMPLEXITY OF DEFINING CLIENTS’ NEEDS

Generally, construction clients’ needs are to complete the project on time, within budget, according to specified quality and safely (Bennett and Flanagan, 1983; Hewitt 1985). The

majority of projects in the construction industry are initiated from within client organisations by a specified need in relation to some form of market need (i.e. business or social need). However, clients' individual priorities vary considerably both between organisations and within individual organisations. Defining the need is a complex process for the client because it is driven by many factors. For example, the environment of their organisation usually drives the needs of clients. Such drivers may be economic forces, social forces or sociological forces (Kwakye 1997). Walker (1996) further pointed out that client's need to start a new facility is made in the midst of environmental forces and within a time scale as illustrated in Figure 5.4.

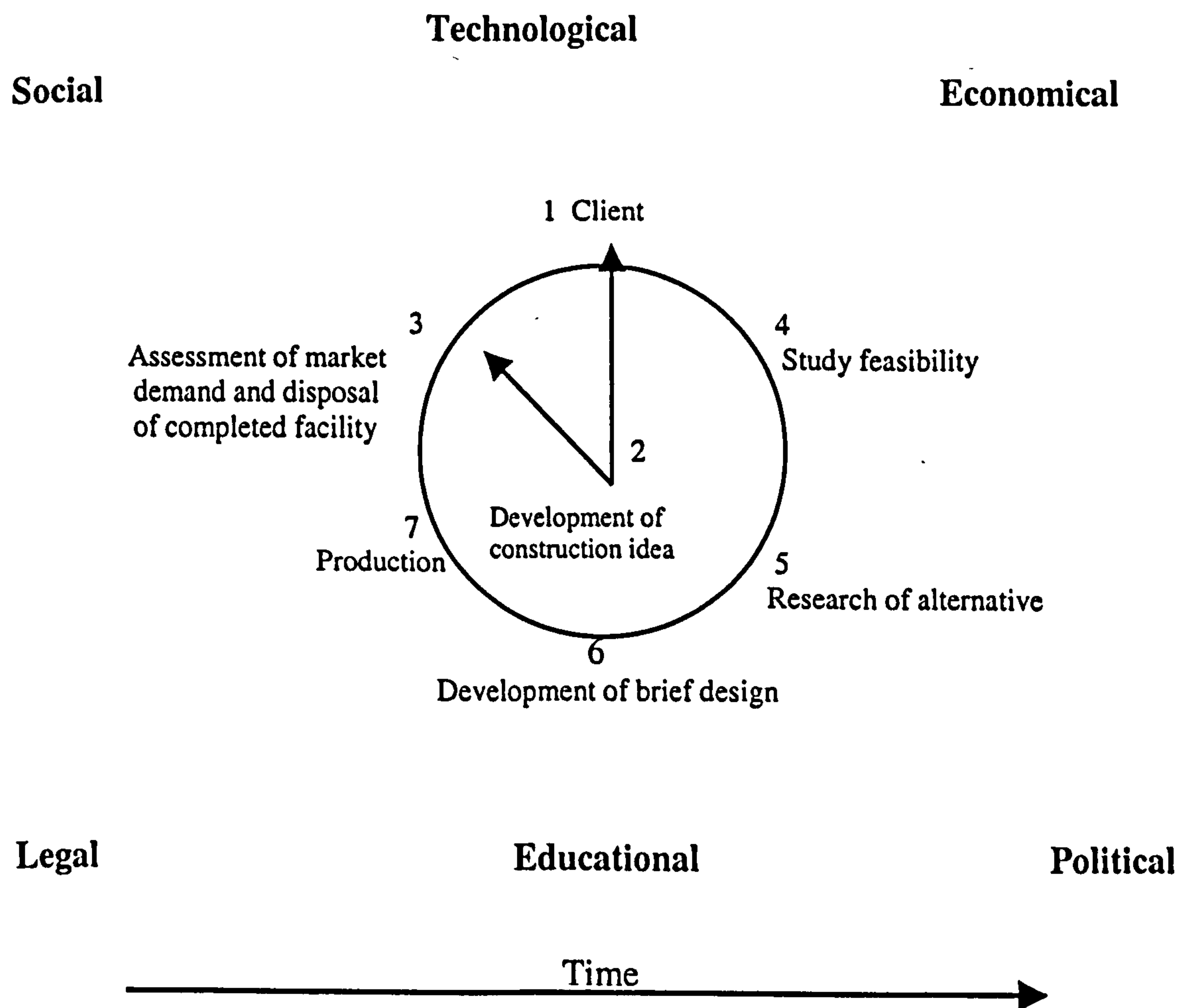


Figure 5.4: Client's development cycle
(source: Kwakye 1997, p.23)

5.6 THE IMPORTANCE OF DEFINING NEEDS

Clients in the construction industry are wide and diverse: each with their own particular needs regarding the project. The identification of the strategic needs of clients is a significant stage in the development process. It is during the initiation stage where the client's needs and requirements are expressed and clarified into the definition of a project, therefore more care should be paid on defining the need. The Latham Report (1994) suggests that clients should seek external expert advice to assist them in making the necessary decisions to identify their needs and undertake the project. Furthermore, the report suggested that, once the client is satisfied about the need and the feasibility within the overall budgetary constraints, it is important to retain a consultant to design the project.

The needs of the client are an essential part of the project scheme and should be satisfied (Latham 1994). Egan 1998 stated that clients' needs are still not being fully satisfied for various reasons. Ways of improving the client's satisfaction by meeting his/her needs have been reviewed by Walker (1989). Among Walker's suggestions to improved satisfaction of client's emphasis is placed on the method of selecting contractors. This included the assessment of client's requirements and evaluation of contractors' potential with respect to meeting the client's needs. According to Nahapiet and Nahapiet (1985), the needs of the clients are influenced by two important factors namely: type of client; and level of experience.

Given that clients can potentially affect the success of project, it must be noted that the problem areas are associated with the nature of the client. There are problems related to the experience level of the client as well as to the client organisation. The client's role within the briefing process with respect to communication is important at this stage is partly responsible for the level of client satisfaction with the completed project.

The client is the inciting party for whom the project is developed, as he is the source of financial resources that support the project and it is important for the client to ensure the following:

- set the objectives clearly (Ward et al. (1991);
- communicate the objectives clearly to other involved parties (Higgin and Jessop 1965;

- define the objectives of the project (Bennett et al 1988); and
- establish the project objectives and ensure that the project organisation is directed towards achieving them (Bennett et al. 1988).

5.7 CLIENT SATISFACTION MEASURES

The inability of the construction industry to consistently satisfy its clients is a major concern. One way to overcome this problem is to adopt new approaches and techniques have to increase the efficiency and client satisfaction. The possibility of improving client's satisfaction is by meeting his needs. According to Love (1996), there are several factors that contribute to client dissatisfaction, they include the following:

- project not completed on time nor in budget;
- project not completed according to the required technical specification and quality;
- lack of feedback from participants; and
- lack of involvement throughout the project.

The Latham report (1994) reviewed procurement and contractual arrangements in the construction industry and gave emphasis to the importance of clients, good briefing and the essential need to the experts and professions and industry in a team approach to satisfy client requirements. Research by Atkin and Flanagan (1995) identified the need for clients and their advisors to be aware of the importance of decision making (business case, development of the design and management of the project) at the strategic level.

Davenport and Smith (1995) examined the relative level of client satisfaction and involvement with all of procurement types. They concluded that it was more difficult to satisfy private clients than public ones, however, they did not give evidence to the reasons of whether it was that public clients have more understanding of the capability of contractors than private contractors and therefore find satisfaction more easily. Table 5.3 presents reports from different authors of the measures of client satisfaction.

Table 5.3 : Client satisfaction measures

Author	Measure of satisfaction
Walker (1989)	Quality, cost and time.
Bitici (1994)	Quality, reliability, on time deliveries, high service levels and minimum cost of ownership.
Kometa (1995)	Function, safety, economy, running costs flexibility, time and quality.
Harvey and Ashmorth (1997)	Trust, cost, performance and management.
Chinyio et al. (1998)	Economy, functionality, quality, timeless, lack of surprise and safety,

It can be seen from the above stated definitions that time, cost and quality (Walker 1994), are not the only measures of client satisfaction, but they also expands to include other factors such as working relationships and other factors which are people related factors such as stakeholders and business partners. With such considerable evidence linking people's relationships can not be ignored as a main contributor to client satisfaction.

5.8 THE IMPOPRTANCE OF CLIENTS

Most of the studies on the client focused at improving the productivity of construction projects. The report by NEDO (1975), which aimed at improving the way construction projects focused on defining the role of the client on: select the method of procurement; prepare the brief. NEDO (1983) recommended that strategic decisions made by clients could have a crucial impact on the overall performance of the project. The importance of the construction clients in the construction process can not be overemphasised and was recognised by Higgin and Jessop (1965). The client's role is crucial to the success of construction projects and considered to be the key to the whole construction process from inception to completion. The outcome of projects is greatly influenced by construction

clients (CII 1990), particularly with respect to their needs and responsibilities in construction process.

The main reasons for clients to promote construction are namely:

- for their own use as a facility to undertake part of their business;
- on the behalf of an existing client; and
- to produce a building as speculative to be sold or leased at profit.

Obviously, these different reasons that promote clients to start construction mean that clients have different objectives. For example, more speculative projects will need to be attractive to potential purchasers and need to be profitable in a relatively short period.

The influence of the construction client in the outcome of projects has been found to be significant, which led to many studies emphasising the importance of their role in the construction process. For example, Latham (1994) outlined the importance of the clients by stating that “clients are the core of the construction process and their needs must be met by the industry”. The importance of clients has been identified in a number of reviews and reports. Some relevant quotations are presented in Table 5.4.

Table 5.4: The importance of the client

Contributor	Definition
Latham (1994)	Clients are the core of the construction process and their needs must be met by the industry.
Flangan (1981)	Clients are the most important party in the construction industry.
Higgin and Jessop (1965)	Most construction research has considered only the project and it should pay more attention to the client.
Kwakyee (1997)	The client is the key to have the whole construction process from inception to completion, without him there will be no project.
Egan (1998)	The way to improvement is to focus on the needs of the client.

The Latham report includes several recommendations to clients both in public and private sector. The most important of these was the proposal for a construction client's forum (CCF). These recommendations are intended to assist clients to achieve their construction needs more effectively (Cook and William 1998).

5.9 CLIENTS' VIEWS ON CONSTRUCTION PERFORMANCE

Recent indications show that clients are generally dissatisfied. For example, Mobbs (1976) accused the UK construction industry of poor performance and failing to satisfy the needs of the clients. Latham (1994) stated that "clients do not always get what they ask for and the level of client satisfaction in the construction is lower than the motor industry". Improving performance to achieve client satisfaction is also a focus of several numbers of other reports such as (Construction Client Forum 1998; CIB 1996; Egan 1998). Egan

(1998) cited the British Property Federation (1997): which states that more than a third of major clients were not satisfied with contractors and consultant's performance.

This dissatisfaction of the poor performance of the industry did not exclude other clients. The CCF (1999) indicates that 60 per cent of small and occasional clients are dissatisfied with the industry. The CII (1990) revealed that a third of all construction projects suffer from late completion resulting from poor planning and lack of experience. However, chances of success and achieving client satisfaction are possible. In order to improve the chance to a project success, the client should perform the following two important activities:

- develop a clear understanding project scope (Ashley et al. 1987; Songer and Moulenar1997); and
- develop a clear project brief (Deakin1999).

5.10 VALUE FOR MONEY

Value for money is now being considered as the most important of the client requirements. The Client's view on what value for money actually means is critical and perceptions vary from one client to another. However, value rather than lowest cost is becoming the main Client need. Construction clients want to choose the best possible value for their money and to ensure that is achieved. Clients want greater value from their buildings by achieving a clear focus on meeting functional business needs. The immediate priorities of clients are to reduce costs and improve the quality of new buildings. Significant value improvements and cost reduction can be often achieved by integration of design and cost. The Client's views on what value for money means are important because they vary among clients. It is therefore important that advisors ensure that they explore these issues in a detail in order to respond appropriately.

5.11 THE CLIENT AND PROJECT TEAM

Most construction project teams comprise three participants, namely: the client with the need of the project; the designer; and the contractor. The business and project objectives of each are understandably different, which often creates complex relationships within

project team. If these relationships are not managed properly they could adversely affect a project's performance (Walker 1994). However, the success of the project lies on the ability of the project team to manage the objectives and any conflict that may arise. Several investigations have been conducted into explaining the way clients communicate their needs to their consultants (Newman et al. 1990; NEDO 1974; Murray et al. 1990;

With the increasing competition in the construction business environment, there is a need for good client and project team relationships. For example, in order for the project team to obtain information upon which it can act with confidence, the members of the project team need to have the ability to understand the structure of their client's organisation and their relationship to others with an interest in the project. In particular, they should understand the decision-making mechanism of the client's organisation and where the authority for decisions is based.

5.11.1 Relationship between client and project team

A successful project means that both the client and the project team have to work in a spirit of trust, openness and collaboration to identify the appropriate objectives for the project. Allen (1984) illustrated the benefits of project team adopting a more positive approach to defining client's needs. Decisions made by the project team will contribute to those taken by the client. The internal organisation and external environment of the client's organisation will determine the timing and sequence of the decision points. The Tavistock Institute (1966) drew attention to the increasingly intricate nature of the client organisation stating that "there are complex systems of different interests".

The client and other project team members should share values. It is important that client /end user needs and priorities of objectives are understood by the project team. Several studies have been conducted concerning the way clients communicate their needs to others (Newman et al. 1991; Murray et al. 1990; and the studies of the Construction Industry Institute (CII) e.g. Rowings et al. (1987). The CIB (1996) suggested that the relationships between client and members of the project team must be expressed in contractual arrangements that:

- deal with key issues;
- are clear;

- are compatible with each other; and
- balance risk, responsibility and reward.

Client drivers or a view on value for money is unproductive unless he/she is going to influence the outcome of his/her projects. This requires a role at times when key decisions are made. Client's involvement is essential to get value for money and achieve satisfaction.

5.12 CLIENT'S INVOLVEMENT

Baxter (1982) outlined that a client should be involved as being a project manager to direct the project in-house and suggested the following which attribute to adopt to this approach:

- manage organisation;
- lead and motivate;
- hand on leadership approach;
- good communication and
- manage own time.

It is important for construction clients regardless of their level of experience to be involved in the construction process in order to achieve their objectives and get what they aim for (Ministry of Public Building Works 1965; Wood Report 1975;). According to Bennett (1985), the client involvement in construction can be classified under the following:

- selection of the project team;
- establish a level of control over project team; and
- establish the project culture.

However, the involvement of the client is more influential and beneficial in the early stages of the project since at this stage the client needs are expressed and defined. Walker (1996) outlined that the degree of involvement and the role of the client in the construction process depend on the following factors:

- the structure of the client organisation;
- the client knowledge and experience of the construction process;

- the authority vested in the various levels of the client's organisation; and
- the personal characteristics of the client's people who have responsibility in the project.

This depends on how frequently the client is involved in construction. For example, if the client constructs frequently, there will be employees familiar with process who act as co-ordinators for the client. However the effectiveness of this arrangement will depend on the degree of authority vested in such a co-ordinator (Walker 1996).

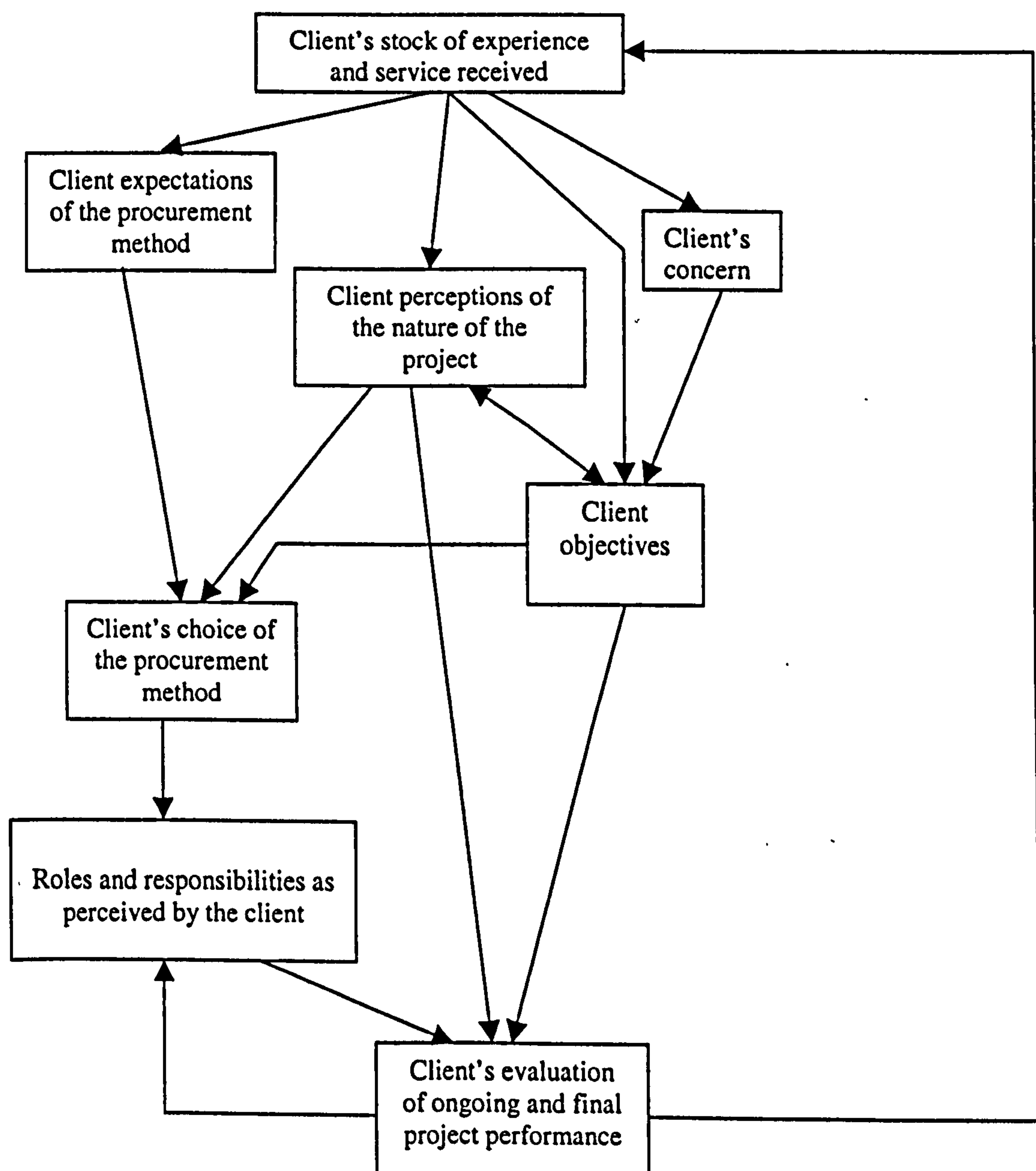


Figure 5.5: The role of client objectives
(source: Ward et al. 1991, pp. 343-353)

5.13 SUMMARY

The client's role is crucial to the success of construction projects. The importance of client's role in the construction process cannot be overemphasised. The client is the initiator of the project needs, it is therefore logical to expect the client to be the leader of the project, particularly as clients have a long term objectives of the project. This chapter has discussed the importance the role of the client in the construction process. The chapter also identified the different types of clients and discussed client satisfaction in relation to the types of clients and concluded that client's needs must be satisfied in order to achieve value for money. The chapter identified that clients in the in the construction industry are wide and diverse; each with their own particular needs regarding the project. The identification of the strategic needs of clients is a significant stage in the development process. The pre-project planning phase is important for the client because it is the stage where his/her needs, objectives and requirements are expressed and clarified into the definition of a project. Chapter six will discuss the importance of pre-project planning phase and highlight the processes associated with it as well as identifying the models that have been developed for this important phase. The pre-project planning represents an opportunity for the client to express his needs. It is therefore essential for clients to pay more attention to it and become more actively involved by investing more time and effort into pre-project planning and performing it in a systematic and structured manner.

CHAPTER SIX

THE PRE-PROJECT PLANNING PHASE

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THE PRE-PROJECT PLANNING PHASE

6.1 INTRODUCTION

Chapter 3 reviewed construction performance and discussed the factors that contribute to poor performance and the need to improve construction. Chapter 4 discussed the key strategic issues that need to be addressed in order to improvement construction performance, and emphasised that these issues have to be addressed early on in the project's life. This should be done during the pre-project planning phase before the design and the construction starts to increase the probability of successful project outcomes. This chapter aims to explore the pre-project planning phase and review the models that have been developed and assess their effectiveness.

Chapter 6 is divided into the following sections: section one reviews project life cycle; section two discusses the nature of pre-project planning; section three discusses the significance of pre-project planning; section four reviews the key issues associated with pre-project planning; section five discusses the problems affecting achieving improvement of pre-project planning and section six highlights the previous attempts of modelling pre-project planning.

6.2 PROJECT LIFE CYCLE

Before elucidating on the pre-project planning phase of construction projects, a discussion of the project life cycle is first presented to clarify where the pre-project planning phase fits within the project life cycle. Although projects by nature vary somewhat with the content of work being done, however, there is a general agreement that they go through a four or five phases (Burke 1999; Lewis 1995). For any project to achieve its objectives it must go through a specific process. This process is described as the project life cycle

(Lewis 1995). Whatever names are chosen for the project, there are usually four or five phases in a project namely: feasibility, conceptual planning, design, construction and start up. Figure 6.1 shows the project life cycle.

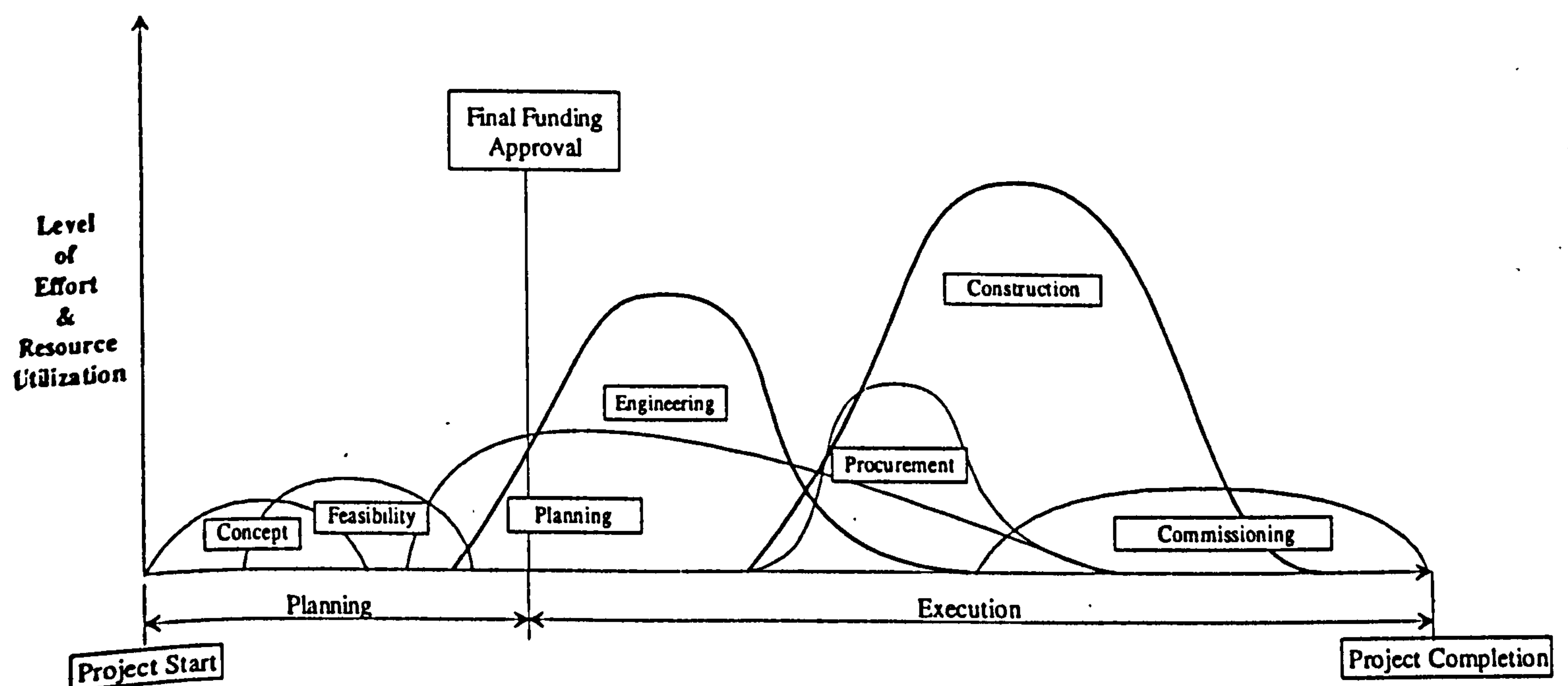


Figure 6.1: The project life cycle of a project
(adopted from Ahuja 1994, pp.4)

However, there is a great diversity in the terms used to describe the phases of the project life cycle relative to the industry and application. For example, Morris's (1992) definition of project life cycle comprised five major phases, they include, pre-feasibility and feasibility, design, detailed procurement; construction and start up. Barrie and Paulsons's (1992) definition comprised conceptual and feasibility; engineering and design; procurement; construction; and start up. The Project Management Body Of Knowledge PMBK (1996) illustrated the diversity of project life cycle in relation to the industry by giving three examples of project life cycle representing the Department of Defence, pharmaceuticals and software development respectively, they are as follows:

The US Department of defence

- determination of mission need;
- demonstration and validation;
- engineering and manufacturing development; and
- production and deployment.

Pharmaceuticals

- discovery and screening;
- preclinical development;
- registration workup; and
- post-submission activity.

Software development

- proof of concept cycle;
- first build cycle;
- second build cycle; and
- final cycle.

Table 6.1 presents the various definitions given by authors to project life cycle.

Table 6.1: The various definitions of project life cycle

Contributor	Definition of project life cycle
Healy (1992)	Feasibility phase, planning phase, design phase and construction phase.
Whittaker (1995)	Concept, identification, design, supply, construction and commissioning.
PMBOK (1996)	Initiating, planning, execution, and closing.
Morris (1992)	Prefeasibility ad feasibility, design, manufacture/procure, erect/install and test/handover.
Gibson et al. (1994)	Business planning, pre-project planning, execution and operation.
Barrie and Paulson (1992)	Concept and feasibility studies, engineering and design, procurement, construction and start and operation.
Burke (1999)	Concept phase, design phase, construction phase and commissioning phase.
Austin and Neal (1986)	Briefing, design, tendering, construction and commissioning.
Khan (1991)	Conception, formulation, appraisal, approval, implementation, reporting, termination and evaluation.
CII (1995)	Business planning, project planning, project scope definition, detailed design, construction and start up.
Meredith (1998)	Conception, selection, planning and evaluation and termination.
CIB (1992)	Feasibility, strategy, design, construction and commissioning.
Angous et al. (1997)	Conceptual phase, study phase, design phase and implementation phase.
Lewis 2000	Concept, definition, planning, execution and close out.
Heisler (1994)	Design and construction,
Adam and Brandit (1996)	Conceptualisation, planning, execution and termination.
Kartam (1996)	Conceptual planning, feasibility study, design and engineering, construction and operation

6.3 THE NATURE OF PROJECT PLANNING

It is generally accepted that planning is the heart of good management because it provides the central communication that co-ordinates the work of all parties (Oberlander 1993). Planning has many purposes, for example, one of the main purposes of planning is to reduce uncertainties that exist before beginning the project by clarifying the objectives. Laufer (1991) described three different ways to coping with uncertainty during the planning of construction projects are called: narrowing - adjusting - absorbing (NAA) and it is mainly.

1. Narrowing down uncertainty by gathering more information.
2. Adjusting uncertainty by splitting decisions as much as possible.
3. Absorbing uncertainty by making more flexible decisions.

The following the perception of planning by different authors.

1. (Rangus et al. 1999): Planning includes the development of a method for converting ideas into a product or service.
2. (Oberlander 1993): Planning also includes a clear definition of the owner's objectives in details. These objectives must be communicated to the design and construction contractor.
3. Sullivan (1997): Planning is selecting goals and ways to attain them. It means defining goals for future organisational performance and deciding on the tasks and use of resources need to be attained.
4. Healy (1997): Planning is a decision making process, it is associated with the formulation of objectives as well as their attainment.

It can be concluded that planning is not only scheduling, planning also involves managing resources and people that are brought together to facilitate a project. Resources and

people need to be managed properly in order to achieve the objectives set for the project.

6.4 PRE-PROJECT PLANNING

Most construction projects begin with the recognition of the need for a new facility. This often occurs long before the start of design and construction. For instance, the CII (1994) considered business planning as the first phase of the project life cycle as it links strategic business goals with initial project goals where the owner is the primary force of this process. Pre-project planning includes the development of the project concept, including the basic decision of selecting the concept that will be used for the execution of the work. It is the bridge that transfers concepts and ideas of the project to a more meaningful physical objectives to satisfy the needs of the client who wants the project to be completed on time, within budget and according to the specified standards and specifications.

According to RIBA (1967), the various stages of the pre-contract period are as follows.

1. Inception: prepare a general outline of requirement of and plan for further action.
2. Feasibility: to provide the client with an appraisal and recommendation to prepare the form in which the project should proceed.
3. Outline proposal: to determine the general approach to layout design and construction in order to obtain approval from the client.
4. Scheme design: to complete the brief and decide on a particular proposal, including planning arrangement appearances, construction methods, outline specifications and cost.

6.4.1 Definition

Beginning at the highest level of abstraction, the first concept is that of pre-project planning itself. There are a number of definitions of pre-project planning in the literature. The most inclusive definition of all is the definition given by the Construction Industry Institute because a model has been developed based on this definition which will be highlighted in this chapter. The early stage of a project is perceived differently by several authors, for example.

1. Barrie and Paulson (1992): concept and feasibility.
2. Morris (1992): pre-feasibility and feasibility.
3. Austin and Neal (1986): briefing.
4. Heisler (1994): conceptual and definition.
5. Burke (1999): concept.

6.4.2 General definitions

The following are definitions of pre-project planning as perceived by different authors.

1. Taylor (1979): The process of identifying need and formulating the basic project objectives.
2. (Process Protocol): The strategic consideration of the client's needs and determining the need of the construction project solution to proceed to the pre-construction stage.
3. (Bennett 1999): The process required to ensure that the project includes all the work required to complete the project successfully.
4. (Burke 1993): The process of developing sufficient information to identify the work to be performed to allow the design to proceed without significant changes that may

adversely affect the project budget and schedule.

5. The PMBOK (1996): The process of formally recognising that a new project existing or should continue into the next phase (Burke1999).
6. (Heisler 1994): The conceptual phase is expressing the needs of client organisations for the construction facility in broad terms.
7. (Simon Report 1944): The conceptual phase refers to elements such as design, brief, selection of consults, sketch plans and preliminary approximate cost.
8. Tatum et al. (1987): Conceptual phase comprises issues such as defining scope of work, design, equipment, procurement and construction methods.
9. Oberlender (1993): The development of project strategy (contracting strategy roles and responsibilities schedule for design procurement) to carry out tasks in a timely manner.

The various definitions reflect the importance of pre-project planning, but it must be mentioned that with the exception of the CII model, there has not been any attempt to specifically model this important phase. The CII model was developed based on this definition, and represented the activities that are performed specifically during this phase of construction projects. Despite of these different definitions given to pre-project planning, a common and fundamental aspect that characterises it is that it starts with identifying the needs and desires of the client and user of the project deliverables.

6.4.3 The CII definition of pre-project planning

Gibson et al. (1993) defined the pre-project planning as “the process of developing sufficient strategic information for owners to address risk to maximise the chance for a successful project”. Through this definition it becomes apparent that information is an

important aspect of the pre-project planning and requires a great deal of attention. The stated definition encompasses the processes that occur after the project idea has been developed, which is sometimes known as feasibility analysis. According to the CII (1994), pre-project planning includes conceptual planning and detailed scope definition and its activities begin once an initial idea for the project is identified.

6.4.4 Information during pre-project planning

The CII defined pre-project planning as “developing strategic information for clients to address risks and increase the chances of successful projects”. It is important that the right information is provided to the right place at the right time. Information that should be available at the start of the pre-project planning phase includes:

- data elements that define the scope of the project such as project schedule and budget requirements and codes and standards to be on the project; and
- a brief outline of the engineering services.

It is only by better understanding the flow of information among project participants that the process of planning can be improved. Early planning must be focused to ensure all activities are weighted appropriately rather than having activities critical by default. This can happen when initial decisions are delayed and slippage occurs. For example, it is essential that risk analysis exercise can be considered during the pre-project planning phase. Important considerations include cost, schedule, and allocation of sufficient resources and time.

It should be remembered that the flow of information in construction projects is not electronic. It is rather human and requires a great deal of attention. For example, to perform approximate estimates, the preliminary required information should include the following:

- type of building and site use;
- total floor area;
- the site and its nature;

- an indication of the quality of work to be specified; and
- a brief outline of the engineering services.

The client in the brief should state the above information.

6.5 THE SIGNIFICANCE OF PRE-PROJECT PLANNING

The pre-project planning phase may be considered by some people as the most time consuming phase, yet, it is the most rewarding one if done properly. The literature revealed that pre-project planning is critical to achieving project goals as it provides valuable input to the remaining project process. It is an important phase because key issues concerning the performance of the project and client needs are defined during this phase (CIB 1997). Equally important, construction input stems from pre-construction planning as it provides sound basis for remaining phases of the project life cycle (CII 1997). This has a management and a technical component. The management topics relate to the exchange of information between project participants. The technical topics involve input to design, which will decrease the scope. Therefore, it can be concluded from the above that early planning performs two functions mainly:

- preparing for the construction period; and
- providing a basis for input to design.

Therefore, more effort should be invested in the pre-project planning phase since the success of this phase will positively reflect on the output of the project (Ahuja 1994 and The Banwell Report 1964). Numerous other writers stated the significance of pre-project planning and its benefits to the construction industry in terms of improving cost time and quality. For example, Shafer (1994), who referred to pre-project planning as front-end engineering, stated that:

“While capital is largely spent during the delivery stage, the key decisions that will influence cost are made during the front end engineering. Front end engineering decisions can influence the cost of projects by

three or four times the amount that occurs in similar decisions made during delivery" (pp. 3.1).

Gibson et al. (1994) identified the most significant variables in measuring success and concluded that the successful completion of a capital project is positively correlated with the level of effort expended during pre-project phase. However, he added, this has to be in line with allocating the adequate resources and well defined scope definition before starting the project. Additionally, Gibson outlined that there has been little research in literature that has identified the important factors for measuring pre-project planning effort and the impact of factors on project success. Furthermore, there has not been any research in which quantitatively established a correlation between the amount of effort performed in the pre-project planning and the success of a project.

Pre-project planning phase also represents the most important point in any project's life cycle since it is the stage that has the most influence on the outcome of the project as crucial decisions regarding the scope definition are made. Gibson and Dumont (1996) revealed that the ability to influence overall project cost is greatest at the beginning of the project where expenditures are relatively low (Figure 6.2).

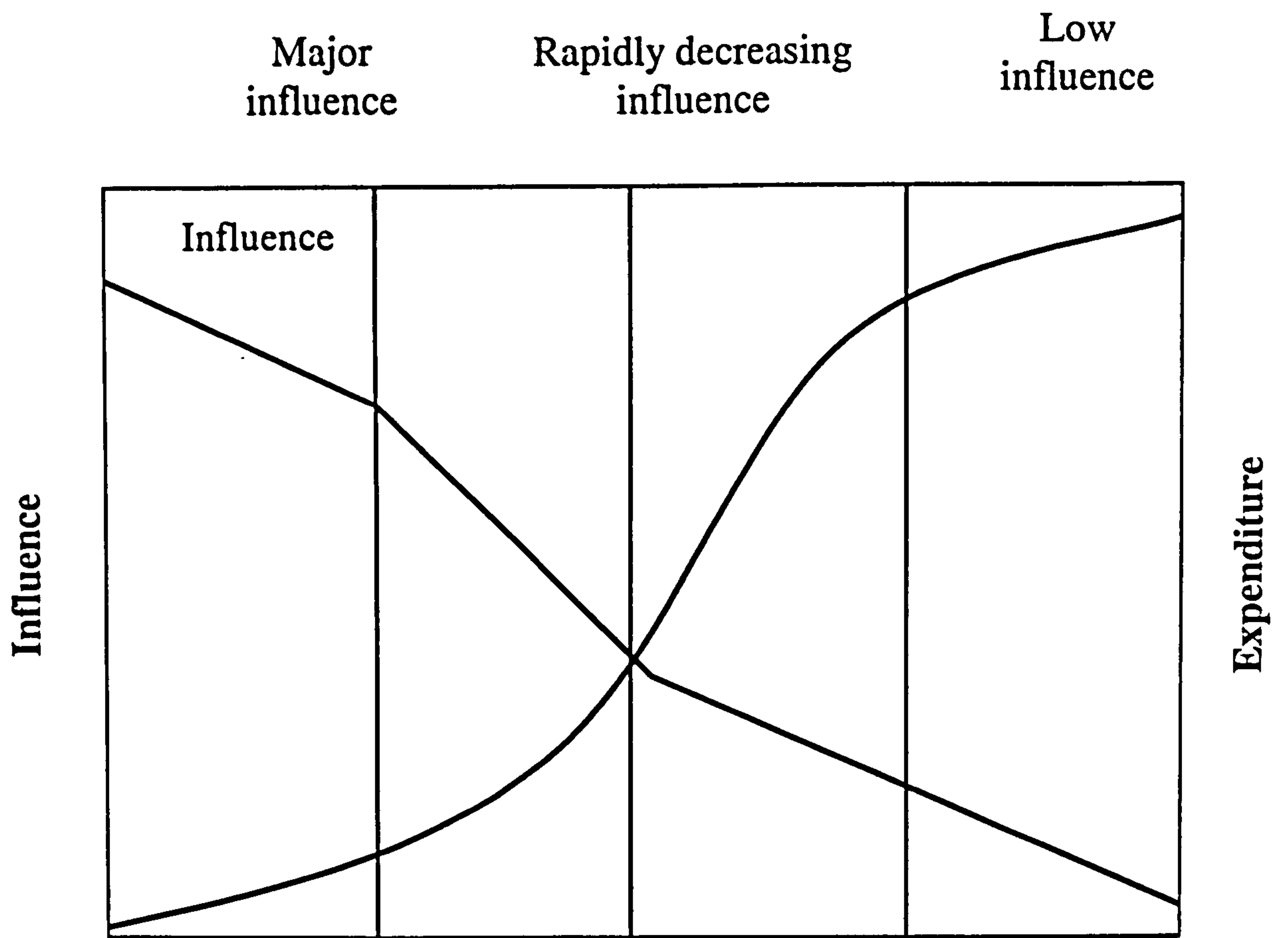


Figure 6.2: Influence of cost and time
(adopted from Gibson et al. 1995)

The profile clearly shows a slow build up of effort during the initial phases as the project is developed. The build up of effort accelerates during the implementation phase. In contrast, the influence is greater at the start of the project and the influence declines as the project progresses. The figure illustrates that it is important to spend more time and effort during the early phase of the project to ensure that the optimal solution is selected and the design is right before implementation. For example, Ahuja (1994) explained that planning is most effective when it is performed early in the project because the impact of decisions made early are usually greater than those made during the later stages. However, in fast track projects where time is the main driver, the high degree of concurrency results in an overlap of processes (e.g. design and construction) which results in construction being

started before the design is fully completed. The issue here is to ensure that the planning of design and construction sequences has been fully considered at the pre-project phase. Figure 6.3 illustrates that the effect of timing on the impact of decisions and that decisions made early on are greater and cost less than those made during the later stages of the project.

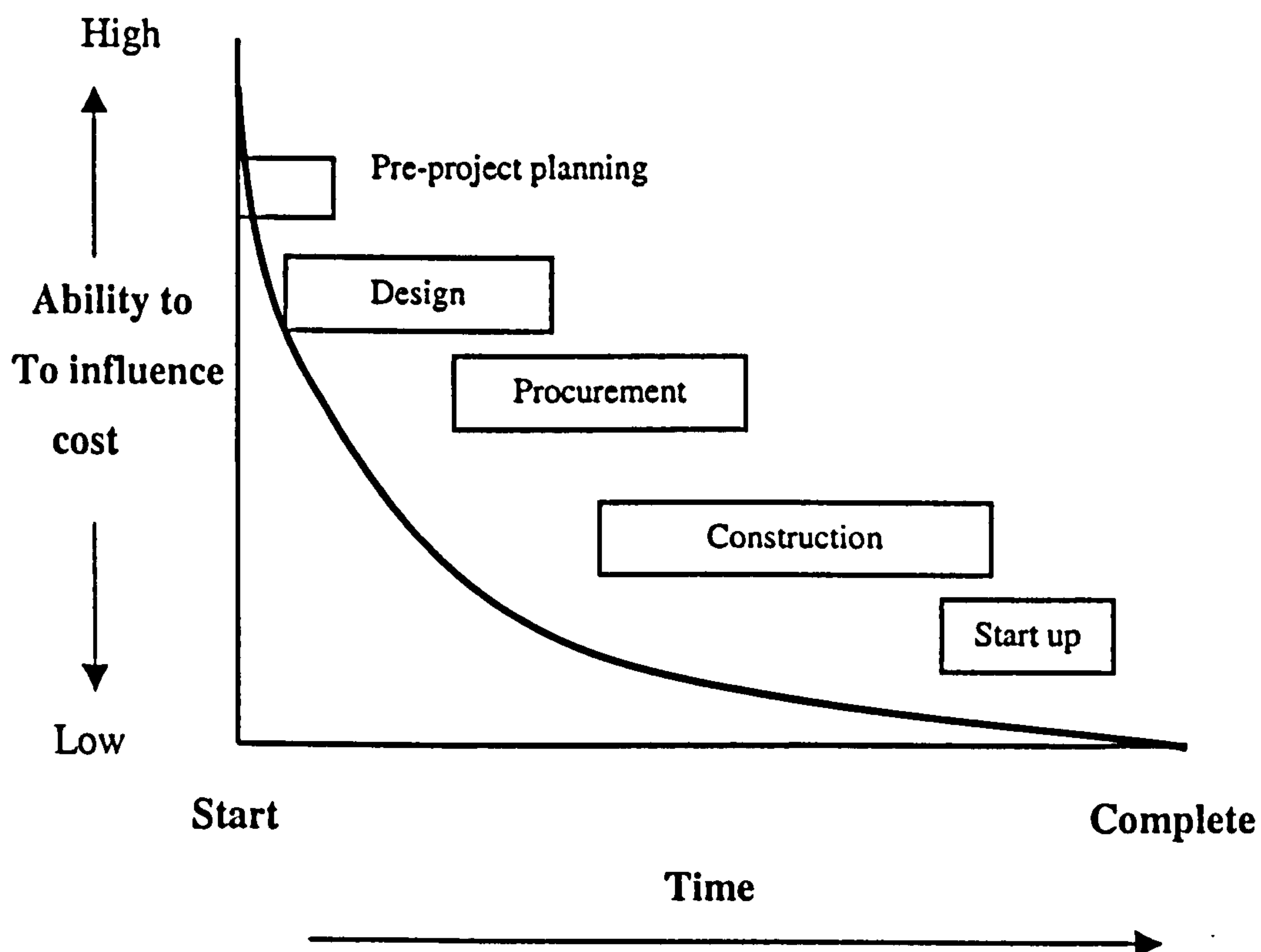


Figure 6.3: Relative ability to influence cost
(adopted from Ahuja, 1994)

Despite its importance and benefits to the construction process, pre-project planning is often perceived to be merely a transitional phase and has therefore received little attention. This lack of attention often leads to major problems that affect cost, schedule and quality (Ahuja 1994). Kezbom et al. (1989) explained that successful projects require the following:

- identify, evaluate and select the project objectives;
- establish a basic strategy and identify the requirements needed to achieve the project

objectives;

- estimate the resources and cost needed;
- develop a detailed plan and schedule;
- forecast the cost and resource needs over time; and
- organise the project team.

6.6 PRE-PROJECT PLANNING AND PROJECT SUCCESS

Sullivan et al. (1997) explained that an increased level of planning during the early planning stage effects the success of the project more than efforts taken after the project has begun. The CII research has demonstrated that there is a correlation between the level of pre-project planning and project success. The CII research on pre-project planning also identified that performing pre-project planning provides an opportunity to achieve project success. For example, in their studies of the relationship between pre-project planning and project success, Gibson et al. (1994) identified the following as very important variables leading to project success:

- existence of a written charter;
- existence of a project plan;
- development of control guidelines; and
- defined project execution plan.

6.7 KEY ACTIVITIES IN PRE-PROJECT PLANNING

A project occurs over an identified period of time during which a change level of effort is required to complete each stage. Projects are composed of processes. A process is defined as “a series of actions bringing about a result (PMBOK 1996). The concept sets the course for early planning because it includes the entire basic key planning issues and requirements that determine the outcome of the project. According to Taylor (1997), the concept can be divided as follows:

- project aim includes fundamental statements such as description of the basic requirements of the project in detail and explains the technical approach; and

- project definition includes items comprising the concept would be translated to more definitive data such as performance specification.

Many researchers refer to the pre-project planning phase by different definitions, for example.

1. **Khan (1991):** The conceptual phase comprises the inception, which is the stage when ideas been recognised and methods are developed for executing the project, which mean conducting feasibility studies and considering alternatives.
2. **The Simon Report (1964):** The conceptual phase refers to the design brief and approximate costs.
3. **Heisler (1994):** The conceptual phase comprises contracting methods and development project schedule.
4. **Oberlender (1993):** The project strategy is a plan to carry out tasks in a timely manner.
5. **Tatum et al. (1987):** The conceptual phase comprises issues that include:
 - defining the scope of work;
 - provide data concerning the site and process design;
 - equipment procurement policy;
 - stating the construction methods;
 - determining of site and local constraints;
 - accounting for resources availability;
 - developing project execution plan; and
 - defining site layout.

The different definitions of a pre-project and variety of terminology such as conceptual phase as expressed by the above mentioned authors indicate that the content of pre-project planning varies according to the type of project, building, and civil engineering etc.

Although many authors referred to the early phase of the project life cycle as conceptual phase, the activities involved are generally the same and it is mainly a client-focused activity where the client expresses his needs and requirements. However, none of the above produced a process model describing the key activities during pre-project planning and how the problems encountered are dealt with.

6.7.1 Tasks in the conceptual phase

Kadir and Price (1995) identified the tasks involved in the conceptual phase. They comprise best practices. In their study of the conceptual phase, they identified ten main tasks in the conceptual phase they include:

- consents and permits;
- the project definition;
- the financial strategy;
- project planning;
- the contract strategy;
- the project management organisation;
- the construction philosophy;
- the procurement strategy;
- the design of temporary works; and
- the design of permanent structures.

The tasks stated above represent best performance which are associated with best practices of major projects, however, they are related to site activities to ensure good site productivity through decisions made in the early phase.

Table 6.2 provides a summary of the definitions of these tasks.

Table 6.2: Definitions of conceptual phase tasks
(adopted from: Kadir and Price 1996)

TASKS	DEFINITIONS
Consents and permits	Fulfilment of a society's embodiment of constitution, laws, salutes, regulations, norms and culture, which ensures rights and protection of itself in relation to the proposed project.
Project definition	Resolution of options during the conceptual phase which culminates in statements of client's requirements.
Financial strategy	The principal means and methods by the financial requirements of total project delivery are satisfied.
Contract strategy	A strategy that defines relationships, duties, obligations and policies which are directed/engineered towards the desired successful total project delivery in accordance with project planning, financial strategy, project definition and consents and permits.
Project management organisation	The formulation and configuration of the client's management team in accordance with contract strategy.
Construction philosophy	The conceptual approach and method of construction that decapitates the design of permanent structures and temporary works.
Procurement strategy	Strategy for proactive project hardware purchasing is required to achieve complete project delivery in accordance with project schedule.
Design of temporary works	The principles of construction practices to realise the permanent works of the people which may or may not be part of the permanent works and reflects construction philosophy.
Design of permanent structures	The conceptual design, preliminary layout and sketches outlining the permanent works so as to fulfil project definition.

In addition, Angus et al (2000) identified the activities associated with pre-project planning namely:

- organise a team and formulate a concept;

- select the project;
- initiate conception phase document;
- expand team and identify supporting organisation;
- complete the planning of the next phase of work; and
- convert document drafts into final documents.

The tasks and activities presented do not indicate the problems associated with pre-project planning and how to solve them. In order to have effective pre-project planning, there is a need for an structured pre-project planning process and tools that takes into account both people and process issues and deal with the problems that inhibit pre-project planning improvement. The following section will highlight some of these problems and the key issues that need to be addressed during pre-project planning.

6.8 PROBLEMS RELATED TO PRE-PROJECT PLANNING

Most problems occur in the planning phase, which comprises the conceptual and development stages (Ahuja 1994). These problems act as obstacles that prohibit pre-project planning improvements. For example, there are problems associated with alignment of needs and objects of clients and stakeholders. Additionally, Newman et al. (1981) summarised the six main problems in the pre-project planing as follows:

- client problem;
- client architect relationship;
- cost problems;
- client organisation problems;
- regulation problems; and
- site timing problems.

6.9 THE NEED FOR AN IMPROVED PROCESS

It is important to ensure that the activities associated with pre-project planning are clearly defined and established before the execution of the work starts. Early planning can significantly impact upon project outcome as targets can be established early on to enable the correct decisions to be taken at the right time. The importance of improved planning is widely recognised because decisions made at this phase will have a major influence on the overall cost.

Improving pre-project planning can be achieved through an effective flow of information and alignment of client objectives with those of project team and stakeholders the early stages of the project. This can be achieved through a structured process and tools that deal with process and cultural issues, which inhibit improvement of pre-project planning to guide the process. The CII (1994) provided a formula for improvement that included the following:

- provide basic elements;
- commit to improvement; and
- develop improvement tools.

It is justifiable to conclude that improving pre-project planning can be achieved by the following:

- developing a formal and structured process;
- identifying the key important issues in the process; and
- involving key stakeholders in the team; and
- resolving the disagreement among team members.

6.10 KEY ISSUES OF PRE-PROJECT PLANNING

It was established earlier in this chapter that pre-project planning provides a basis of input for the design and prepares for the construction phase. It is therefore, important to have a clear understanding of the pre-project planning.

Pre-project planning comprises all activities that serve to make it more effective. These activities start when the idea or identification of the need for the project occurs. There are important issues underpinning the effective exercise of pre-project planning previously discussed in Chapter 4 that should be addressed by the client as explained in Chapter 5.

6.10.1 Define client's needs

The starting point of the project is to address the need, which may be internal or external. The evaluation of the need from something quite vague to something tangible that serves the basis of a project plan. The first stage of pre-project planning starts with identifying the needs and desires of the user of the project deliverables. This represents two important elements: it will form the basis for customer's acceptance of the project success measures; and the starting point for planning. (Walker 1994) suggested that a successful project requires the following:

- customer requirements are clearly understood and agreed;
- scope of work and cost estimates are agreed with both customer and project team; and
- risks and uncertainties are understood and accepted by all participants.

It can be observed that defining client needs is an essential part of an effective pre-project planning process and it requires commitment and agreements of people involved within the client organisation.

6.10.2 Produce scope definition

Scope definition is very important and severe consequences can occur if it is not properly identified as discussed in Chapter 3. There are many problems associated with pre-project planning. For example, some project team members believe that project management activity occupies too much of their time in particular (Rosenau 1998).

Project definition is the process that starts when a customer first conceives the idea of the project (Lock 1994).

6.10.3 Co-ordination between people involved

Other problems associated with pre-project planning are a result of differences between the functional disciplines involved in a construction project (Hamilton 1994). This is because the different people involved usually bring with them different objectives that cause conflicts between the project participants. In the pre-project planning phase, roles and responsibilities of the people involved must be determined as well as the method by which the project will be approached (Burke 1999).

6.10.4 Communication of project objectives

Ward et al. (1991) pointed that it is important for clients to select clear objectives and communicate these objectives clearly to the other involved parties to avoid conflict. The first step toward effective planning is clear, detailed definition of the owner's objectives. According to Rowings et al. (1987), the client must communicate these project objectives to the project participants through:

- contract documents;
- policy manual;
- project procedure manuals;

6.10.5 Alignment of client's and project team's objectives

Clients obviously have needs, but they should make sure that these needs are specified clearly and prioritised to enable the project team to align their priorities as closely as possible to these needs. Morris (1994) suggested that alignment meetings should be arranged to ensure that client's and end users' needs and priorities of objectives are understood. Alignment tools, which are discussed in Chapter 3, can help the project team achieve the alignment of objectives of the client and project team.

6.10.6 An effective client briefing

A Client brief is crucial to the success of a project because it is partly responsible for the current level of client dissatisfaction (NEDO 1974) and Latham (1994). Furthermore,

according to Kelly (1996) and Murry (1996), the concept of briefing is considered to be among the critical factors in determining the client's satisfaction with a project. It is therefore important that the client communicates project objectives to the design team.

6.10.7 Selection of an appropriate procurement system

It is accepted that the right choice of procurement is important to the success of the project (Bennett and Grice 1990). The selection of the most suitable procurement system contributes positively to the attainment of client objectives with respect to time, cost and quality of construction projects (Bowen et al. 1999). Several selection methods have been developed to assist the client in choosing the right one with respect to his/her objectives.

6.10.8 An adequate definition of the project

Inadequate definitions of project requirements can have a devastating effect on the project. It is a frequent cause of project failure (Taylor et al. 1979). A fully documented and agreed project definition is fundamental to project success (Taylor et al. 1979). Whittaker (1995) argued that project definition is determining the scope and nature of the plant to be designed and constructed. He relates that the failure of many projects in recent years has been the consequences of inadequate definition of the project at the time the projects were approved.

6.10.9 Appointment of a team

The appointment of a team formation is important during pre-project planning. The client should select a team based on their skills, knowledge and experience. Within the client organisation a team has the responsibility of defining the client's need and align the team's agreement on the need. Effective planning requires a high degree of co-operation between the team members. But the team does not come easily, it must be carefully cultivated. Usually, the participants have no prior working relation with each other owing to their alliance with different organisations, from which they are detached, yet they must behave as a team. In the pre-project planning phase, the roles and responsibilities of the

people involved must be determined as well as the method by which the project will be approached (Burke 1999).

6.10.10 Objective setting

The first step in planning involves establishing objectives for the project. It is a basic element of planning because the objectives guide numerous decisions required throughout the project's life cycle (CII 1986). These decisions involve trade off between time, cost and quality as well as performance characteristics. The process of establishing objective setting involves three important elements, mainly:

- establish objectives;
- communicate objectives; and
- formulate project objectives

6.11 MODELLING IN THE CONSTRUCTION INDUSTRY

Construction process understanding and the activity of process modelling have important roles to play within in the construction industry. However, most of the literature related to pre-project planning has focused on the management side of project planning. The only substantial research work detected on pre-project planning was found in the study conducted by the Construction Industry Institute (CII 1994). The CII developed a model for pre-project planning in a generic form that can be applied to different companies with certain modifications.

According to Poon et al (2000), the early process models mainly focused on modelling the design and construction processes only such as the BAA and RIBA Plan of Work. Walker (1995) adopted the manufacturing process concept and developed the conversion process model. According to this model, production is understood as conversion of materials and labour inputs to the product outputs. Furthermore, production process can be divided into sub-processes. However, the model does not differentiate between processing activity and the flow of activity.

6.11.1 Previous attempts to model pre-project planning

While industry individuals have recognised the importance of pre-project planning (Ahuja 1993; Hill et al.1990; Sullivan 1994), little conceptual modelling had been performed with the exception of the study performed by the Construction Industry Institute (CII 1993). There is a considerable research focus on modelling the process of planning of design and construction phase of construction projects in comparison to the pre-project planning. For example, in currently acknowledged models of design and construction process (RIBA 1980; British Federation 1993) and currently published client focused guides (CIRIA 1995), the pre-project planning was given less examination and attention compared to the late stages of the project.

6.11.2 Process protocol approach to pre-project planning

The process protocol is a generic process that is intended to reduce the time and demands of all projects (Kagioglou et al. 1998). The model divided the process into five main phases, they are idea, conceptual engineering, detailed engineering, engineering completion and construction and project engineering. According to this model, pre-project planning activities described in the idea and conceptual engineering stages from phase zero to phase three.

BAA process

The BAA model is an activity-focused model (BAA 1995), which focused on data management and specific to the developer's operations or industry segment.

RIBA process

Table 6.3 presents comparison of how pre-project planning phase is perceived by the Construction Industry Institute, the Process Protocol, the BAA and ARIBA Plan of Work.

The RIBA Plan of Work is an acceptable model for the building project in the UK (RIBA 1970). It models the activities describing all design work and management tasks within

the project program from inception to completion. Table 5.3 shows how the early phase of the project planning is perceived by the CII, RIBA, Process Protocol and BAA.

Table 6.3: How pre-project planning is presented

CII Pre-project planning model	RIBA Plan of work	Process Protocol	BAA Project Process
1 Organise for Pre-project Planning	PRE Pre-Arrangement	0 Demonstrating the Need	A Inception
2 Select Project Alternatives	A Inception	1 Conception of Need	
3 Develop project Definition Package	B Feasibility	2 Outline Feasibility	B Feasibility
		3 Substantive Feasibility	C Concept Design
4 Make Decision	C Outline proposals	4 Outline Conceptual Design	

6.11.3 The CII tool

There are several models, which focus specifically on pre-project planning models that have been developed. Among these models are the CII model and the process protocol. The CII model is a functional process model that focuses on the functional aspects of the planning while the process protocol considers it as part of the entire project life cycle. The Construction Industry Institute (CII 1993) has targeted pre-project planning as a key to project success. The following section will shed some light on the CII model as well as some other models that have been developed and assess their applications. The Construction Industry Institute (CII 1993) identified the major processes of pre-project planning and developed a model using the IDEF0 modelling technique as shown in Figure 5.4.

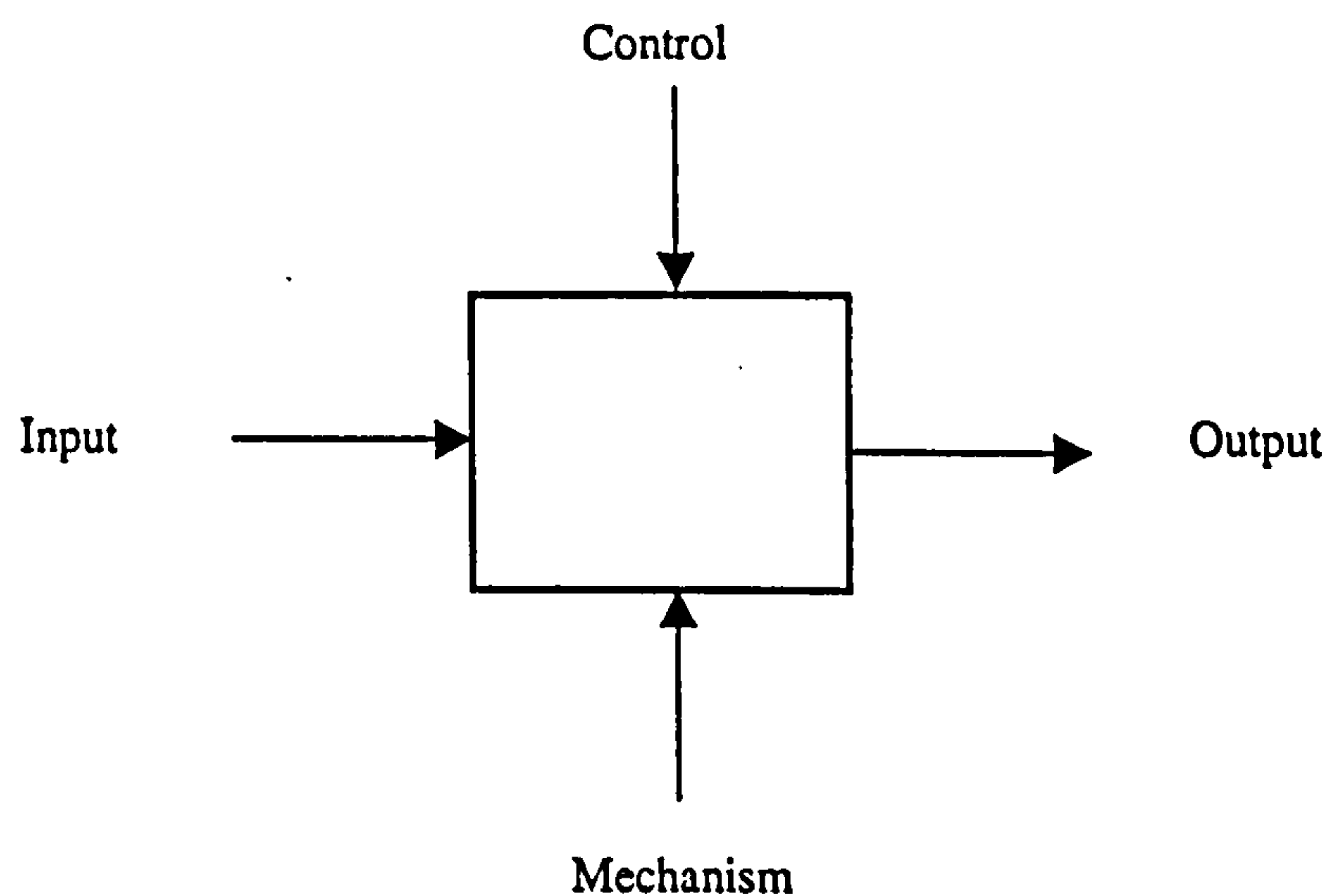


Figure 6.4: SADT Notation
(source: Newton 1995)

The model was based on the definition that the CII gave to define pre-project planning. The model comprises the following functional processes.

Organise for pre-project planning: it comprises the following:

- select the team responsible for performing pre-project planning;
- draft a charter which defines the team's responsibilities; and
- prepare pre-project planning plan.

Select project alternatives: it comprises the following:

- analyse existing technology to meet the owner's requirements;
- evaluate sites to meet owner's needs;
- prepare conceptual and estimates based on project alternatives; and
- evaluate alternatives.

Develop project definition package: it comprises the following:

- analyse project risks;
- document scope design;
- define project execution plan;
- establish project control guidelines; and
- compile project definition package

The CII used the IDEF0 technique to represent the activities of the pre-project planning. Figure 6.5 represents the sub-processes associated with the "perform pre-project planning".

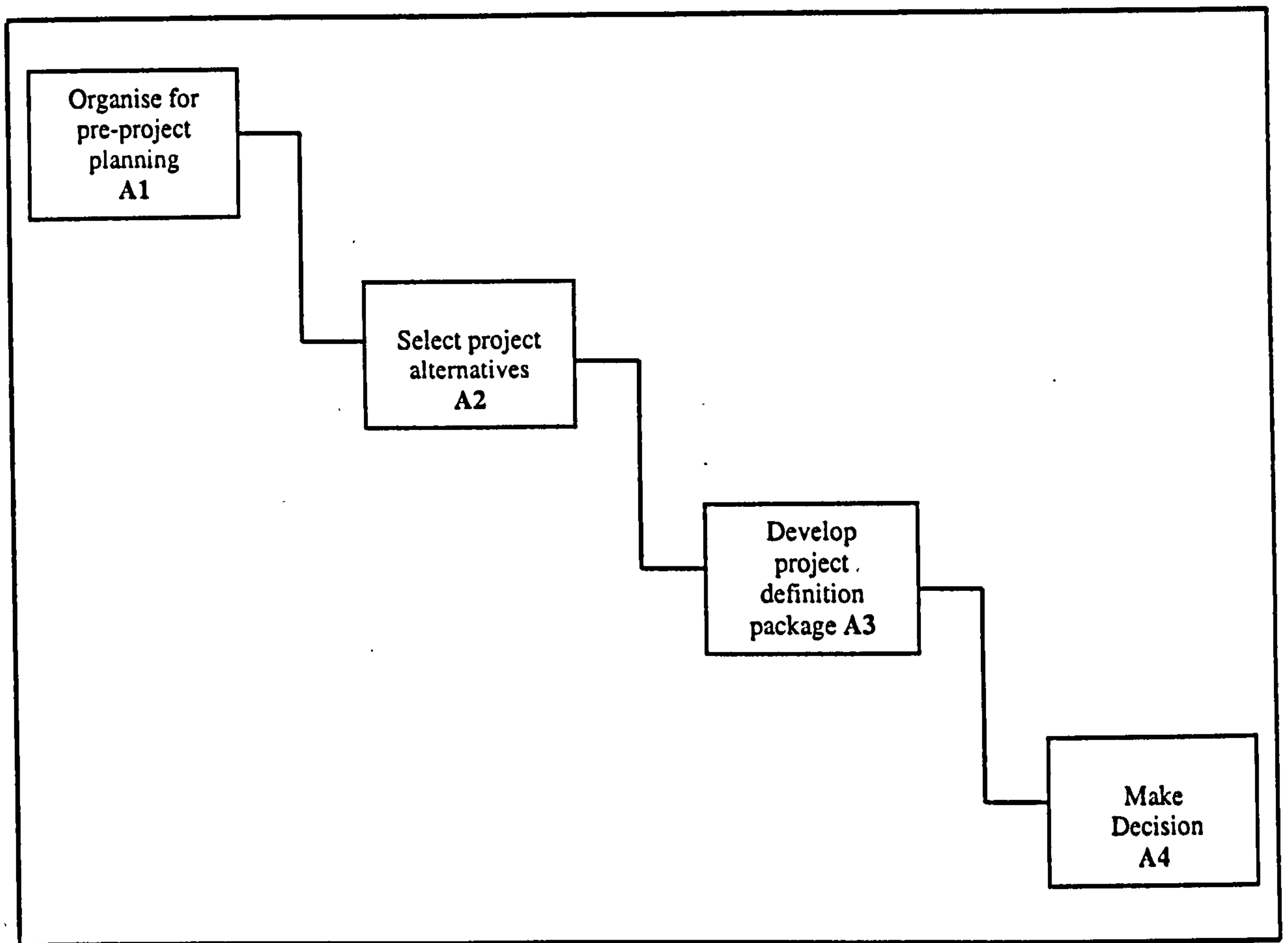


Figure 6.5: Perform pre-project planning: A0

6.11.3.1 Limitations of the CII model

The general observations that can be drawn out from the model are:

- it is mainly owner focused;
- the principles are not specific but can be applied with certain modifications.
- it concentrates on modelling the pre-project phase to identify all the activities involved; and
- it breaks down the process into four sub-processes.

However, the model has limitations, among these limitations are:

- it is general and generic;
- it describes the delivery system without showing how the team is involved and how the information flow among them (the co-ordination of functional disciplines involved); and
- it was tested and developed from the industrial sector and needs to be validated.

6.11.4 Other pre-project planning models

A literature review concerning modelling pre-project planning revealed several attempts were made to model pre-project planning phase. For example Sanvido (1990) developed a model of the construction process which is shown in Figure 6.6.

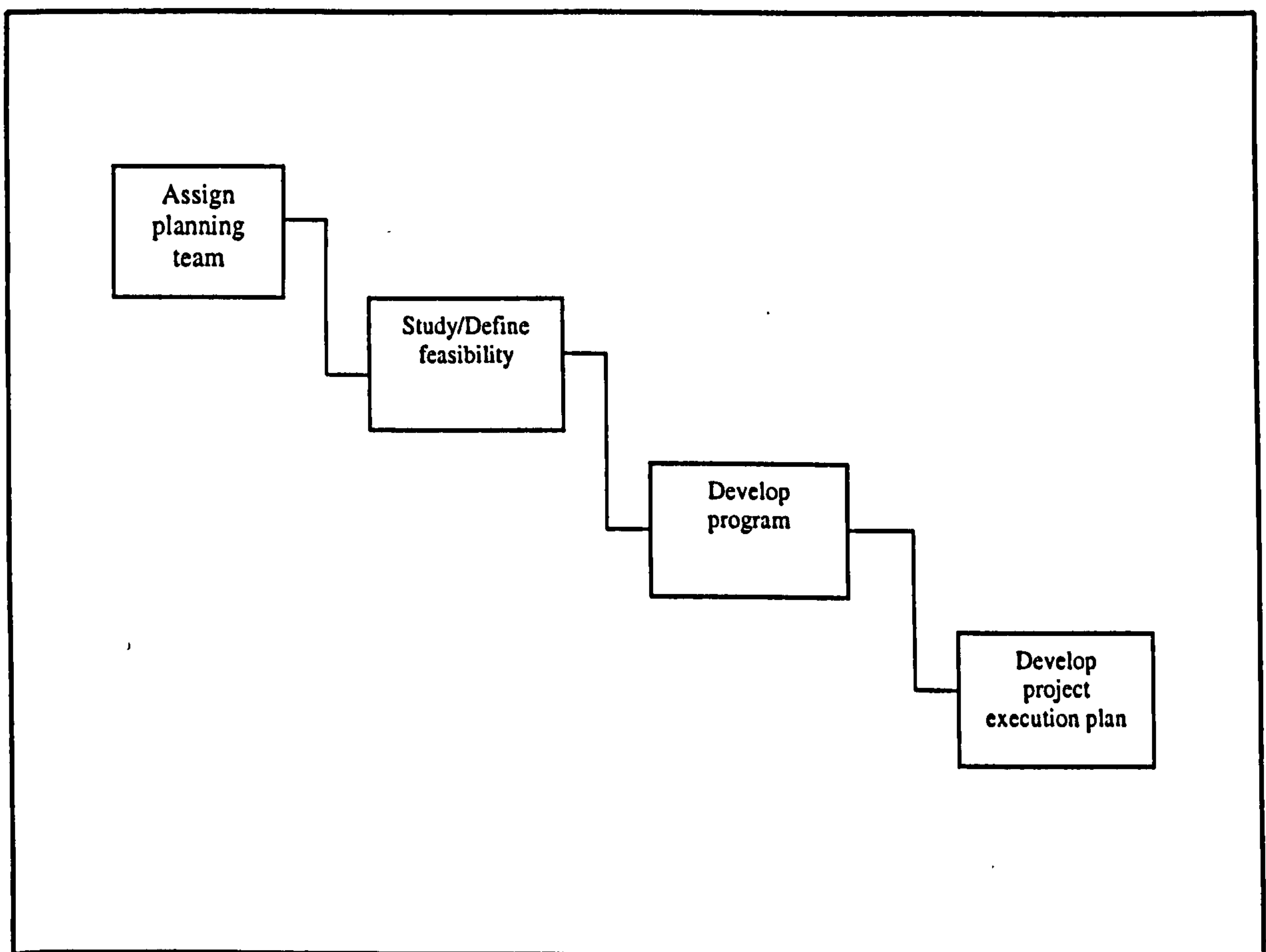


Figure 6.6: Sanvido's plan facility diagram

Gibson et al. (1995) identified some other pre-project planning models and they are summarised in Table 6.4.

Table 6.4: Pre-project planning models
(adopted from Gibson et al. 1994)

Contributor	Activities
1. CII'S Scope definition and control model	<ul style="list-style-type: none"> • Idea. • Conceptual engineering.
2. Sanvido (1990)	<ul style="list-style-type: none"> • Assign planning team. • Define needs. • Study feasibility. • Develop program. • Develop project execution plan. • Select and acquire site.
3. Jwell (1986)	<ul style="list-style-type: none"> • Definition of a problem. • Gathering of data. • Development of evaluative criteria. • Formulation of alternatives. • Choose best alternatives.
4. Tompkins and White (1984)	<ul style="list-style-type: none"> • Define (or redefine) the objectives. • Specify the primary support activities. • Determine the interrelation activities among all activities. • Determine the space requirements for all activities. • Generate alternative facilities plans. • Evaluate alternative facilities plans. • Select a facilities plan.

6.12 SUMMARY

This chapter has examined the pre-project planning phase and emphasised its importance to the construction process and project success. Most of the literature related to pre-project planning did not deal directly with the process. However, few attempts have been made to model the pre-project planning. Most of these models represented the pre-project planning phase as part of the entire structure such as the BAA model, the Process Protocol and the RIBA plan of work. Several models have been identified. It was concluded that these models are project specific and lack the tools that make them applicable. The review of the previous attempts to model the pre-project planning were useful for better understanding the key issues of the pre-project planning activities. Therefore, more attention and effort should be invested for this phase. The next chapter will discuss the general methods available and assess their strengths and weaknesses as well as discussing the specific strategy adopted to collect data for the research.

CHAPTER 7
ANALYSIS OF CIENT QUESTIONNAIRE
AND CASE INTERVIEWS RESULTS

CHAPTER SEVEN

ANALYSIS OF CLIENT QUESTIONNAIRE AND CASE INTERVIEW RESULTS

7.1 INTRODUCTION

One of the main objectives of this research is to examine the client's approach to pre-project planning and develop tools to improve the process. Chapter 2 discussed various research methods for data collection; outlined the specific strategy for collecting data for this research; and the methodology for collecting data. As explained in Chapter 2, the specific research methodology adopted for this research was questionnaire survey and case interviews. This chapter presents analysis of responses to the questionnaire sent to construction clients and case interview questions addressed to four construction clients.

7.2 QUESTIONNAIRE RESPONSE

One hundred and seventy (170) questionnaires were sent to construction client organisations using self-addressed envelopes. After sending the questionnaire, follow-up contact was made by telephone and writing to non-responding construction clients to remind them and request their response. The number of positive responses is forty-eight (28 per cent). This response rate is not unusual for the construction industry bearing in mind that the questionnaires were sent during the summer holiday season. Smith et al. (1991) stated that the expected industry response norm is of the order 25-30 per cent if the appropriate measures for increasing questionnaire response are undertaken. From a total of the questionnaires sent, fifty-four (31 per cent) questionnaires were received. Table 7.1 shows the statistics of the survey questionnaire survey. Among the reasons for not receiving a higher response rate is:

- heavy schedule and pressures of work;
- sensitivity of the subject area; and
- volume of questionnaires that client organisations receive.

Table 7.1: Statistics of the questionnaire survey

Number of questionnaires sent	170
Number of positive replies received	48
Number of negative replies received	7
Per cent of positive replies received	28%
Per cent of negative replies received	4%
Per cent of total replies received	31%

7.3 GENERAL INFORMATION

7.3.1 Type of client

Figure 7.1 provides a description of companies represented in the survey. Sixty-nine per cent of the companies have been engaged in public business, twenty-two per cent have been engaged in private business and nine per cent have been engaged in other business such as educational.

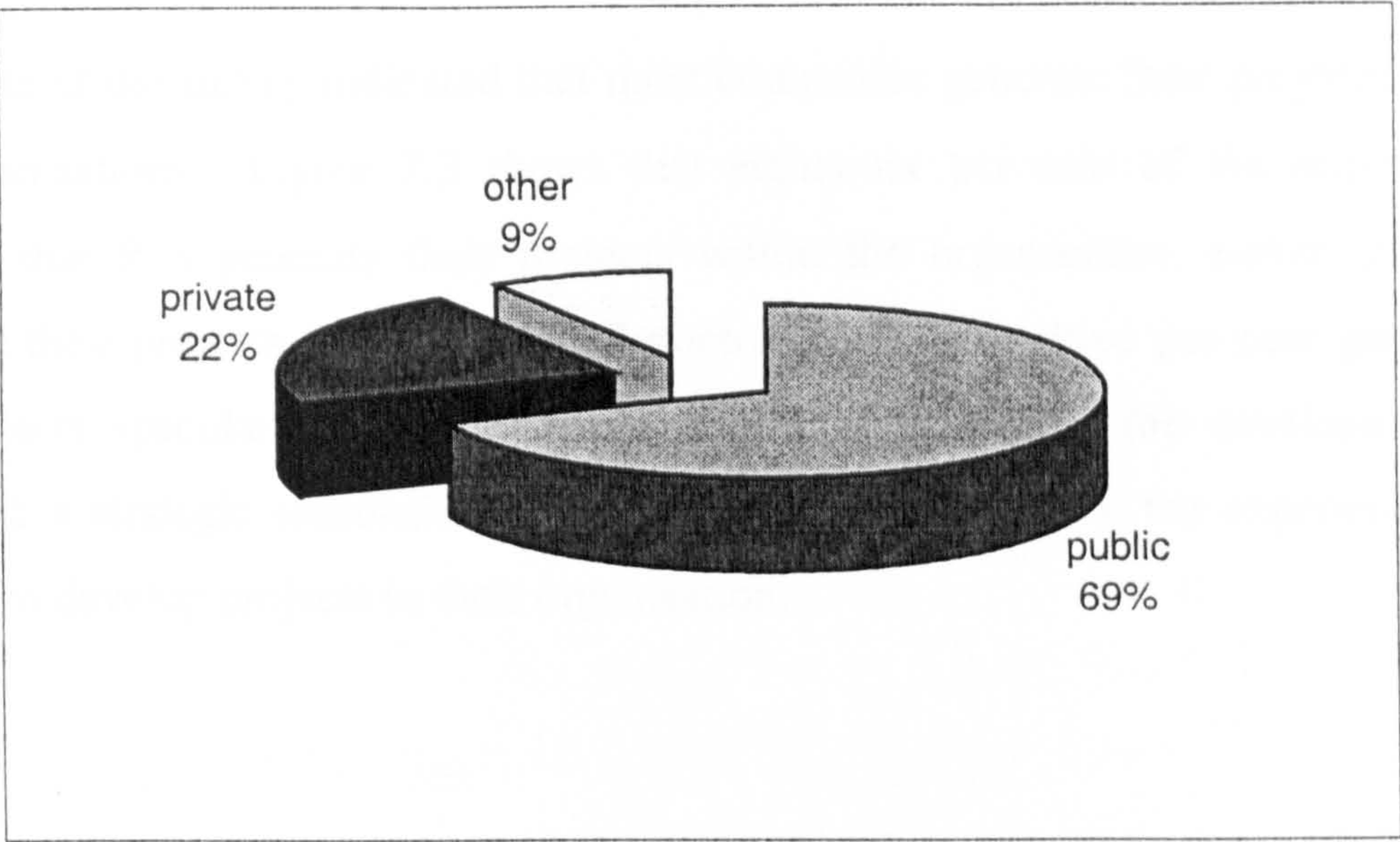


Figure 7.1: Type of clients

Figure 7.2 shows that forty-seven per cent of the respondents have been involved in new build business twenty eight per cent have been involved in maintenance and twenty-five per cent have been involved in refurbishment.

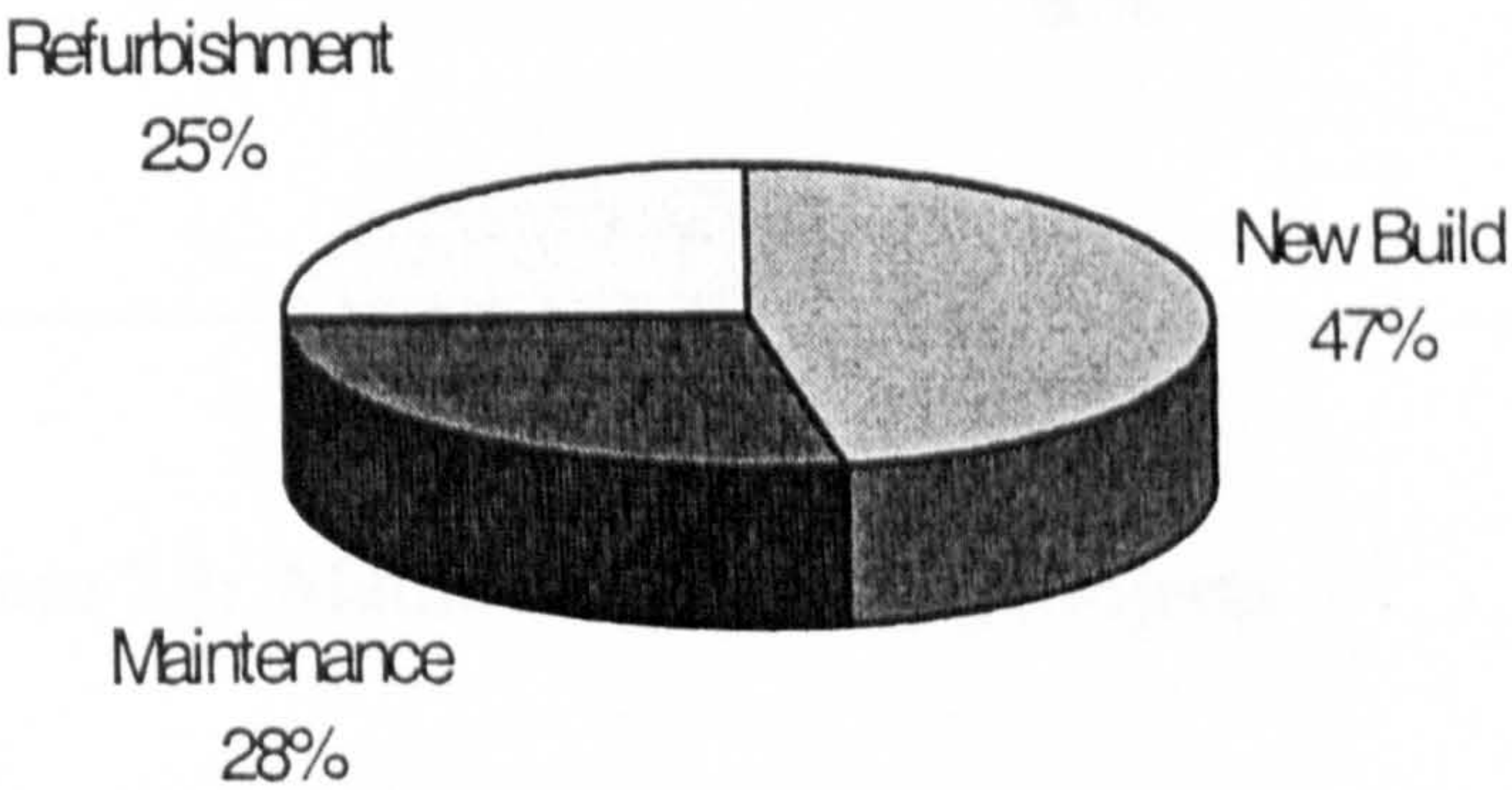


Figure 7.2: Type of business

7.3.2 Method of generating projects

The results of the survey indicated that most companies generate their projects within their organisations. Figure 7.3 shows that eighty-six per cent of the respondents indicated that they generate their projects within the organisation, eleven per cent generated their projects through external contracts and only three per cent generated their projects speculatively. The results clearly indicate that the development of projects is a strategic responsibility of the client and they have the experience and potential to develop projects in their organisation.

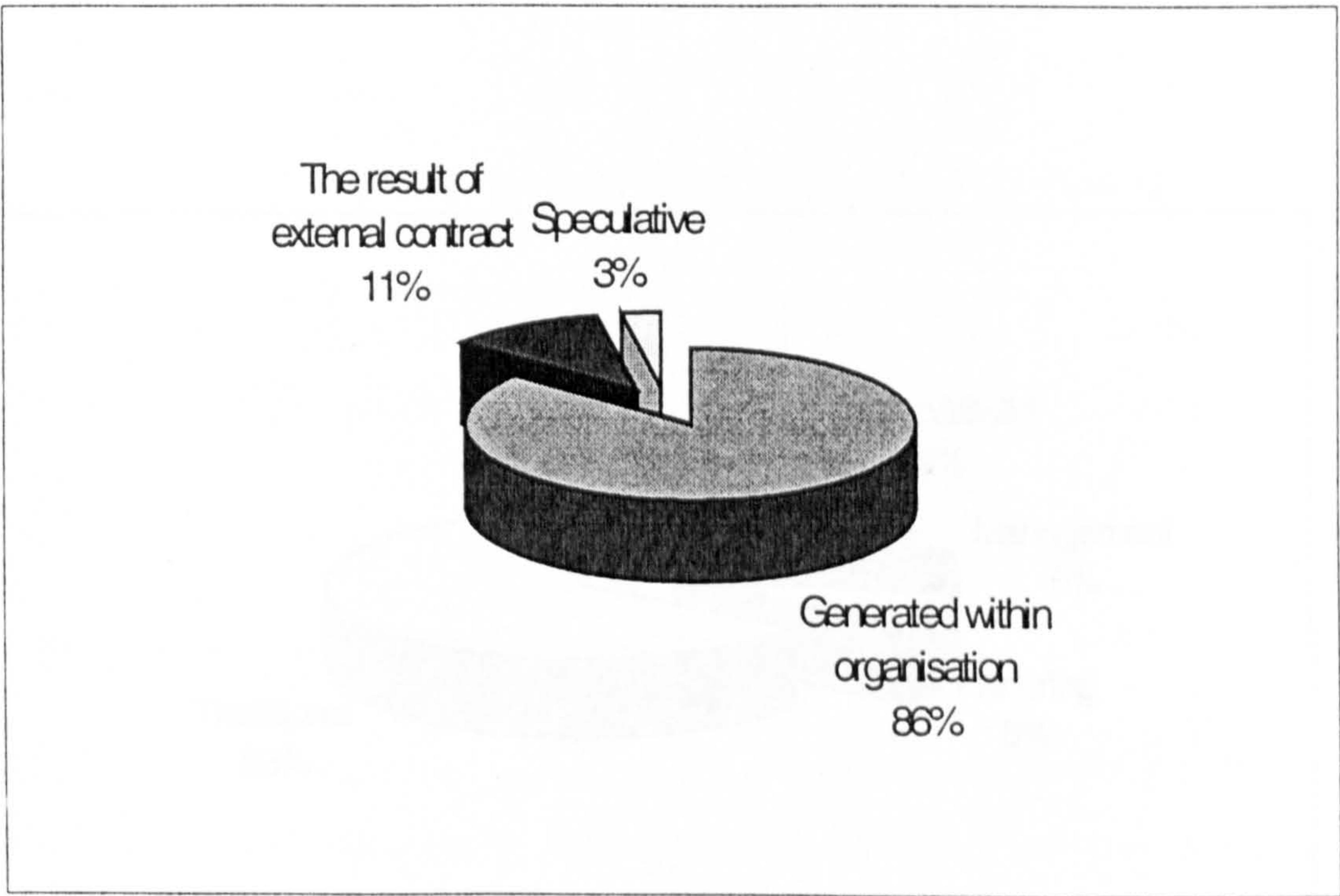


Figure 7.3: Method of generating projects

7.3.3 Type of procurement used

The majority (63 per cent) of the companies surveyed used traditional contracts to procure their projects, which is characterised by the separation of design and construction. Figure 7.4 shows how companies procured their projects in the last five years. Design and build was the second most preferred method of procuring projects with nineteen per cent of the respondents indicated that they used design and build for their projects. Both partnering and management were the least preferred methods of procuring projects. Only eight per cent of the respondents indicated that they used management and partnering. The results of the survey show that traditional procurement is the most preferred procurement by respondents which supports findings of the literature which indicated that traditional procurement is the most used method (The Royal Institute of Chartered Surveyors 1994, 1996).

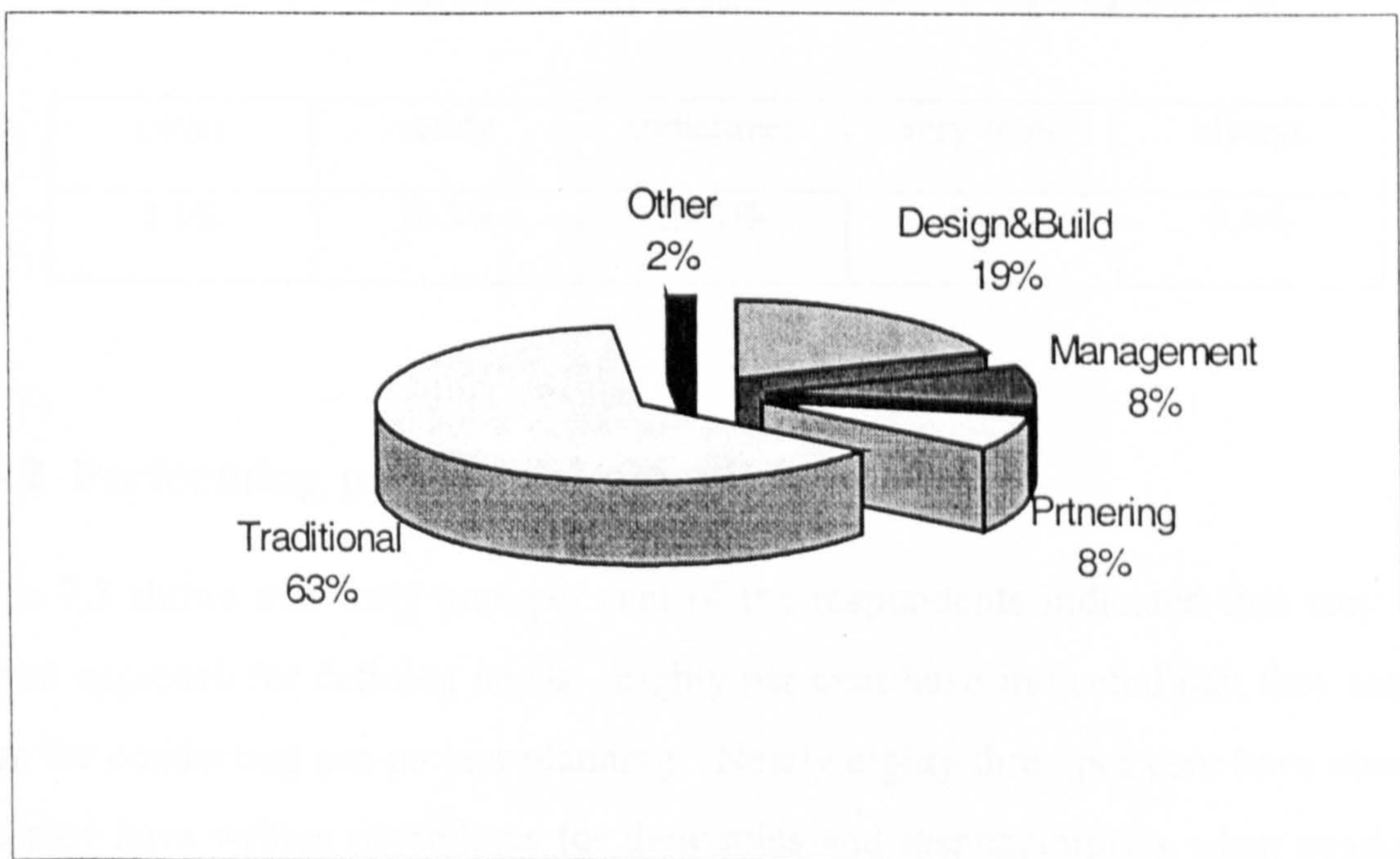


Figure 7.4: Type of procurement used

7.4 PRE-PROJECT PLANNING PROCESS

Respondents were asked to respond to questions about the way they conduct pre-project planning process in their organisations and the tools they most often use as well as the problem they frequently encounter when performing pre-project planning.

7.4.1 Degree of formality behind pre-project planning

Table 7.2 shows the extent to which respondents are using a formal pre-project planning process. The majority of respondents indicated that they use a formal pre-project planning process. Seventy-nine per cent use a formal pre-project planning process between sometimes to always. Only twenty-one per cent of the respondents indicated that they do not use or rarely use a formal pre-project planning process.

Table 7.2: Degree of formality behind pre-project planning

never	rarely	sometimes	very often	always
2.1%	19.3%	29.7%	40.4%	9.4%

7.4.2 Performing pre-project planning

Table 7.3 shows that forty nine per cent of the respondents indicated that they use a formal approach for defining needs. Eighty per cent have indicated that they assign a team for conducting pre-project planning. Nearly eighty three per cent have indicated that they have written procedures for their roles and responsibilities when conducting pre-project planning. However, most of the respondents, sixty per cent indicated that they do not allocated enough time for conducting pre-project planning. The results indicate that pre-project planning does not receive adequate attention among the respondents.

Table 7.3: Performing pre-project planning

	Frequency of scores per cent					Combined scores per cent		Ranking
	never 1	rarely	some- times	very often	always	never to rarely	sometimes to always	
Perform pre-project planning								
Formal process for defining needs	2.2	4.3	10.6	34.0	48.9	6.5	93.5	1
A team is assigned to perform pre-project planning	8.5	8.5	8.6	40.4	34.0	17.0	83.0	2
Written procedures for responsibilities	6.4	12.8	25.5	31.9	23.4	19.2	80.8	3
Sufficient time is allocated to pre-project planning	21.3	38.3	23.4	6.4	10.6	59.6	40.4	4

7.4.3 Degree of client involvement

Table 7.4 shows that clients are generally satisfied with the degree of their involvement in the pre-project planning. Eighty-three per cent of the respondents indicated that their involvement in the pre-project planning was between very good and acceptable. Only seventeen per cent indicated that their involvement was between poor to very poor. These results support the findings of the CII (1994) which revealed that pre-project planning is an owner driven activity and the phase where clients express their needs and therefore more effort should be invested during this phase.

Table 7.4: Degree of client involvement

very poor	poor	acceptable	good	very good
4.8%	12.2%	29.7%	37.3%	16.0%

7.4.4 Effort expended into pre-project planning

Respondents were asked to determine their assessment of the effort they invested into pre-project planning. The results have been presented in Table 7.5 and show that the majority of respondents (89 per cent) are satisfied with their the level of effort they put to pre-project planning. Only twenty per cent indicated that put little effort to pre-project planning. These results coincide with the findings of Gibson and Hamilton (1994) and Gibson et al. (1994) and stress the importance of pre-project planning.

Table 7.5: Level of effort expended into pre-project planning

very poor	poor	acceptable	good	very good
0.0%	21.3%	42.5%	24.5%	11.7%

7.4.5 Relationship between pre-project planning and project success

Table 7.6 shows that the overwhelming majority of respondents indicated that there is a relationship between the effort expended in the pre-project planning and cost and schedules growth. Nearly ninety-eight per cent of the respondents indicated that the relationship exists between sometimes and always. Only two per cent of the respondents indicated that this relationship rarely exists. Again these results coincide with the findings of the CII which established that there exists a relationship between effort of pre-project planning and project success.

Table 7.6: Correlation between effort expended in the pre-project planning and project success

Correlation between level of effort expended to pre-project planning and project success.	Frequency of scores per cent				
	never	rarely	some-times	very often	always
	0.0	2.0	21.3	49.8	29.8

7.4.6 Risk consideration factors

Table 7.7 illustrates that respondents ranked all the risk factors high. For example, respondents ranked budget costs and planning regulations first in their consideration of risk. All respondents indicated that they consider it between always to sometimes. The next most frequent considered risk factor is construction risks with ninety per cent of the respondents indicating that they consider construction risks between sometimes to always. The next most frequent considered risk factors were operating and maintenance cost, availability of contractors and availability of designers in that order.

Table 7.7: Risk consideration frequency analysis

	Frequency per cent						Combined per cent		Ranking
	never	rarely	some- times	very often	always	never to rarely	sometimes to always		
Develop project execution plan								Scores	
Budget costs	0.0	0.0	6.4	6.4	87.2	0	100	1	
Planning regulations	0.0	0.0	4.3	19.1	76.6	0	100	2	
Construction risks	0.0	4.3	14.9	31.9	48.9	4.3	95.7	3	
Operating and maintenance cost	2.1	4.3	21.3	38.3	34.0	6.4	93.6	4	
Availability of contractors	2.1	12.8	27.7	27.7	29.8	14.9	85.2	5	
Availability of designers	6.4	14.9	23.4	25.5	29.8	21.3	78.7	6	

7.4.7 Developing a project execution plan

Respondents were asked how often they developed a project execution plan during pre-project planning. Table 7.8 shows that ninety per cent of the respondents indicated that they develop a project execution plan between sometimes and always. Only two per cent of the respondents indicated that they do not develop a project execution plan.

Table 7.8: Developing a project execution plan

never	rarely	sometimes	very often	always
0.0%	2.3%	21.8%	65.8%	10.1%

7.4.8 Factors considered when developing a project execution plan

The extent to which construction clients considered various factors when developing project execution plan was established. Table 7.9 shows the various factors that were considered important in the development of an effective project execution plan. Health and safety plan and safety and construction strategy ranked as the most considered factors when developing project execution plan with one hundred per cent of the respondents indicated that they consider them between always and sometimes. Procurement approach, commissioning and hand-over procedures and planning and cost control ranked second with nearly ninety eight per cent of respondent indicated that they use them between always and sometimes. The use of value management and engineering procedures was ranked last with nearly eighty one per cent of the respondents indicated that they use it between always and sometimes. The results suggest that the development of execution plan is highly considered by clients and that they are aware of the factors associated with it.

Table 7.9: Developing project execution plan

	Frequency of scores per cent						Combined per cent		Ranking
	never	rarely	some-times	very often	always	never to rarely	sometimes to always	Scores	
Develop project execution plan									
Health and safety plan	0.0	0.0	2.1	6.4	91.5	0.0	100.0	1	
Safety and construction strategy	0.0	0.0	4.3	25.5	70.2	0.0	100.0	2	
Procurement approach	0.0	2.1	2.1	23.4	72.3	2.1	97.8	3	
Commissioning and hand-over procedures	0.0	2.1	14.9	31.9	51.1	2.1	97.8	4	
Planning and cost control	0.0	0.0	6.4	17.0	76.6	2.1	97.8	5	
Quality control and environment	0.0	2.1	6.4	10.6	78.7	4.2	95.7	6	
Organisation resourcing and project definition	0.0	4.3	21.3	27.7	46.8	4.3	95.8	7	
Financing the project	2.1	2.1	6.4	10.6	78.7	4.2	95.7	8	
Defining project objectives	0.0	10.6	10.6	23.4	55.3	9.6	90.3	9	
Develop contracting plan	0.0	12.8	25.5	25.5	36.2	12.8	87.2	10	
Assessing project environment	0.0	12.8	25.5	34.0	27.7	12.8	87.2	11	
Use value management and engineering procedures	6.4	12.8	21.3	46.8	12.8	19.2	80.8	12	

7.4.9 Use of tools during pre-project planning

Table 7.10 reports the responses from clients regarding the extent to which they use tools and extent to which these tools contribute to the success of a project. The results showed that lessons learnt, benchmarking, brainstorming, value management are frequently used. By contrast, the other tools are either never used or rarely used by respondents. Table 7.16 shows that most tools were used highly by the respondents, however, the respondents indicated low use of some of the tools. Lessons learnt from previous projects was the most frequently used tool by respondents with 95 per cent of the respondents indicated that they use it between always to sometimes. Value engineering comes in second with 85 per cent of the respondents indicated that they use it between sometimes and always. Risk management comes in third with eighty-three per cent of the respondents indicated that use it between sometimes to always. Brainstorming comes in fourth with nearly 77 per cent of the respondents indicated that they use it between sometimes to always. Benchmarking comes in fifth as the most used method during pre-project planning with 73 per cent of the respondents indicated that they use it between sometimes to always.

By contrast, the results of the questionnaire show that other tools received low percentage of response use of project definition rating index, agreement matrix, an alignment thermometer and scope definition checklist tools. All (100 per cent) of the respondents indicated that they never or rarely use alignment thermometer or a similar tool during pre-project planning. Eighty-five per cent of the respondents indicated never or rarely use PDRI. The majority of respondents, nearly 81 per cent indicated they never or rarely uses agreement matrix. Nearly 77 per cent of the respondents indicated that they never or rarely use scope definition checklists during pre-project planning. These results do not come as a surprise and clearly show that the reasons behind the low use of the stated tools are that respondents are not familiar with since most of these tools are not developed in the UK.

Table7.10 : Tools used during pre-project planning

	Frequency of scores per cent						Combined per cent		Ranking
	never	rarely	some times	very often	always	ever to rarely	some-times	Scores	
Use of tools during pre-project planning									
Lessons Learned	0.0	4.3	10.6	25.5	59.6	4.3	95.7	1	
Value Engineering Programs	12.8	2.1	10.6	46.8	27.7	14.9	85.1	2	
Risk management	12.8	4.1	19.1	40.6	23.4	16.9	83.1	3	
Management by Objectives	8.5	12.8	17.0	38.3	23.4	21.3	78.7	4	
Brainstorming	6.4	17.0	17.0	38.3	21.3	23.4	76.6	5	
Benchmarking	12.8	14.9	17.0	36.2	19.1	27.7	72.3	6	
Agreement matrix	57.4	23.4	12.8	4.3	2.1	80.8	19.2	7	
Project definition rating index	57.4	27.4	8.5	6.4	0.0	85.1	14.9	8	
Scope Definition Checklists	19.1	42.6	21.7	11.4	5.2	61.7	38.3	9	
Alignment thermometer	80.9	19.1	0.0	0.0	0.0	100.0	0.0	10	

7.4.10 Problems encountered during pre-project planning

In their research of identifying the problems that occur during pre-project, Gibson (1996) noted a number of problems that frequently occur during pre-project planning. Table 7.11 outlines the identified problems and summarises the response of the construction clients. Respondents were asked to indicate the extent to which these problems occur during pre-project planning. Insufficient budget was the most frequent problem that occurred during pre-project planning with 87 per cent of the respondents indicated that it occurs between sometimes and always. Poor communication within the team and with stakeholders comes in second as the most occurring problem during pre-project with 83 per cent of respondents indicated that it occurs between sometimes and always. Poor representation of specialists and stakeholders comes in third with nearly 82 per cent of the respondents indicated that it occurs between sometimes and always during pre-project planning. Poorly established priorities between team members came in fourth with nearly 79 per cent of respondents indicated that it occurs between sometimes and always. Insufficient budget for conducting comes fifth and lack of leadership come in sixth with 75 and 74 per cent of the respondents indicating that they occur between sometimes and always. Only 47 per cent of the respondents indicated that unclear definition of team's roles occur during pre-project planning. The results show pre-project planning despite of the earlier results relating to the level of effort spent and correlation to project success, respondents agree that they encounter problems.

Table 7. 11: Problems occurring during pre-project planning

	Frequency of scores per cent					Combined per cent		Ranking
	never	rarely	some-times	very often	always	never to rarely	some-times to always	
Problems occurring during pre-project planning								
Insufficient time for conducting pre-project planning	6.4	6.4	17.0	59.6	10.6	12.8	87.2	1
Poor communication within the team and with stakeholders	2.1	14.9	27.7	42.5	12.8	17.0	83.0	2
Poor representation of specialists	3.4	14.7	31.2	35.3	15.4	18.1	81.9	3
Poorly established priorities between team members	11.7	9.4	21.8	33.7	23.4	21.1	78.9	4
Insufficient budget for conducting pre-project planning	10.4	14.7	24.3	34.8	15.8	25.1	74.9	5
Lack of leadership	15.4	11.2	22.4	28.7	22.3	26.6	73.4	6
Unclear definition of team's roles	12.8	40.4	34.0	12.8	0.0	53.2	46.8	7
Lack of team's skills	21.3	34.0	17.0	17.0	10.6	54.3	44.6	8

7.4.11 Producing scope definition

Clients were asked to respond to what extent they conduct certain activities when producing the scope definition. Table 7.12 indicates that 92 per cent of the respondents indicated that they define deliverables (e.g. specifications and drawing) between sometimes and always when producing the scope definition. Eighty-four per cent of the respondents indicated that they produce conceptual estimates between sometimes and always. Nearly 83 per cent of the respondents indicated that they use business and project objectives as guideline. Seventy-five per cent of the respondents indicated that they document the project scope and preliminary design when producing the scope definition. Nearly 71 per cent of the respondents indicated that they formulate a document containing the methods and resources for performing pre-project planning. Results show that most of the respondents do not use any particular tools for evaluating the completion of scope definition. Only 25 per cent indicated that they use tools to develop such a document.

Table : 7.12 Project’s scope definition frequency analysis

	Frequency of scores per cent						Combined per cent		Ranking
	never	rarely	some- times	very often	always	never to rarely	sometimes to always	Scores	
Producing scope definition									
Defining deliverables (e.g. specifications drawings)	0.0	8.5	10.6	40.4	40.4	8.5	91.4	1	
Prepare conceptual estimates	3.8	12.4	31.4	26.7	27.7	16.2	83.8	2	
Use of business and project objectives as guidelines	4.3	12.8	23.4	34.0	25.5	17.1	82.9	3	
Document project scope and preliminary design	6.7	14.8	24.6	34.6	19.3	21.5	78.5	4	
Formulate a document containing the methods for performing pre-project planning	2.1	27.0	36.2	28.3	16.4	29.1	70.9	5	
Use of tools for evaluating completion of scope	42.6	31.9	12.8	8.5	4.2	74.5	25.5	6	
Use of partnering to spread risk	42.6	31.9	10.6	12.8	2.1	74.5	25.5	7	

7.4.12 Communicating project objectives

Table 7.13 shows that written project objectives, policy and procedure manuals, written scope of work and pre-construction meetings are the most used methods of communicating project objectives with all of respondents indicated that they use them between sometimes and always. Written objectives and priorities came in second with nearly 98 per cent of the respondents indicated that they use it between always and sometimes. Project execution plan came in third with nearly 90 per cent of the respondents indicated that they use it between sometimes to always. Client's request for proposals comes in forth with nearly 81 per cent of the respondents indicated that they use it between sometimes to always. Value management technique comes in fifth with 78 per cent of the respondents indicated that they use it between sometimes and always. Finally, documented procedures to ensure agreement on objectives comes last with 77 per cent of the respondents indicated that they use as means of communicating project objectives. It is surprising that agreement comes in last, as agreement is important when communicating project objectives.

Table 7.13: Communicating project objectives

	Frequency of scores per cent						Combined per cent		Ranking
	never	rarely	some- times	very often	always	never to rarely	some-times to always	Scores	
Communicating project objectives									
Contract document	0.0	0.0	12.8	21.3	66.0	0.0	100.0	1	
Pre-construction meeting	0.0	0.0	4.3	34.0	61.7	0.0	100.0	2	
Written scope of work	0.0	0.0	14.9	38.3	46.8	0.0	100.0	3	
Policy and procedures manuals	0.0	0.0	19.1	34.0	46.8	0.0	100.0	4	
Written objectives and priorities	2.1	0.0	29.3	29.8	38.3	2.1	97.9	5	
Project execution plan	2.1	8.5	27.7	44.7	17.0	10.6	89.4	6	
Clients request for proposals	4.3	14.9	25.5	36.2	19.1	19.2	80.8	7	
Value management techniques	6.4	14.9	19.1	42.6	17.0	21.3	78.7	8	
Documented procedures to ensure agreement on objectives	8.5	14.8	21.3	42.6	12.8	23.3	76.7	9	

7.4.13 Alignment of project objectives

Respondents were asked how they dealt with alignment of project objectives. Table 7.14 shows that regular meetings and communication were ranked first among the respondents as means of alignment of project objectives. Respondents were given the chance to elaborate by adding other tools that they use for alignment. Teamwork, teambuilding programs, feedback and lessons learnt are among the tools that respondents use regularly to align their objectives with that of the project's team. On the other hand, the results clearly show that the use of tools for alignment were very low. The results indicate that tools such as agreement matrix, alignment thermometer and project definition rating index (PDRI) are not common among respondents, which explain the low response of the respondents.

For example, Table 7.14 shows that regular meetings are the most common tool used to align project objectives with all of the respondents indicated that they use it between sometimes to always. More than ninety one per cent indicated that they assess and identify areas of potential disagreement to help the team align project objectives. Nearly ninety per cent indicated use contractors and other specialists to help align project objectives. The results however indicate that respondents do not use tools such as agreement matrix as to ensure alignment or ensure team is focused on the objectives set for the project. The low response concerning the use of tools can be attributed to the fact that the respondents are not familiar with these tools or they are not interested in using them.

Table 7.14: Alignment of project objectives frequency analysis

	Frequency of scores per cent					Scores per cent		Ranking
	never	rarely	someti mes	very often	always	never to rarely	sometimes to always	Scores
Alignment of objectives frequency analysis								
Regular meetings to keep lines of communication open	0.0	0.0	4.3	38.3	57.4	0.0	100.0	1
Assess and identify potential areas of disagreement	2.1	6.4	17.0	31.9	42.6	8.5	91.5	2
Use of specialists	2.1	8.5	25.5	27.7	36.2	10.6	89.4	3
Use of contractors	2.1	8.5	25.6	29.8	34.0	10.6	89.4	4
Ensure appropriate stakeholders representations	8.5	4.3	10.6	40.4	36.2	12.8	87.2	5
Use teamwork and team building programs	8.5	8.5	14.9	48.9	19.2	17.0	83.0	6
Use of sub-contractors	6.4	17.0	17.0	25.6	34.0	23.4	76.6	7
Use of teams to ensure team is focused on the objectives	25.5	38.3	21.3	12.8	2.1	63.8	36.2	8
Use of tools to ensure team agreement (e.g. agreement matrix)	29.8	44.7	19.1	4.3	2.1	74.5	25.5	9

7.5 CASE INTERVIEWS

The following approach was adopted (Brooks and Backhouse, 1978):

- initial contact with the interviewees by sending a letter and a follow up phone;
- in depth interview using a recorded tape;
- review of relevant documents supplied by interviewees; and
- further discussion with some of the interviewees to clarify any issues relevant to the subject of interest.

The questionnaire survey results indicated that more than ninety per cent of respondents perform a formal pre-project planning process. These case interviews underpinned the postal survey and clarified the issues raised in the questionnaire. The objective of the case studies was to obtain more detailed information of the client's approach to pre-project planning and clarify some of the issues arose from the questionnaire. To achieve this objective, it was decided to perform case interviews and contacts were made by telephone of clients who were interested in participating in the interviews. Four clients were selected based on their willingness and keeping in mind that they conduct the interviews as listed in Table 7.14. The client organisations varied from NHS, university, shopping centre and charity to find out how they approach pre-project planning in terms of time and effort and people involved. The interviews lasted from one hour and a half such as the one involved organisation "A" (NHS), where documents were reviewed, to just half an hour such as the interview involving organisation "D" (shopping centre). The organisations involved in the case study interviews are shown in Table 7.15.

Table 7.15: Types of client organisations involved

Organisation	Type of Business	Number of Employees	Annual Turnover
A	NHS	3000	100 m
B	University	200	30 m
C	Charity	2000	250 m
D	Shopping centre	7000	1000 m

7.6 ORGANISATION A

Organisation “A” is a large client organisation with 3000 employees and £100m average annual turnover. The Organisation has developed the following objectives for capital investment:

- to improve the quality of patient care by providing appropriate services to meet the needs;
- to reduce revenue costs by improving efficiency of both clinical and non-clinical services;
- to improve access within the hospital;
- to provide space that is effectively used to meet clinical and non-clinical needs;
- to achieve the level of health care to meet epidemiological and demographic changes at minimal cost;
- to improve the quality of building stock to a better condition;
- to achieve the target of an average of 70 per cent day cases all specialists; and

- to ensure that any changes to development occurs smoothly, within minimal disruption to patients, staff, visitors and general public.

7.6.1 The pre-project planning process

The organisation has a two-phase process that outlines its approach to performing pre-project planning, namely:

- strategic outline case; and
- outline business case.

The pre-project planning process of Organisation A comprises three major activities as shown in Figure 7.4.

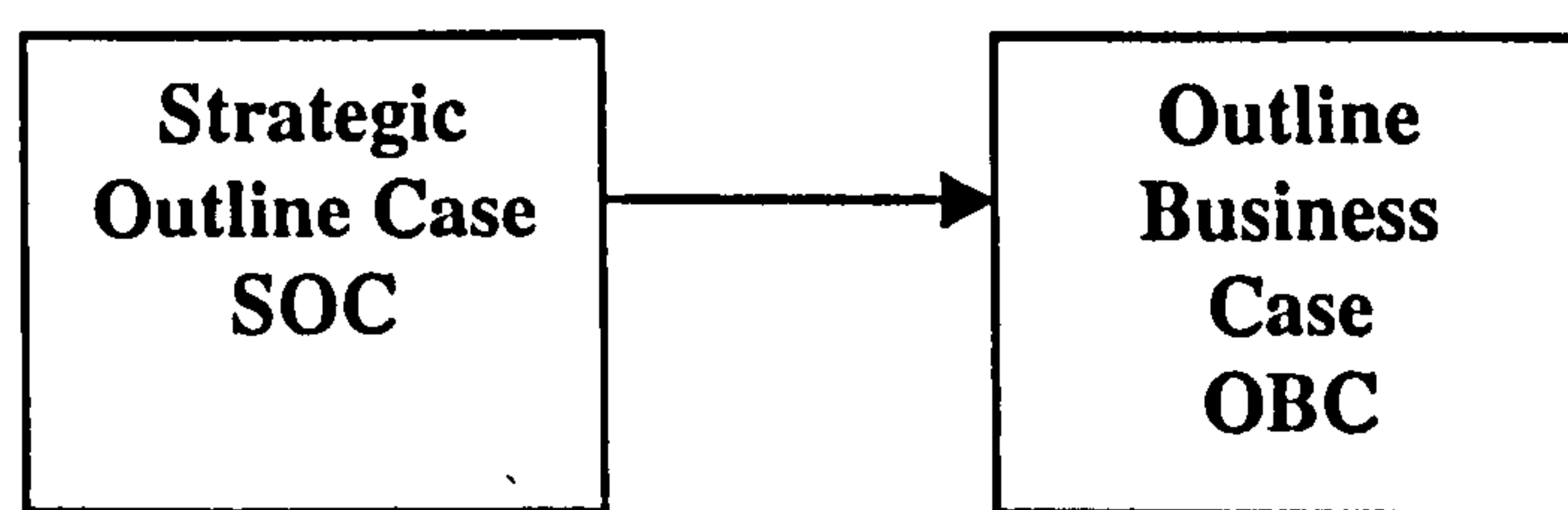


Figure 7.4: Pre-project planning of Organisation A

I. STRATEGIC OUTLINE CASE (SOC)

The Strategic Outline Case (SOC) is the first formal step in planning major NHS capital development. SOC is a strategic document that analysis options for the development and examines the case for change based on the health needs. The strategic outline case is prepared by:

- project director;
- project manager;
- estate advisor;
- project accountant; and
- project administrator.

The Strategic Outline Case includes the following activities.

- a. Statement of need.

- b. Formulation of options.
- c. Affordability.
- d. Timetable and deliverability.
- e. Trust and commissioners statement.

A. Statement of need

The statement of need involves a wide range of people from the organisation namely:

- project director;
- project manager;
- project accountant;
- estate advisor;
- project administrator; and
- other stakeholders.

The process of defining needs in Organisation “A” includes the following:

- assessment of total project budget;
- development of project definition based on need;
- communicating the need to other stakeholders who have interest in the project.

B. Formulation of options

1. Formulation of options includes the following:

- generation of options;
- appraisal of short listed options;
- conclusions from option appraisal;
- summary of sensitivity testing for short listed options;
- formulation of options;
- identification of significant risks;
- risk management responsibilities; and
- assessment of project risks for the selected option.

2. Generation of options – Joint statement

The project Board and the Business Case Team undertake detailed option appraisal and analysis. Representatives from stakeholders are involved in detailed discussions with different departments of interest of the project. A range of benefits is identified which are considered relevant to the appraisal of various options for the future provisions of actual service. The business case team generates a long list of options for analysis. These ranged from minimal options for future piecemeal rationalisations between sites to a greenfield site options.

3. Appraisal of short listed options – Trust's statement

The review team considers the relative weights of each benefit criterion and the scores that should be accorded to each of the options.

4. Conclusions from option appraisal – Trust statement

The business case team and project board select the option based on the results of costs and benefits appraisal (the weighted benefit scores). The best option provides significantly more benefits against the objectives for capital investment than the other options. Each option is weighted in terms of the following.

1. Capital investment required.
1. Change in capital charges.
2. Change in operating costs.
3. Impact on revenue.

C. Affordability

1. Methodology for financial appraisal of options is a Trust statement

BHRVT has developed the capital costs of the selected option based upon a reference cost system with adjustment of departmental areas. Once costs have been measured using approximate quantities and the works cost has been adjusted for economies of scale resulting from the project carried out as in the contract.

- The trust has commissioned an independent PFI assessment of the selected option including a sensitivity of the assumptions.

D. Timetable and deliverability

1. Project management and organisation (Joint Statement)

A formal project organisation has been put into place to take forward the trust's single site strategy. The project organisation structure consists of the following.

2. The project board, chaired by the executive, comprised:

- all the trust executives directors;
- the project director; and
- the project business manager.

4. Membership of the business case team, chaired by project director, comprises:

- service planning;
- clinicians;
- finance;
- nursing;
- support services; and
- representatives from ELHA.

5. Overall project arrangements which includes:

- prepare a management control plan: and
- report arrangements in line with national guidance and proven methods developed by other large PFI projects.

6. Milestones to financial close

Prepare a project plan identifying the key milestones and target dates from the approval of the strategic outline case to financial close. From a range of options for

capital investment, the strategic outline case (SOC) makes the key decisions. "From a range of options for capital investment, the strategic outline case concludes that the preferred option is to close Blackburn Royal Infirmary (BRI) and relocate the services based there in a new extension to Queens Park Hospital (QPH)". The SOC also concludes that the preferred option is suitable for the private finance initiative (PFI) procurement.

Trust Board

The Trust Board is responsible for the strategic direction of performance and quality, service development, cooperation and clinical governance and general policy direction of the trust. The Trust Board comprises the chief executive, five non-chief directors and six executive directors. The Trust Board supported by number of sub-committees including the:

- audit committee;
- remuneration committee;
- ethnic minorities committee;
- clinical governance risk committee;
- single site project board; and

Operational Management

The Trust operates a developed management structure with authority delegated as close as possible to staff dealing directly with service provision. Clinical services are directly managed via Services Managers and Clinical Directors for individual specialists. There are also six Executive Directors who are responsible for the provision of all management and support functions.

Project management arrangements

The Project Board will establish at the outset of each stage in the procurement process the resources required, timetable and objectives. The Project Board is the key decision making forum in relation to the project.

II. OUTLINE BUSINESS CASE

The outline business case describes in details the objectives and recommendations of the strategic business case. The objective of the business case is to get all the information formulated. In addition, the analysis supporting the conclusion of the strategic outline case are reviewed and tested in much greater detail.

7.6.2 Features of the Outline Business Case

- 1. The case for change in the Outline Business Case details many problems associated with the proposed project. The pressures and weaknesses are recognised by commissioners and the Trust as the principle factors supporting a rationalisation of acute services in Blackburn, Hyndburn and Ribble Valley.**
- 2. Project objectives and scope the project board and business case teams undertake detailed option appraisal and analysis. The work involves detailed discussion with all the people of interest using comprehensive survey of to obtain the opinion of people involved. A range of objectives for capital investment are identified i.e. project benefits, project constraints and output specifications.**
- 3. Formulating options which includes preparing list of options and performing a benefit appraisal using weighting scoring to select the best option based on the results of the scoring system which takes into consideration various appraisals such as cost and affordability using risk analysis method.**

People involved

The Project Board is the key decision making forum in relation to the project. The Board's role involves the following:

- representing wider ownership;
- maintaining co-ordination;
- setting out project controls and processes;
- agreeing internal and external communications plan;
- ensuring that the project achieves its objectives; and

- signing off the project documentation.

Core project team

A core project team is appointed comprising the following:

- project manager;
- project accountant;
- estate advisor; and
- project administrator.

The team has a defined role and responsibilities and criteria of selecting the team are based on skills and experience. The responsibility of the core team covers the whole span of the project, co-ordinating all aspects of the project and reporting to stakeholders, particularly the Trust and Project Board. They are also responsible for project documentation, ensuring a comprehensive audit trail and for internal and external communications.

7.7 ORGANISATION B

Organisation B is a medium sized client organisation with 200 employees and £30 m turnover. Organisation “B” approach to pre-project planning is structured, which revolves around the RIBA plan of work at the end of each stage. It comprises two phases namely inception and feasibility study.

7.7.1 Pre-project planning process

I. CONCEPTION PHASE

This phase relates to the establishment of need. The client establishes the need for a project. The University, architect and consultants are involved in discussing the details of the concept and how the project progresses. Meetings are held to compare the various concepts and reports of these meetings are written after each meeting and circulated and criticised. At the end of this stage, a document is prepared that includes

the rationale behind the selection of the project, preliminary list of tasks, schedule and budgets. The processes includes of the following:

- locate the resources to fund the need;
- brainstorm to select projects to be considered;
- identify risks for each project;
- select one project and gather more information; and
- search for and document alternative solutions.

II. FEASIBILITY STUDY PHASE

This phase includes the identification of the source of funding for initial capitalisation and the preparation of the business plan. The business plan includes sets in detail budget needs and project expenses for the construction project.

7.7.2 People involved

Several people are involved in performing the feasibility study phase. University's Estates Department, representing each of the four areas to be recommended is involved in the project. The Estates Department being the manager and operator of the university property, has the role of acquisition of the building. They are the decision-makers of organisation "B". However, the number of people involved varies with every project and depends on who the stakeholders are. They include:

- Sport England;
- Lottery monitors;
- Campus wide planners;
- Project manager;
- Engineers; and
- Local residents.

Some other features noted in the pre-project planning process of Organisation "B" include the following:

- the need is established by the Estate Management Committee;

- the need to locate funds introduced to other stake holders whose needs has to be taken into account;
- meetings are held regularly to facilitate communication and exchange information; and
- verify actual availability of funding.

7.8 ORGANISATION C

Organisation “C” is a large charity client organisation with 2000 employees and £250 m turnover, which was formed in 1958 and was formed out of what was BUPA at the time where took on several hospitals and started making business (a charity). It has expanded over the years to its current size. In the last ten years it has changed from being one of the smaller elements of the private medical health industry to one of the largest that includes 43 hospitals. These changes happened because of a change of management where a new chief executive was appointed who put emphasis on the hospital managers to run their business and has provided quite fundamental changes in terms of how things should be achieved. The pre-project planning process of Organisation C was a formal one and it included the following stages.

7.8.1 The pre-project planning of organisation

The pre-project planning of organisation C comprises two distinct stages namely: business planning; and feasibility study.

I. Business planning

The hospital manager and his/her team develop the business plan. First the hospital manager perceives the need and then produces a statement of need, which is called a business case, and covers the business that he could attract. The statement of need will then be sent to the facilities department in the form of the Director of that department who actually presents it to the Corporate Policy Group (CPG). The CPG performs evaluation process to decide whether it is worth making the project. After completion of the evaluation process a document of the evaluation is presented to the Board of

Governors who makes the final decision as they are the key decision maker. If they decide to execute the project, a budget is allocated.

The outcome of the business phase includes the following:

- conceptual estimates of the facility; and
- document containing project elements (i.e. project execution plan and contract risk).

II. Feasibility study

A feasibility study is undertaken that improves the costs and programs. The output of the feasibility study is a decision whether to execute the project or not. The purpose of the feasibility study is to improve the costs and evaluate whether it is worth doing it then the outcome of the feasibility is passed to the Board of Governors who either approves or disapproves the scheme. If the approval is granted, then the budget is allocated. The project manager, being the client, passes the statement of need to the project team. The project team performs a feasibility study in house or sometimes employs an architect. If an architect carries out the feasibility, the client will provide him/her with a schedule of accommodation.

7.8.2 People involved

A group of people involved who run the business for the organisation are namely:

- chief executive;
- business office manager;
- operating theatre;
- director of operations; and
- director of planning facilities.

Some features of the pre-project planning include:

- the hospital manager is the client and represents all of the people who form the hospital;

- the teams consists of heads of departments (business office manager, operating theatre;
- a strong emphasis on significantly improving the pre-project planning effort; and
- a strong emphasis on process improvement benchmarking and other tools.

7.9 ORGANISATION D

Organisation “D” is a large sized client organisation in the market sector with 7,000 employees and £1000 m turnover. This organisation has no specific formal pre-project planning process.

7.9.1 Pre-project planning process

A team is formed to prepare a proposal to handle the feasibility study in order to determine if the project is feasible. The proposals are then presented to the partner and agree on a set of deliverables and timeline. Once the proposal is completed and accepted by the partner, it becomes the specifications of the project. The partner approves the terms outlined in the project proposal, both parties sign contracts. The contract terms are negotiated on a project by project basis. Both partnering organisations share the responsibilities and costs of delivering the project. The duties are defined in the project specifications. Sharing the risk allows both parties to take on projects that they may not have wanted to take on their own.

7.10 SUMMARY

Chapter 7 presents an analysis of the responses of forty eight responding clients to the questionnaire survey and four case interviews on their current pre-project planning practices. The findings of both the questionnaire survey and case interviews indicated that there are certain limitations of the current pre-project planning process. The questionnaire survey was used to elicit information in the extent construction clients use pre-project planning and the use of pre-project planning tools as well the factors that inhibit improvement. The case interviews complemented the questionnaire survey results and provided more details on how client organisations performed pre-project planning. The case interviews indicated various approaches among these four

organisations in terms of the number of phases and people involved. The lessons learned is that pre-project planning is an important phase in the project life cycle and that clients should pay more attention to it by investing more time and effort. Although the questionnaire results and case interviews showed that pre-project planning is performed formally to a large extent, there is a lack of using tools and techniques for improving pre-project planning. . However, they all agreed about the importance of pre-project planning. Both the questionnaire and case interview results along with findings from the literature review contributed to the development of the framework, which will be discussed in Chapter 8.

CHAPTER EIGHT
FRAMEWORK DEVELOPMENT
AND VALIDATION

CHAPTER EIGHT

FRAMEWORK DEVELOPMENT AND VALIDATION

8.1 INTRODUCTION

Chapter 2 established the need to improve construction performance. Chapter 3 addressed key strategic issues and the adoption of tools to help improve performance. Chapters 4 and 5 respectively stressed the importance of the clients' role in the construction process and the importance of pre-project planning as the phase where clients can express their needs and make key strategic decisions concerning the project. This chapter presents the framework that has been developed for improving pre-project planning and discusses the data that have been obtained during the framework validation. The chapter is divided into five sections they are mainly:

- description of the framework developed and its elements;
- presentation of the pre-project planning process map;
- presentation of the tools;
- implementation of the tools for guiding the process;
- presentation of an assessment tool for measuring achieving improvement in the pre-project planning; and
- validation of the framework.

8.2 DEVELOPMENT OF THE FRAMEWORK

The framework was developed from the examination of literature presented in Chapters 3 to 6 and the results of the questionnaire survey and case interviews presented in Chapter 7. The literature concerning pre-project planning has revealed

that pre-project planning is an important phase in the construction project life cycle, however the only few attempts were made to model it. The Construction Industry Institute (CII 1994) targeted the pre-project planning and identified the major processes involved and presented it in a model using the Integrated Definition technique (DEF0) structured analysis and design technique. The CII model and other pre-project planning models have been presented in Chapter 6.

It was concluded from Chapter 6 that the CII model is generic and focuses on the functional aspects of the planning. It also lacks tools that facilitate communication and deal with the problems that occur during the pre-project planning. It was also mentioned that the Process Protocol is a model of the process from inception to completion, which intended to be used to meet the demands of all projects. There is a need for improved pre-project planning that describes the activities of the pre-project planning supplemented with tools that measure progress and monitor improvement.

8.2.1 The need for a framework for improving pre-project planning

The need for an effective and improved pre-project planning was discussed in Chapter 5. This was based on the following:

- pre-project planning is a key phase in the project life cycle;
- the current pre-project planning lacks the tools that deal with process and cultural issues; and
- a structured approach can enhance the pre-project planning process as it provides time of when to start and finish.

The framework provides an opportunity for performance to be measured and factors that inhibit improvement to be identified so as to resolve the differences that appear to exist when these factors are encountered. The framework also provides a way to measure, monitor and control the pre-project planning process and provides the members of the team an understanding of the amount of effort required from its representatives. A need for a framework to clearly links pre-project planning process to activities within these phases is very important, this can be achieved by the following:

- following a structured process;

- using tools to guide process and improve team alignment; and
- measurement of the pre-project planning progress and improvement.

8.3 DESCRIPTION OF THE FRAMEWORK

The framework is a practical comprehensive tool aimed at helping clients improve pre-project planning by improving the relationship between project participants through tools that take into account both cultural and process issues. The framework is an acknowledgement that improvement is related to good practices. The framework that has been developed comprises the following three main components:

- a pre-project planning process map with the accompanying tools that guide this process;
- an assessment tool for measuring pre-project planning; pre-project planning progress; and
- an assessment tool for measuring factors that inhibit pre-project planning improvement.

Figure 8.1 presents the concept development of the components of the framework.

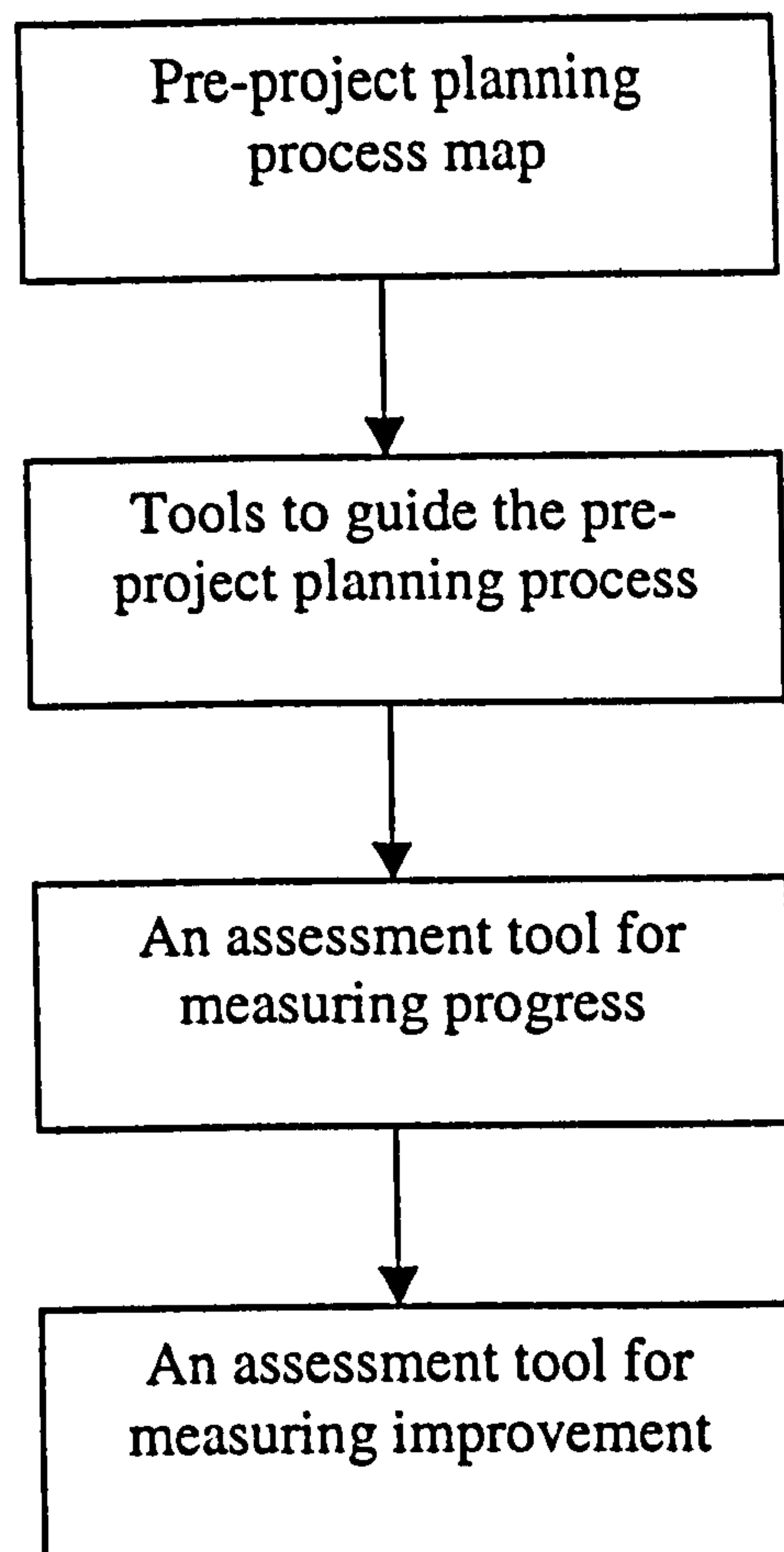


Figure 8.1: Steps in the concept development of components of the framework

8.4 COMPONENTS OF THE FRAMEWORK

The first component of the framework is mapping the pre-project planning process. The second component in the framework comprises the tools that help guide the process. These tools include PDRI, agreement matrix and the alignment thermometer. The third component includes an assessment tool for measuring progress and monitoring improvement of pre-project planning. It is a tool intended to evaluate the extent to which an improvement is attained when performing pre-project planning.

The framework encompasses a structured process, tools to guide the process and an assessment tool for measuring pre-project planning progress. The framework describes the pre-project planning approach into three levels. These levels are as follows. Figure 8.2 illustrates the three levels of the framework.

1. **Process level** – comprising the processes and sub-processes of the pre-project planning activities and is divided into six phases.
2. **Tools level** – comprising the tools that are implemented to guide the pre-project planning process at certain stages (soft and hard gates).
3. **Assessment level** – comprising the tools that measure pre-project planning progresses and factors that inhibits pre-project planning improvement.

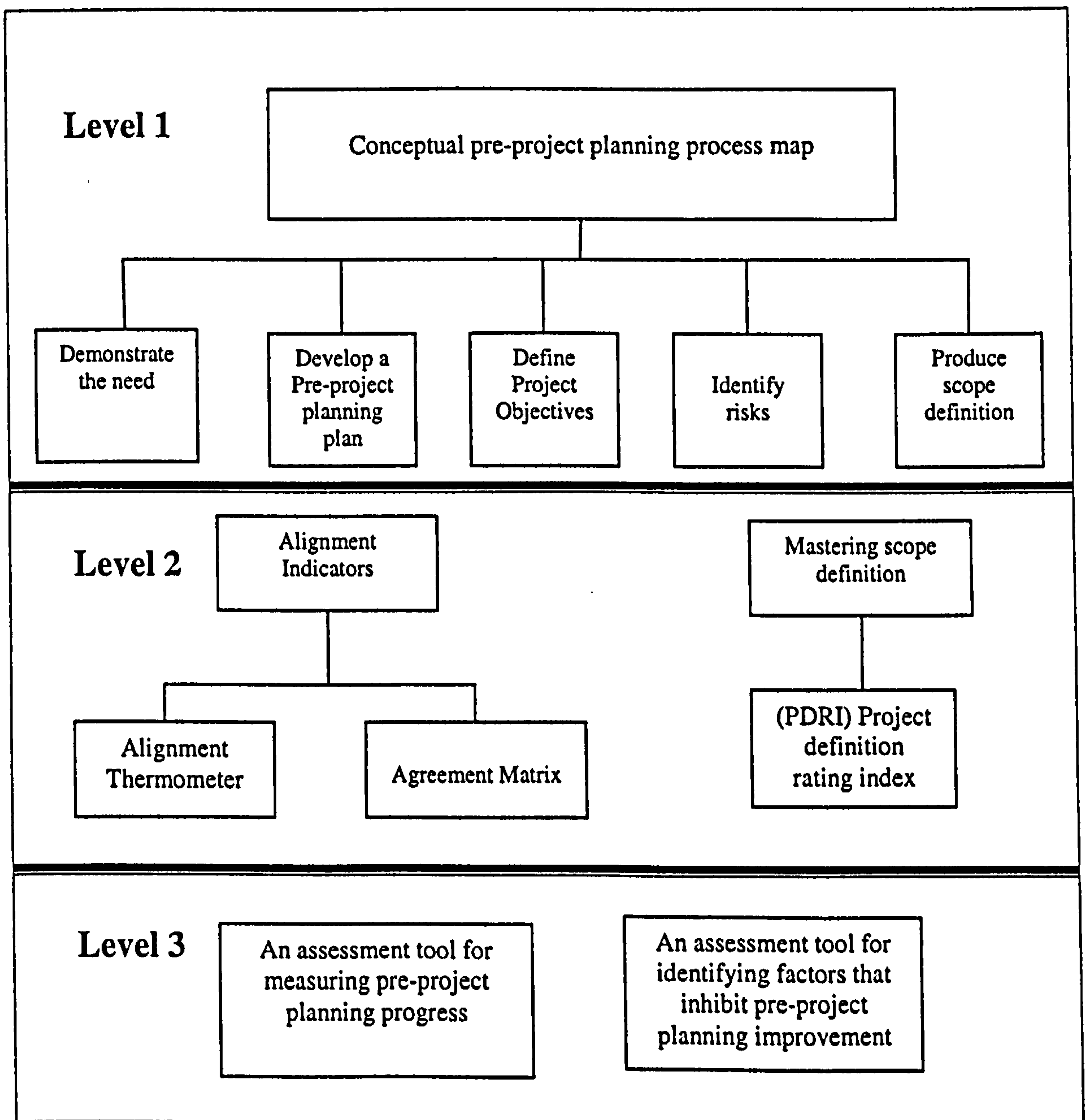


Figure 8.2: Conceptual representation of the framework

8.5 MAPPING THE PRE-PROJECT PLANNING

A model that states which activities must be performed is helpful, as it can ensure that no important activities will be forgotten. Thus, the pre-project planning process describes the functions or activities that need to be undertaken as well as the tools required to effectively measure and solve the problems that might arise between team members involved in the process.

Chapter 6 has reviewed various modelling techniques such as Integrated Definition (IDEF0) and the process protocol and stated their advantages. Integration Definition for Function Modelling (IDEF0) modelling technique was successfully used to model the design process Savnvido et al (1994) and modelling the pre-project planning (Gibson 1995). The IDEF0 is a systematic and very structured technique. It is important when using the IDEF0 technique to establish the activities that comprise the model. However, this technique was not chosen principally because it does not facilitate communication of the process either quickly or early as it focuses on the functional aspects of the project.

Another modelling technique available is process protocol, which can be used to represent the process activities throughout the project life cycle. The advantage of process protocol is that it comprises both soft and hard gates, which help ensure everything is complete before going to the next stage. Furthermore, the process protocol shows the different options and alternatives needed to be made when making decisions at certain points in the process.

8.5.1 Strategy for mapping the Pre-project Planning Process

The specific methodology adopted for modelling the pre-project planning process was the process protocol. The process protocol is "a common set of definitions, documentation and procedures that provides the basis to allow a wide range of organisations involved in a construction project to work together seamlessly" (Kagioglou et al. 1998b). The process protocol was considered more suitable for the following reasons:

- it breaks down the activities into phases, which will help show the gates and where the tools can be implemented;
- the process map provides the framework for pre-project planning process; and
- it provides the basis for company and industrial knowledge, which enables improvement

Furthermore, Shet et al (1996); and identified the following advantages associated with the process protocol:

- it takes a whole project review;
- it recognises the interdependency of activities throughout the duration of the project;
- the stage-gate/review-process approach used facilitates concurrency and progressive fixity and approval of information throughout the process;
- it enables co-ordination of participants and activities in the construction project and identifies the responsible parties; and
- it encourages the establishment of multi-functional teams including stakeholders.

The pre-project planning processes consist of processes and sub-processes that are performed to complete the activities associated with it. The model describes fully how it works within the framework supplemented with tools to guide its activities. The tools guide pre-project planning process and help in making the decisions that are taken along this process through review gates. Gibson (1994) outlined that it is important to structure as it provides a way for measuring and controlling this process.

Mapping the pre-project planning process could give the client and team members an understanding of the amount of effort required from its representatives and enable decisions to be made at end of each phase with review gates. In this way the pre-project planning process will act as a communication tool to benefit all the participants of the pre-project planning.

8.6 KEY CHARACTERISTICS OF THE PROCESS MAP

The pre-project planning process map functions as a communication tool to enable construction clients make the key decisions throughout the process with review gates and help and project team understand the amount of work required from its representatives. It is decided to divide the key phases of the pre-project planning into the following phases.

1. Phase zero: Demonstrating the need
2. Phase one: Outline feasibility
3. Phase two: Appoint a pre-project planning team
4. Phase three: Define project objectives
5. Phase four: Evaluate project risks
6. Phase five: Produce scope definition
7. Phase six: Outline conceptual design

The above stated phases are further broken down into sub-processes as presented in Section 8.7.

8.6.1 Stages and Gates

The construction industry's processes are organised around stages, which are normally followed by a phase review meeting (decision gates). Before explaining the process map, it is important to define two very important elements they are namely: *Stages* and *Gates*. Stages are specific periods which work on the project takes place (Buttrick 1997). These are when the information is collected and outputs are created. Gates are the decision points that precede every stage (Buttrick 1997). They serve as points to:

- check the project is required and risks are acceptable;
- confirm the priorities of the project;
- agree the plan by project participants; and
- make a decision regarding carrying on to the next stage

(Buttrick 1997) suggested treating gates as entry points to the next stage. In this way the user can start the next (provided that relevant criteria and checks have been completed) as soon as the user is ready even the previous stage is not fully completed. There are two types of gates, soft gates and hard gates (Buttrick 1997). Soft gates should be considered as entry points to the next stage. By contrast, in the soft gate, the next stage can be perused when you are ready regardless of whether the previous stage has been completed.

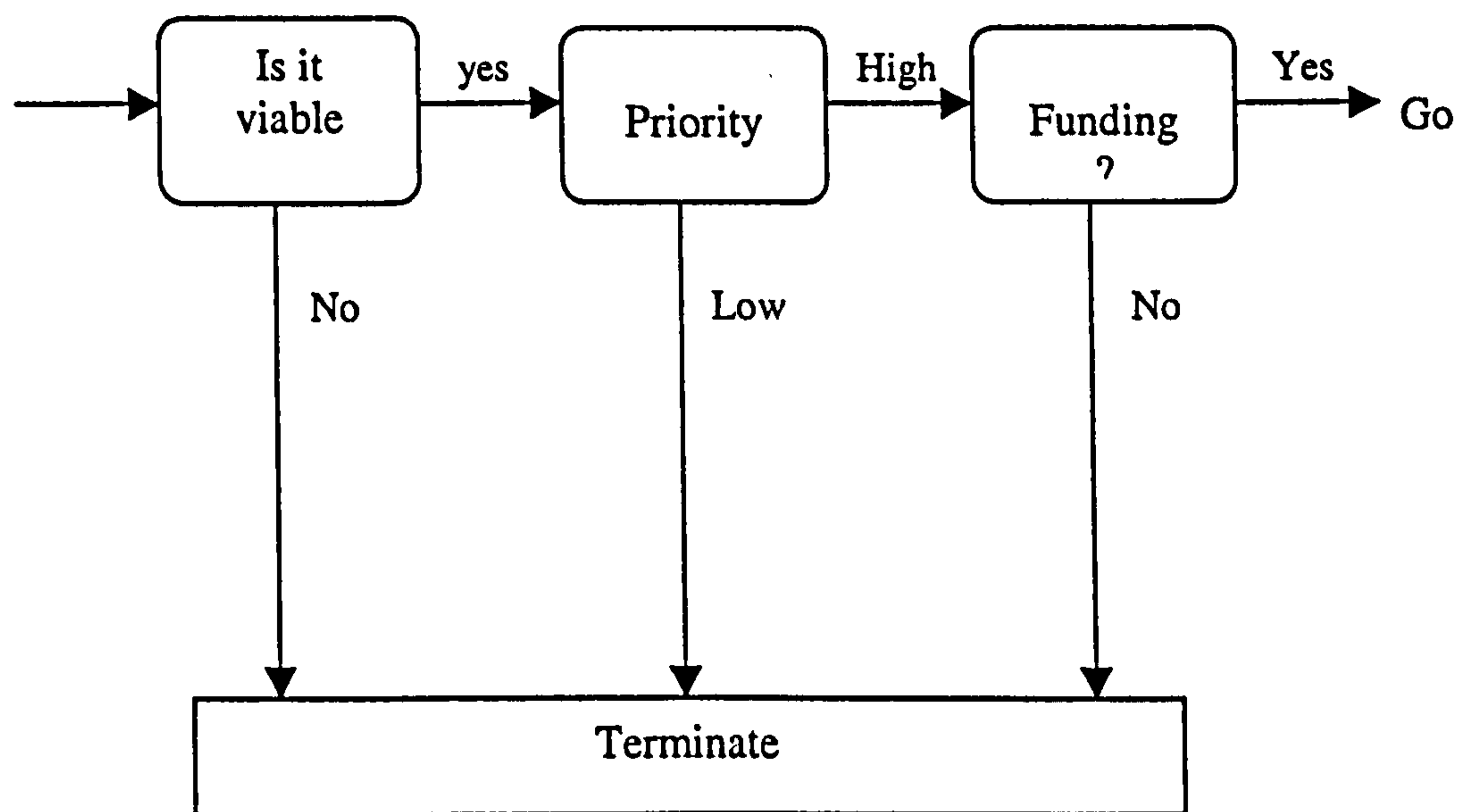


Figure 8.3: The three decisions required at each stage
(adopted from: Buttrick 1997)

Figure 8.3 indicates that there are situations where termination of a project is considered. These situations include the following:

- the project is viable;
- the project priorities and
- availability of funding.

However, the strategy suggested lacks the tools that help make such decisions and determine whether these three decisions are viable. The following section discusses the pre-project planning phases, the first component of the framework.

8.7 KEY PRE-PROJECT PLANNING PROJECT PROCESSES

It was mentioned in Chapter 6 that the pre-project planning developed by the CII is divided into four main phases, they are: organise for pre-project planning; select alternatives; develop project definition package and make decision. This research divides pre-project planning into six phases. The first phase (phase zero is demonstrating the need)

PHASE ZERO: Demonstrate the needs

Demonstrating the need is divided into the following sub-processes:

- statement of needs;
- define needs; and
- agreement of needs.

PHASE ONE: Outline feasibility

Outlining feasibility comprises the following.

1. Select feasibility team.
2. Evaluate alternative solutions.
3. Identify risk.
4. Select the best.

PHASE TWO: Appoint a pre-project planning team

This phase comprises the following.

1. Assign a team.
2. Develop a charter.
3. Allocate budget and time for pre-project planning.

PHASE THREE: Define project objectives

This phase comprises the following.

1. Identify project objectives.
2. Develop strategic brief.
3. Develop project execution plan.

PHASE FOUR: Evaluate project risks

This phase comprises the following.

1. Identify risks.
2. Evaluate risk.
3. Select procurement.

PHASE FIVE: Produce scope definition

This phase comprises the following.

1. Develop checklists for project objectives.
2. Perform evaluation of scope definition using.

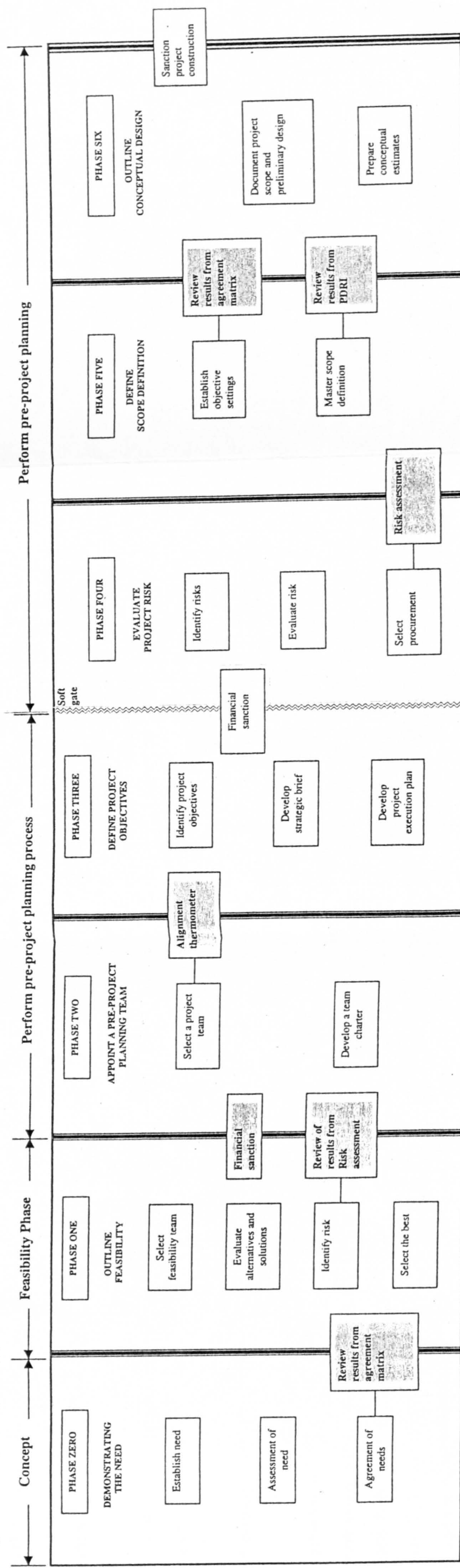
PHASE SIX: Outline conceptual design

This phase comprises the following.

1. Document project scope and preliminary design.
2. Prepare conceptual estimates.

The pre-project planning process with review gates could help facilitate better communications between clients and other stakeholders.

Figure 8.4: Pre-project planning process



8.8 IMPLEMENTING TOOLS IN THE PRE-PROJECT PLANNING PROCESS

This section describes the approach of applying the pre-project planning tools the mechanism of the pre-project planning and how and when the pre-project planning tools are implemented during the process. At each phase there are gates (soft and hard gates), where decisions concerning the projects are made.

1. At the end of phase zero (demonstrating the need), review the results from agreement matrix to determine the agreement is achieved between client and other team members.
2. At the end of phase one (outline feasibility), review the results of risk assessment tool to determine that risk is identified and the best solution can then be selected.
3. Begin performing the pre-project planning.
4. At the sub-process define needs (agree needs), complete the alignment measurement using alignment thermometer and compute the alignment index. If misalignment is detected, it should be corrected before starting the next function in the process. This tool is intended to determine the degree of agreement between the client and the team members on the objectives of the project. This tool was described in full detail in Chapter 3.
5. At the end of sub-process define project (establish objectives settings), complete the alignment measurement using the agreement matrix tool. This agreement matrix tool is intended to determine the degree of agreement among the team members on the objectives of the project.
6. At the end of sub-process evaluate project risks, use PDRI tool to evaluate and assess the risks and use the sensitivity tool to assess the risk during the conceptual planning phase.
7. At the end of sub-process evaluate the completion of scope definition, use the PDRI tool to determine whether all the elements concerning the scope definition

have been evaluated and completed. The PDRI is a tool intended to determine, compute and evaluate the completion of scope definition by assigning weight scales for each element.

8. Use the **alignment indicator** to identify potential alignment problem areas that occur during pre-project planning. These potential problem areas are discussed in the next section of this chapter.

8.9 THE KEY ALIGNMENT INDICATORS

Alignment is identified as “the condition when appropriate project representatives are working with acceptable tolerance to develop and meet agreed and understood objectives” (CII 1994). In order to achieve alignment barriers must be identified and overcome. CII (1997) revealed the following as critical and important issues that have the greatest effect on team alignment and consequently obstructing the achievement of alignment. They relate to cultural and process issues. They are mainly:

- effective leadership;
- open communication;
- trust and shared values;
- appropriate stakeholders representation;
- structured pre-project planning process;
- suitable reward system;
- priority between project objectives;
- timely team meetings;
- teamwork and team building programs; and
- use of planning tools.

8.10 ASSESSMENT OF THE PRE-PROJECT PLANNING

An assessment is an important task to assess the extent of achieving progress and improvement in performing pre-project planning. The need for an effective tool for a measurement tool can not be overemphasised. This tool serves as a regular and systematic review of an organisation to evaluate whether the degree to which their pre-project planning process is effectively in place. In order to provide companies with a tool for measuring its approach to pre-project planning, the followings were used:

- statement indicators; and
- scores based on a certain scale.

8.10.1 Statement of indicators

Statement indicators are words and sentences that describe a state of behaviour or practice. They are employed to measure practice of a particular process (Campbell and Cairns 1994). They describe a process, as either a good management process is in place or a good management process does not exist. A series of varying degree of performing the process. The elements of the assessment tool is based on the following:

- process definition of each;
- description of the characteristics of a good and bad practices;
- construction hierarchy of characteristics; and
- rank characteristics on a scale.

8.10.2 Scores for the assessment tool

In order to assess pre-project planning progress and achieving improvement numerically, a six-point scale is used (0 to 5) where five indicates good practice and zero indicates a bad practice. The score should provide an effective assessment means of scoring the capability of performing a pre-project planning practice with respect to known best practices. According to Grant (1999), statement indicators provide two extremes of performing a process, namely:

- a good management process is in place; and
- a good management process does not exist.

8.11 ASSESSMENT TOOLS FOR MEASURING AND IMPROVING PRE-PROJECT PLANNING

8.11.1 Assessment tools for measurement

The Egan Report (1998) stated that the development of a management measuring instrument that should help assessment of construction organisations' capability as one of the means towards modernising business processes of companies in the construction industry.

The tool developed for measuring the level of pre-project planning comprises two very important elements: the tool for measuring and improving the pre-project planning process as presented in Figure 8.5; and the pre-project planning enables presented in Figure 8.6. After identifying the current level regarding pre-project planning process and enables improvement can be identified from the next level on the figures provided.

The tool developed for measuring the level pre-project planning progress comprises pre-project planning processes that were derived from the literature concerning pre-project planning is mainly presented in Chapter 6 and tested through the questionnaire survey and case interviews. The pre-project planning processes presented in Figure 8.5 are also used and correspond to specific phases as shown in Figure 8.4.

The tool will help construction clients to assess their performance numerically using a six point scale where five means excellent pre-project planning and zero represents very poor project planning performance. Figure 8.6 represents the factors that enable pre-project planning improvement. These factors have been linked closely to the principles of TQM such teamwork and teambuilding programs and leadership. Some of the factors inhibiting pre-project planning improvement are also derived from that identified CII (1997) which were also tested in the questionnaire and case interviews were found to be closely related to the problems during pre-project panning.

This statement tool is developed based on statement indicators that are linked to scores. These scores provide an overview or highlight the strengths and weakness of achieving improvements. Figures 8.5 and 8.6 show respectively the assessment tools for measuring pre-project planning progress and improvement.

Figure 8.5 : A tool for measuring and improving pre-project planning progress

	Phase zero	Phase one	Phase two	Phase three	Phase four	Phase five	Phase six
Score	Degree of formality behind pre-project planning	Appointment of pre-project planning team	Defining project objectives	Communicating project objectives	Evaluate project risks	Producing scope definition	Outline conceptual design and estimates
5	Fully committed and actively performing formal pre-project planning	A team is always in place to perform pre-project planning	Project objectives are fully defined through written and documented project strategy	Established system of communication is in place and fully used	Potential project risks are adequately and fully identified using well established methods	Scope definition is well documented and evaluated before the project is authorised to start	Conceptual design and estimates are fully documented before the start of construction
4	Formal pre-project planning is fully understood and conducted most of the time	A team is appointed to perform pre-project planning most of the time	Project objectives are fully defined and produced most of the time	Established system of communication is in place and used most of the time	Risks are regularly identified and assessed most of the time	Scope definition is evaluated most of the time	Conceptual design and estimates are documented most of the time
3	Formal pre-project planning is conducted occasionally	A team is occasionally appointed to perform pre-project planning	Project objectives are understood and defined occasionally	Established system of communication is used occasionally	Risks are identified and assessed occasionally	Scope definition is evaluated occasionally	Conceptual design and are occasionally documented
2	The importance of formal pre-project planning is recognised and is partially conducted	The importance of a team is recognised and partially used	The importance of defining project objectives is recognised and partially defined	The importance of communication is recognised and partially used	The importance of identifying risks is recognised and partially identified and assessed	The importance of scope is recognised and partially evaluated	The importance of conceptual design and estimates are recognised and partially conducted
1	The importance of formal pre-project planning is considered but not conducted	The importance of team recognised but not used	The importance of defining project objectives is recognised but not conducted	Importance of communication is recognised but not established	The importance of identifying risks is recognised but not conducted	The importance of evaluating scope definition is recognised but not conducted	The importance of conceptual design and estimates are considered but not conducted
0	Aware of importance of formal pre-project planing but no interest in conducting	No recognition of importance	Aware of importance of defining project objectives but no interest in conducting	No recognition of importance	Aware of importance of identifying risks but no interest in conducting	Aware of importance scope definition but no interest in conducting	Aware of its importance but no interest in conducting

Figure 8.6: A tool for measuring pre-project planning enables

Score	Resources allocated for pre-project planning	Representations of stakeholders and specialists	Project Leadership	Measuring alignment during pre-project planning	Feedback and lessons learnt	Communication within team and with stakeholders	Teamwork and teambuilding programs	Use of tools during pre-project planning
5	Resources are always allocated for performing pre-project planning	Stakeholders and specialists are well represented during pre-project planning	Committed to developing effective team leadership	Alignment indicators are always in place for measuring alignment	Lessons learnt from previous projects are fully incorporated during pre-project planning	Established system of communication is fully implemented with effective feedback	Effective teambuilding and teamwork programs are always in place	Tools and techniques are fully used during pre-project planning
4	Resources are allocated most of the time.	Stakeholders and specialists are well represented most of the time	Project leadership is defined most of the time	Regular measurement and analysis of alignment problems are performed most of the time	Lessons learnt are incorporated most of the time	Established system of communication is implemented most of the time with some feedback	Teamwork and teambuilding programs are established most of the time	Tools and techniques are used most of the time
3	Resources is allocated occasionally	Stakeholders and specialists are represented occasionally	Project leadership is defined occasionally	Alignment measurement is occasionally conducted	Lessons learnt are occasionally incorporated	System of communication exists and occasionally used	Teamwork and teambuilding programs are established occasionally	Tools and techniques are occasionally used
2	The importance of allocating resources is recognised and partially conducted	The importance of stakeholders and specialists recognised and partially conducted	The importance of leadership is recognised and partially defined	Measurement of alignment is considered and partially measured	Lessons learnt are considered and partially used	System of communication exists and partially used	The importance of teamwork and teambuilding is recognised and partially used	Tools and techniques are recognised and partially used
1	The importance for allocating resources is considered but not used	Aware of its importance but not conducted	The importance of leadership is recognised but not conducted	Aware of the importance of measuring alignment but not conducted	Aware of the importance of lessons learnt but not used	The importance of established system is recognised but not co-ordinated	The importance of teamwork and teambuilding programs is considered but not conducted	The importance of tools and techniques are recognised but not used
0	No interest to allocate resources for pre-project planning	No recognition of importance	Aware of importance but no interest	No recognition of importance	No recognition of importance	No recognition of importance	Aware of their importance but no interest in conducting	Aware of their existence but no interest of using them

8.12 VALIDATION OF THE FRAMEWORK

Validation implies that something is assessed to be valid and that the adjudication is conducted by a person or body component to judge (Church 1983). The validation of the framework developed in this research was achieved by means of responses of construction clients who were in position to provide an overview of the whole pre-project planning process in their organisations. Questionnaire documents for evaluating the framework are shown in Appendix D. The documents contain questions for evaluating the framework, pre-project planning process map, an assessment tool for measuring pre-project planning progress, an assessment tool for identifying factors that enable pre-project planning improvement, an illustrative example of alignment tool, agreement matrix and an assessment tool for tool to determine the extent the degree of formality behind pre-project planning process in the organisation.

8.12.1 Evaluation of the framework

Six client organisations were selected to evaluate the framework. The selection of the client organisations was solely based on their willingness to participate in the interview. The construction clients were contacted by telephone and a letter then was sent to them explaining the objectives of the evaluation. Six client organisations expressed their willingness to participate in the evaluation. Details of the methodology of evaluation are discussed in Chapter 6. Table 8.2 provides average rankings of the effectiveness of the framework with respect to specific questions in the questionnaire.

Four of these organisations were involved in the case interviews and therefore they were aware of the framework that has been developed. Two other client organisations were selected after written and telephone contacts.

8.12.2 Objectives and basis for evaluating the framework

The objectives of evaluating the framework are as follows.

1. To assess the effectiveness of the pre-project planning in terms of the following:
 - the extent to which it represents pre-project planning activities;

- the extent to which the pre-project planning process could assist in making better decisions concerning the project ;
 - its ability to facilitate communication of project objectives;
 - its usefulness to overall construction process; and
 - the ease with which it can be used.
2. To assess the effectiveness of the measurement tool in terms of:
- its effectiveness in measuring pre-project planning progress;
 - its accuracy in representing pre-project planning improvement areas;
 - its usefulness to project team; and
 - the ease with which the tool can be used.
3. To identify the factors that inhibit pre-project planning improvement:
- the accuracy of the tool in identifying the factors that inhibit pre-project planning improvement;
 - its usefulness in assessing the factors that inhibit pre-project planning improvement; and
 - the ease to which the tool can be used.
4. To assess the effectiveness of alignment tools in terms of:
- usefulness;
 - ease of use; and
 - ability to overcome alignment barriers.

To achieve the above stated objectives, it was decided to demonstrate the framework to six construction client organisations and provide them with a questionnaire for evaluation requesting them to complete it which will allow them to indicate their opinion on the various aspects of the framework being evaluated. It was decided that the respondents of the case interviews (case interviews discussed in Chapter 7), could be used for evaluation as they were familiar with the framework. In addition, two more respondents were selected to conduct the evaluation based on their willingness to

participate. Certain constraints prevented to involve more individuals, as it is highlighted in the limitations discussed in Chapter 9.

8.12.3 Nature of respondents and their organisations

Table 8.1 presents the details of the respondents of the evaluation questionnaire including information about their organisations. The respondents consisted of a project manager, head of building and project management, a developer, a development unit manager, and director of estates and facilities. Despite of the constraints of the limited number of the framework evaluators, they are fairly representative of the potential client organisations with considerable years of experience, which will enable a fair assessment of the framework.

Table 8.1: Information about the respondents and their organisations

Respondents	Experience years	Type of organisation	Number of employees	Annual turnover
Position				
Project manager	25	Charity	7000	£250 m
Project director	12	Supermarket	10000	£300 m
Project manager	7	NHS	3000	£100 m
Director of state	1	university	2000	£150 m
Project manager	25	Developer	20	£90 m
Head of building and management	35	University	3000	£120 m

8.12.4 Results of the framework validation

The construction clients were contacted by telephone and a letter then was sent to them explaining the objectives of the evaluation. Six client organisations expressed their willingness to participate in the evaluation. Details of the methodology of evaluation are discussed in Chapter 6. Respondents were asked to complete the structured questionnaire for evaluating the framework recording their assessment to the statements based on a rating system scale from 1 to 5., where 1 is very poor and 5 is excellent. The responses have been presented in Table 8.2. Average scores and percentages of the scores were then calculated and presented in Table 8.2. The range column illustrates the degree of agreement between respondents.

The highest average rating of the framework was 4 out of 5 (80 per cent) was assigned for the following.

1. The extent to which the processes map could assist in making better decisions concerning the project.
2. The usefulness of the pre-project planning process map to the overall construction process.
3. The ease to which the assessment tool for measuring pre-project planning progress can be used.
4. The accuracy of the assessment tool in identifying the factors that inhibit pre-project planning improvement.
5. The degree of simplicity to which the assessment tool can be used.
6. The degree of simplicity of adopting the framework

An average rating of 3.8 (76 per cent) was assigned to the following.

1. The effectiveness of the assessment tool in measuring pre-project planning progress.
2. The overall assessment of the framework.

An average rating of 3.5 (70 per cent) was assigned in the following:

1. The extent to which the pre-project planning process map represents pre-project planning activities.
2. The ability of the pre-project planning process map to help in making better decisions concerning the project.
3. The ability of the pre-project planning process map to facilitate better communication of project objectives.
4. The accuracy of the assessment tool in representing areas of pre-project planning improvement.
5. The usefulness of the assessment tool to the project team.
6. The effectiveness of the alignment tool in measuring alignment.
7. The efficiency of the framework in terms of cost.
8. The ability of the alignment tool to overcome alignment problems.

An average rating of 3 or 3.26 were assigned in the following.

1. The ease to understand the aspects of gates.
2. The usefulness of the assessment tool in assessing the factors that inhibit pre-project planning improvement.
3. The degree of simplicity in using the tool.

Table 8.2: Responses to questions

Questions		Individuals scores 1 is poor & 5 is excellent						Rating (out of 5)		
								Avg.	Avg %	
Mapping pre-project planning process		Individual scores						score	score	Range
1	The extent to which the process maps represents the pre-project planning activities.	4	5	2	3	4	3	3.50	70	3
2	The extent to which the activities in the process could assist in making better decisions concerning the project.	4	4	3	5	4	4	4.00	80	2
3	The ability of the process map to help in making key decisions regarding pre-project planning.	4	4	3	3	4	3	3.50	70	1
4	The ability of the pre-project planning process map to facilitate communication of project objectives.	3	3	2	4	4	5	4.00	70	3
5	The usefulness of the pre-project planning process to the overall construction process.	4	4	3	5	4	4	4.00	80	2
6	The ease to understand the aspects of the gates.	2	2	3	4	3	4	3.26	65	2
An assessment tool for measuring pre-project planning improvement.									<u>73%</u>	()
7	Its effectiveness in measuring pre-project planning progress.	4	4	4	3	4	4	3.83	76	1
8	Its accuracy in representing pre-project planning improvement.	4	4	3	4	3	3	3.50	70	1
9	Its usefulness to the project team.	3	4	4	3	4	3	3.50	70	1
10	The ease to which it can be used.	4	4	5	5	3	3	4.00	80	2
Factors that inhibit pre-project planning improvement									<u>74%</u>	()
11	The accuracy of the tool in identifying the factors that inhibits pre-project planning improvement.	3	4	4	4	5	4	4.00	80	2
12	The usefulness of the tool in assessing the factors that inhibits pre-project planning improvement.	3	2	3	3	3	4	3.00	60	2
13	The ease to which the tool can be used.	4	4	3	4	4	5	4.00	80	2
Alignment thermometer									<u>73%</u>	
14	The effectiveness of the tool in measuring alignment.	4	4	3	4	4	3	3.50	70	1
15	The ability of the tool in overcoming alignment problems.	3	2	3	3	4	4	3.26	65	2
16	The degree of simplicity of using the tool.	3	5	3	3	2	2	3.00	60	3
General									<u>65%</u>	
17	How easy the framework to use?	4	5	4	3	4	4	4.00	80	2
18	Is the framework cost effective?	4	3	3	4	4	3	3.50	70	1
19	Your overall assessment to the framework.	5	4	4	3	4	3	3.80	76	2

8.13 GENERAL COMMENTS

There is a general agreement among the interviewees that the framework is an effective tool that could help in improving pre-project planning. However, some portions of pre-project planning process details are not applicable in small organisations. By contrast, it is noted that medium and larger client organisations could be beneficial and could be applied. They also indicated that pre-project planning includes some essential ingredients such as alignment tools that could help in identifying and reducing communication problems. Other comments included the following:

- the process is applicable to complex multi perspective problems where there is a dynamic change; (large organisation); and
- size of the project where the information is more fragmented and therefore problems are more complex.

8.13.1 Suggestions for improvements

The respondents to the framework evaluation offered some suggestions for improvement, which mainly focused on general application and certain aspects of the components of the framework. This reflected on the low ratings with respect to the questionnaire. The suggestions that the respondents provided included the following:

- alignment tool needs simple calculations;
- loop; and
- gates.

The framework that has been developed is a generic one. Construction clients can use it with certain modification to suite their specific needs. For example the pre-project planning process is divided into seven phases from phase zero to phase six, and therefore clients can use the whole process if they have the experience and in house facilities. While other client organisations can use phase zero to phase one if they are only concerned about defining the needs and performing feasibility study and decide to assign a contractor to do it for them. The procurement route will influence who is involved in the process. For example, in partnering and design construction, (phase II) project team will involve more down stream specialists and consultants however the

overall process should remain the same. Clearly the risk assessment will influence the choice of actual procurement.

8.14 SUMMARY

The research focused specifically on developing a framework for improving pre-project planning. The framework comprises three elements: the mapped process, pre-project planning tools which provides the guidance to the process and assessment tool to determine the achievement of pre-project planning improvement. This chapter has presented a framework for improving pre-project planning which construction clients can use to improve performance. The various components of the framework have been outlined. The framework has the potential of helping construction clients in a number of ways by allowing construction clients to perform pre-project planning more systematically; and identifying the factors for addressing improvement. Equally important, the framework provides a proactive measure for a construction client as the framework evaluates the capabilities that drive improvement and effectiveness of the pre-project planning process.

The chapter has also discussed the results obtained from the validation of the framework with six client organisations. The evaluation of the framework comprised three parts namely: pre-project planning process map; with the tools that guide the process; a tool for measuring and improving pre-project planning process and a tool for measuring pre-project planning enables. The results generally show that the framework is an effective tool that could enhance pre-project planning particularly in large client organisations where projects are more complex and there is a great deal of dynamic of change.

CHAPTER NINE

CONCLUSION AND RECOMMENDATIONS

CHAPTER 9

CONCLUSION AND RECOMONDATIONS

9.1 INTRODUCTION

The previous chapter presented the development of the framework and presented data for evaluation. This chapter presents the conclusion, recommendations and suggests further work. The need for an effective framework for improving pre-project planning cannot be overemphasised for implementing the principles of pre-project planning. The reports of Latham (1994) and Egan (1998) both called for radical changes to be achieved through the introduction of effective business processes within construction in order to meet the challenges of an evolving business environment. Many of the problems encountered in the later stages of the project have their origin in the pre-project planning phase. These problems are frequently attributed to poor planning and poor identification of client needs which act as contributory factors to poor project performance. Pre-project planning is an important phase in the project life cycle because:

- early consideration of key issues affecting the outcome of the project ; and
- vital for the success of design and construction.

The main aim of the research was to develop a framework to assist construction clients perform pre-project planning with tools that enable overcome the problems that they encounter within their organisation as well as with other project participants with regard to alignment of project objectives.

Furthermore the framework comprises assessment tools that enable pre-project planning progress to be measured and improvement monitored. To achieve this aim, the objectives of the research were to:

- examine the pre-project planning in construction clients organisations;
- identify the factors that inhibit improving pre-project planning;
- map the pre-project planning phase;
- identify the tools that improve pre-project planning process; and
- develop a framework for improving pre-project planning.

In order to achieve the aim, the research has focused on the following objectives:

- gain an understanding of the current pre-project planning practice and associated problems;
- identify the tools that help improve pre-project planning;
- identify the factors that inhibit improve pre-project planning;
- map the pre-project planning process;
- develop an assessment tool for measuring pre-project planning progress; and
- develop an assessment tool for measuring pre-project planning performance.

These objectives were achieved through a comprehensive literature search review, a questionnaire survey and four case study interviews in chapter 7. These objectives were developed to focus on the pre-project planning (Chapter 6) within the concepts embedded in performance, key strategic issues and client role (Chapter 3, 4 and 5). The subsections below list the achievement of the research objectives.

9.2 CONTRIBUTIONS TO THE RESEARCH

One of the main problems that inhibit pre-project planning improvement is the lack of tools that guide pre-project planning and measure its progress and performance. The research contributed to the body of knowledge by linking the improved pre-project

planning process to the improvement of construction performance. The main aim of this research was to develop a framework to improve pre-project planning of construction projects. The framework provides a comprehensive tool that helps solve problems that occur during pre-project planning with respect to project objectives and goals of the construction project and enable performance to be measured and improved.

This research developed a framework for improving pre-project planning that can be used by construction clients to improve their approach to pre-project planning. The framework comprises three elements namely: pre-project planning process map with tools that guide the process; an assessment tool for measuring pre-project planning progress; and an assessment tool for measuring pre-project planning improvement. The framework was validated and found to be useful and applicable by six construction clients through questionnaire interview.

The research examined the pre-project planning through an extensive literature review. Critical pre-project planning functions have been presented and tested through the questionnaire survey and case interviews to determine how clients perform pre-project planning. The research contributes to body of knowledge by introducing a framework for improving pre-project planning. The framework comprises three components namely: a structured pre-project planning process map; tools that deal with process and cultural issues which inhibit pre-project planning improvement; assessment tools that help measure and monitor pre-project planning progress and performance. The framework could benefit client organisations and improve their approach to pre-project planning.

9.2.1 Pre-project planning process map

The first contribution of this research is the development of pre-project planning process map that enables clients perform its activities and make critical decisions. Such a process either has been lacking the details in the existing literature or has the tools. The pre-project planning process map functions as a communication tool to

enable construction clients make the key decisions throughout the process with review gates and help and project team understand the amount of work required from its representatives. The pre-project planning process map comprises six key phases namely.

PHASE ZERO	Demonstrating the need
PHASE ONE	Outline feasibility
PHASE TWO	Appoint a pre-project planning team
PHASE THREE	Define project objectives
PHASE FOUR	Evaluate project risks
PHASE FIVE	Produce scope definition
PHASE SIX	Outline conceptual design

9.2.2 Assessment tools

The objective of these tools is to measure the progress achieved during pre-project planning. An assessment of pre-project planning progress and improvement is an important task as it provides means of measuring the level of achieving progress. The need for an effective and structured tool for measuring achievement of accomplishing improvement of pre-project planning can not be overemphasised. This tool serves as a regular and systematic review of an organisation to evaluate the degree to which their pre-project planning process is effectively in place. They describe a process, as either a good management process is in place or a good management process does not exist.

9.2.3 Alignment tools

The research identified several tools, which are useful in dealing with alignment issues and scope definition during pre-project planning. These tools deal with both culture and process issues. The tools include an alignment thermometer and agreement matrix. Although results of the survey showed that respondents are not familiar with these tools, validation of the framework indicated that positive response toward the use and degree of simplicity of using them and that it could be beneficial to improving pre-project planning.

9.2.4 Problems encountered during pre-project planning

Alignment is a crucial factor that frequently inhibits pre-project planning improvement. Results of the questionnaire confirmed the findings of the (CII 1997) which identified the critical and important issues that have the greatest effect on team alignment and consequently obstructing the achievement of alignment during pre-project planning, they are namely:

- effective leadership;
- open communication;
- appropriate stakeholders representation;
- structured pre-project planning process;
- suitable reward system;
- priority between project objectives;
- timely team meetings;
- teamwork and team building programs; and
- use of planning tools.

9.3 LIMITATIONS

The research The research has two main limitations. The first gives rise to further research (see section 9.5). The applicability of the results to the limitations of the research include:

- case interviews have not been conducted with contractors to elicit views on their approach to pre-project planning;
- the number of validation interviews were limited to six client organisations due to the substantial material the framework comprises which has to be demonstrated to respondents. The framework validation material is presented in Appendix D.

9.4 RECOMMENDATIONS

Several issues have been identified from the findings of this research to improve the effectiveness of client's approach to pre-project planning. These recommendations include the following:

- pre-project planning is the client's responsibility and should reside with him/her;
- a structured pre-project planning with accompanying tools will enhance performance encourage communication between project team;
- clients should place emphasis on performing pre-project planning efforts using a formal process; and
- clients should spend more resources in order to ensure a well defined project before the start of design and construction.

9.5 FURTHER RESEARCH

The following recommendations are made for further research into pre-project planning:

- validation of the framework through a wide questionnaire to include clients as well clients;
- the use of the framework on a wide range of projects to further test its applicability to different project types;
- extend the research to include other construction phases such as design and construction; and
- extend the research to include contractors' approach to pre-project planning.

9.5.1 Process mapping other phases

The research examined pre-project planning and developed a framework to improve it. Further research based on the process map and accompanying tools is to map processes involved in the remaining phases of construction project life cycle. This will demonstrate the continuity and optimise integration from inception to completion, such as a process map.

9.6 RESEARCH BENEFITS

The benefits of the framework can be summarised as follows:

- the development of a structured pre-project process map that could assist construction client better conduct pre-project planning;
- the identifications of tools that can be implemented in the pre-project planning process to solve the process and cultural issues; and
- the development of assessment tools that can measure progress and monitor performance of pre-project planning.

9.6.1 Direct benefits

The direct benefits of the framework derived from its use in performing pre-project planning activities in a structural manner. The following benefits are achieved:

- it helps construction clients and project team to focus on project objectives;
- it ensures pre-project planning activities are performed and assessed throughout the process;
- it facilitates communication between client and project team;
- it minimises alignment barriers
- it aligns team members toward the same objectives; and
- it provides step by step review by the introduction of review gates.

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APPENDIX A

Workshops and conferences attended during the research period

Workshops

Sixth Research Methodology Workshop on 5th & 6th March 1998, Churchill College, Cambridge, UK.

Conferences

Association of Researchers in Construction Management. ARCOM 99: 15th Annual Conference and Annual General Meeting. September 15-17 1999, Liverpool John Moores University, UK.

Postgraduate Research in the Built and Human Environment in the UK. The Bizarre Fruit Conference. 9-10 March 2000, University of Salford, UK.

APPENDIX B

Questionnaire covering letter

Dear Sir

Enclosed with this letter a survey questionnaire, which is part of my PhD research at Loughborough University, aimed at improving pre-project planning.

The CII defined pre-project planning as the process of developing sufficient strategic information to maximise the chance for a project success. According to the CII pre-project planning starts the concept or feasibility study and ends when a decision is made to start construction.

I would be grateful if you could fill in the questionnaire and return it in the next two weeks. It is estimated that it will take approximately ten minutes to complete the questionnaire. The data collected from this survey will be treated on a confidential basis.

Thank for your time and I will be very happy to send you a summary of the results when they are published if you would like to receive them.

Please use the self-addressed envelope to return to:

M. A. Sherif, Department of Civil and Building Engineering
Loughborough University, Loughborough, Leics.

LE11 3TU

Telephone: 01509-263171 Ext. 4140

Thank You

Sincerely

M.Sherif

APPENDIX C

Glossary

Pre-project planning

The process of developing sufficient strategic information with which clients can address risk and decide to commit resources to maximise the chance for a successful project.

Alignment

The condition where appropriate participants are working within acceptable tolerance to develop and meet a uniformly defined set of project objectives.

Alignment thermometer

Alignment thermometer is a self-evaluation survey that is designed to be used during the pre-project planning phase of the project.

Project definition-rating index (PDRI)

A tool designed to measure project scope definition for completeness.

Agreement matrix

A tool designed to ensure that the team members are focused on the same project objectives.

APPENDIX D

**Questionnaire on
client's approach to pre-project planning**

QUESTIONNIRE OF CLIENTS' APPROACH TO PRE-PROJECT PLANNING

A - GENERAL INFORMATION

1. Please provide the following general information:

- Name of company

- Age of the company

- Turnover of company

- Number of employees

2. Indicate the type of projects usually undertaken by your company.

New build

☐

Maintenance

☐

Refurbishment

☐

3. Indicate how does your company procure projects.

Partnering

☐

Design & Build

☐

Management

☐

Traditional

☐

Other

☐

4. Is/are the project(s):

- Generated within the organisation for its own purpose.
- The result of an external contract, for a customer.
- Government sponsored.
- Speculative.
- Other.

☐☐☐☐☐

5. Which field of business does your company operate ?

Public

☐

Private

☐

Other

☐

6. Please describe the type of projects you are/were involved in the last five years.

☐

Building

☐

Civil

☐

Other

B – PRE-PROJECT PLANNING PROCESS

In the following questions please tick the appropriate box.

10. Please indicate how often your company employs the following during pre-project planning.

Never rarely sometimes very often always

Formal process for performing pre-project planning.

--	--	--	--	--

1. Please indicate how often your company employs the following during pre-project planning.

Never rarely sometimes very often always

A formal process for defining needs.

--	--	--	--	--

A team specifically assigned to perform pre-project planning.

--	--	--	--	--

A written procedure for defining responsibilities and rolls of the team.

--	--	--	--	--

Sufficient time and budget is allocated to perform pre-project planning.

--	--	--	--	--

10. Please indicate the degree of your involvement during pre-project planning.

very poor poor acceptable good very good

--	--	--	--	--

11. Indicate the effort expended into pre-project planning?

	very poor	poor	acceptable	good	very
good					

12. Is there a correlation between effort expended into pre-project planning and project success?

never	rarely	sometimes	very often	always

13. Please indicate how often your company considers the following risks factors during pre-project planning?

	never	rarely	sometimes	very often	always
Budget costs					
Availability of contractors and designers.					
Planning regulations					
Operating and maintaining cost					
Availability of contractors					
Construction risks					

14. How often do you develop a project execution plan?

never	rarely	sometimes	very often	always

15. Indicate how often your company employs the following factors when developing a project execution plan?

	never	rarely	sometimes	very often	always
Safety and construction strategy					
Financing the project.					
Quality control and environment plans					
Organisation resourcing and project definition					
Procurement approach					
Commissioning and handover procedures					
Planning and cost control					
Assessing project environment					
Health and safety plan					
Develop contracting plan					
Developing project objectives					
Use value management and Engineering procedures					

16. Please indicate how often your company uses the following tools during pre-project planning.

	never	rarely	sometimes	very often	always
Benchmarking.					
Project definition rating index (PDRI).					
Agreement matrix.					
Brain storming.					
Management by objectives.					

Alignment thermometer

--	--	--	--	--

Scope definition checklist

--	--	--	--	--

Value engineering programs

--	--	--	--	--

Work process flow diagram

--	--	--	--	--

Lessons learned from previous projects

--	--	--	--	--

14. Please indicate how often the following occur during pre-project planning.

Insufficient time for conducting pre-project planning.

never	rarely	sometimes	very often	always

Unclear definition of team Members' roles.

--	--	--	--	--

Lack of team skills.

--	--	--	--	--

Poor communication between team members.

--	--	--	--	--

Lack of clear process.

--	--	--	--	--

Insufficient budget for conducting pre-project planning.

--	--	--	--	--

Poorly established priorities between project objectives.

--	--	--	--	--

Lack of leadership.

--	--	--	--	--

Lack of experience with new technology.

--	--	--	--	--

Lack of a clear process for pre-project planning.

--	--	--	--	--

Poorly established priorities between project objectives.

--	--	--	--	--

Authorisation of the project execution before completing the pre-project planning.

--	--	--	--	--

Others. _____

--	--	--	--	--

--	--	--	--	--

15. Please indicate how often you employ the following when producing a scope definition.

	never	rarely	sometimes	very often	always
Use of tools for evaluating completeness of scope before start of detailed design.					
Use of partnering approach to spread the risk.					
Document project scope and And preliminary design					
Prepare conceptual estimates					
use of business and project objectives as guidelines in checklists					
Formulate a document containing the Method and resources					
Define deliverables (e.g. specifications and design drawings)					

16. Please indicate how often the following are employed when communicating project objectives to the project participants.

	never	rarely	sometime	very often	always
Project execution plan.					
Owner's request for proposals.					
Written scope of work.					
Contract document.					
Policy and procedure manuals.					
Pre-construction meetings.					
Written objectives and priorities.					
Value management technique.					
Documented procedures (as guidelines to ensure agreement on project objectives).					

Please indicate how often you use the following when aligning project objectives?

	never	rarely	sometimes	very often	always
Use of tools to ensure team Agreement					
Use of tools to ensure team is focused on the project objectives					
Regular meetings to keep lines of Communications open					
Assess and identify potential areas of disagreement					
Ensure appropriate stakeholders Representations					
Use teamwork and teambuilding Programs					
Use of contractors					
Use of sub-contractors					
Use of specialists					

17. Please indicate the level of your involvement in the pre-project planning?

very poor	poor	acceptable	good	very good

18. Are there any limitations for the current pre-project planning practice?

19. What actions can be taken to improve the process?

20. Who is involved in the pre-project planning?

21. Please give examples of recent projects where stakeholders are involved in the pre-project planning.

22. Please explain the processes used to align their needs?

APPENDIX E

Questionnaire and documents for evaluating the framework

Questionnaire for evaluating framework

Evaluation of the framework

The aim of this questionnaire is to evaluate a framework developed for improving pre-project planning. The completion of the questionnaire will follow a demonstration of how it works.

A. General information

1. Company Name
2. Type of business
3. Number of employees
4. Annual turnover
5. Position of the respondents
6. Years of experience

B. Evaluation of the framework

Please tick in the box to represent your assessment of the question.

Figure (1): Pre-project planning process map

	Ranking (1 is poor & 5 is excellent)				
	1	2	3	4	5
7. The extent to which figure (1) represents pre-project planning activities.					
8. The extent to which the activities in figure (1) could assist in making better decisions concerning the project.					
9. The ability of figure (1) to help in making key decisions regarding pre-project planning.					
10. The ability of figure (1) to facilitate communication of project objectives.					
11. The usefulness of the PPP process to the overall construction process.					
12. The easiness to understand the aspects of gates.					

Figure (2): An assessment tool for measuring pre-project planning progress

	Ranking (1 is poor & 5 is excellent)				
	1	2	3	4	5
13. The effectiveness of the assessment tool in measuring pre-project planning progress.					
14. The accuracy of representing pre-project planning improvement aspects.					
15. The usefulness of the tool to the project team.					
16. The easiness of using the assessment tool.					

Figure 3: An assessment tool for measuring factors that enable pre-project planning improvement

	Ranking (1 is poor & 5 is excellent)				
	1	2	3	4	5
17. The accuracy of the tool in identifying the factors that inhibit PPP improvement.					
18. The usefulness of the tool in assessing the factors that inhibit PPP improvement.					
19. The ability of the tool in overcoming problems occurring during PPP.					
20. The easiness of using the tool.					

21. General

Is the framework easy to apply?

Is the framework cost effective?

Could you apply it?

22. In what ways could the overall process be improved?

23. What is your overall assessment of the framework?

Poor	Average	Good	Very good	Excellent

24. Other comments:

APPENDIX F

Documents for evaluating the framework

Figure F1: Pre-project planning process

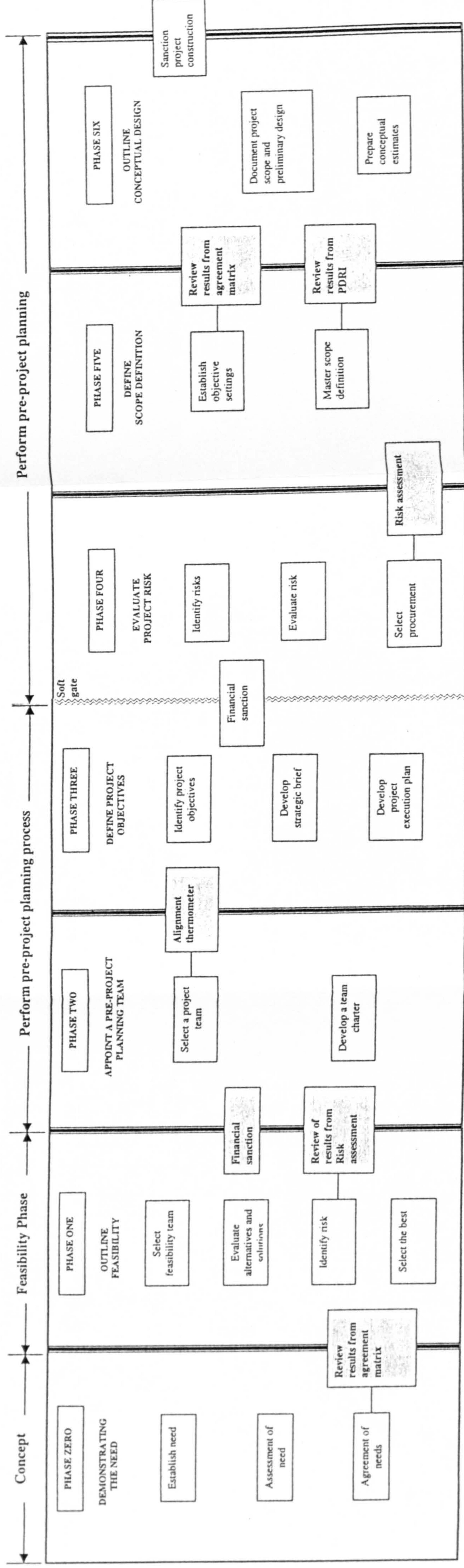


Figure F2 : A tool for measuring and improving pre-project planning progress

	Phase zero	Phase one	Phase two	Phase three	Phase four	Phase five	Phase six	
Score	Degree of formality behind pre-project planning	Demonstrating the need	Appointment of pre-project planning team	Defining project objectives	Communicating project objectives	Evaluation of project risks	Documentation of scope definition	Outline conceptual design and estimates
5	Fully committed and actively performing formal pre-project planning	Fully committed to defining and establishing agreement of the need	A team is always in place to perform pre-project planning	Project objectives are fully defined through written and documented project strategy	Established system of communication is in place and fully used	Potential project risks are adequately and fully identified using well established methods	Scope definition is well documented and evaluated before the project is authorised to start	Conceptual design and estimates are fully documented before the start of construction
4	Formal pre-project planning is fully understood and conducted most of the time	The need is defined and agreed most of the time	A team is appointed to perform pre-project planning most of the time	Project objectives are fully defined and produced most of the time	Established system of communication is in place and used most of the time	Risks are regularly identified and assessed most of the time	Scope definition is evaluated most of the time	Conceptual design and estimates are documented most of the time
3	Formal pre-project planning is conducted occasionally	The need is occasionally defined and agreed	A team is occasionally appointed to perform pre-project planning	Project objectives are understood and defined occasionally	Established system of communication is used occasionally	Risks are identified and assessed occasionally	Scope definition is evaluated occasionally	Conceptual design and are occasionally documented
2	The importance of formal pre-project planning is recognised and is partially conducted	The importance of defining the need is recognised and partially conducted	The importance of a team is recognised and partially used	The importance of defining project objectives is recognised and partially defined	The importance of communication is recognised and partially used	The importance of identifying risks is recognised and partially identified and assessed	The importance of scope is recognised and partially evaluated	The importance of conceptual design and estimates are recognised and partially conducted
1	The importance of formal pre-project planning is considered but not conducted	The importance of defining the need is recognised but not conducted	The importance of team recognised but not used	The importance of defining project objectives is recognised but not conducted	Importance of communication is recognised but not established	The importance of identifying risks is recognised but not conducted	The importance of evaluating scope definition is recognised but not conducted	The importance of conceptual design and estimates are considered but not conducted
0	Aware of importance of formal pre-project planning but no interest in conducting	Aware of its importance but no interest in conducting	No recognition of importance	Aware of importance of defining project objectives but no interest in conducting	No recognition of importance	Aware of importance of identifying risks but no interest in conducting	Aware of importance but no interest in conducting	Aware of its importance but no interest in conducting

Figure F3: A tool for measuring pre-project planning enables

Score	Resources allocated for pre-project planning	Representations of stakeholders and specialists	Project Leadership	Measuring alignment during pre-project planning	Feedback and lessons learnt	Communication within team and with stakeholders	Teamwork and teambuilding programs	Use of tools during pre-project planning
5	Resources are always allocated for performing pre-project planning	Stakeholders and specialists are well represented during pre-project planning.	Committed to developing effective team leadership	Alignment indicators are always in place for measuring alignment	Lessons learnt from previous projects are fully incorporated during pre-project planning	Established system of communication is fully implemented with effective feedback	Effective teambuilding and teamwork programs are always in place	Tools and techniques are fully used during pre-project planning
4	Resources are allocated most of the time.	Stakeholders and specialists are well represented most of the time.	Project leadership is defined most of the time.	Regular measurement and analysis of alignment problems are performed most of the time	Lessons learnt are incorporated most of the time	Established system of communication is implemented most of the time with some feedback	Teamwork and teambuilding programs are established most of the time.	Tools and techniques are used most of the time
3	Resources is allocated occasionally	Stakeholders and specialists are represented occasionally.	Project leadership is defined occasionally.	Alignment measurement is occasionally conducted	Lessons learnt are occasionally incorporated	System of communication exists and occasionally used	Teamwork and teambuilding programs are established occasionally	Tools and techniques are occasionally used
2	The importance of allocating resources is recognised and partially conducted	The importance of stakeholders and specialists recognised and partially conducted.	The importance of leadership is recognised and partially defined.	Measurement of alignment is considered and partially measured	Lessons learnt are considered and partially used	System of communication exists and partially used	The importance of teamwork and teambuilding is recognised and partially used	Tools and techniques are recognised and partially used
1	The importance for allocating resources is considered but not used	Aware of its importance but not conducted.	The importance of leadership is recognised but not conducted.	Aware of the importance of measuring alignment but not conducted	Aware of the importance of Lessons learnt but not used	The importance of established system is recognised but not co-ordinated	The importance of teamwork and teambuilding programs is considered but not conducted	The importance of tools and techniques are recognised but not used
0	No interest to allocate resources for pre-project planning	No recognition of importance	Aware of importance but no interest	No recognition of importance	No recognition of importance	No recognition of importance	Aware of their importance but no interest in conducting.	Aware of their existence but no interest of using them

Alignment Thermometer is a tool designed to provide a quick measure of team alignment and to identify potential areas of disagreement to will require additional discussion and explanation. The alignment thermometer can be used at a team meeting by following these steps:

Steps 1 and 2

Table F1

Project name	Level of agreement					
Alignment issue	1	2	3	4	5	score
1.	0	3	5	8	10	10
2.	0	3	5	8	10	5
3.	0	3	5	8	10	8
4.	0	3	5	8	10	8
5.	0	3	5	8	10	10
6.	0	3	5	8	10	8
7.	0	3	5	8	10	10
8.	0	3	5	8	10	8
9.	0	3	5	8	10	8
10.	0	3	5	8	10	10
Total score						77

Step 1: Place the circled number in the score column that best shows your level of agreement.

Step 2: Place the circled number in the score column and add the column to obtain the individual total score.

Step 3

Table F2

Team score		respondent								
Issue	1	2	3	4	5	6	7	Calculated average	Calculated range	Range/Average
1	10	8	8	8	8	8	10	8.6	2	0.23
2	5	8	8	8	8	5	8	7.1	3	0.42
3	8	8	8	5	8	8	8	7.6	3	0.40
4	8	8	10	8	10	8	8	8.6	3	0.35
5	10	8	8	5	5	8	8	7.4	5	0.67
6	8	8	8	5	8	8	5	7.1	3	0.42
7	10	5	5	10	8	10	8	8.0	5	0.63
8	8	8	8	5	7	8	8	7.4	3	0.40
9	8	8	5	8	8	5	8	7.1	3	0.42
10	10	8	8	8	10	8	10	8.9	2	0.23
Total								77.9		

Step 3: Plot the team's answers in the appropriate column and calculate the

- **Average**
- **Range** (high score _ low score), and
- **Range** _ **Average**

Measuring alignment during pre-project planning

Project name:	Level of agreement						
	1	2	3	4	5	Score	
Alignment issues							
Stakeholder are appropriately represented on the project team	0	3	5	8	10		
Project leadership is defined, effectively and accountable.	0	3	5	8	10		
The priority between project objectives is clear	0	3	5	8	10		
Communication within the team and with stakeholders is open and effective.	0	3	5	8	10		
Team meetings are timely and effective	0	3	5	8	10		
Team culture foster trust, honesty and shared values	0	3	5	8	10		
The pre-project planning fosters sufficient funding, schedule and scope to meet our objectives	0	3	5	8	10		
Reward and recognition systems promote meeting project objectives	0	3	5	8	10		
Teamwork and teambuilding programs are effective	0	3	5	8	10		
Planning tools are effectively used	0	3	5	8	10		
Total score							

An assessment tool for measuring pre-project planning progress

1. Degree of formality behind pre-project planning

5	Fully committed to and actively performing formal pre-project planning.
4	Formal pre-project planning is fully understood and conducted most of the time.
3	Formal pre-project planning is conducted occasionally.
2	The importance of pre-project planning is recognised and is partially conducted.
1	The importance of pre-project planning is considered but not conducted.
0	Aware of importance of formal pre-project planning but no interest in conducting.

2. Defining needs

5	Fully committed to defining and establishing agreement of the need.
4	The need is defined and agreed most of the time.
3	The need is occasionally defined and agreed.
2	The importance of defining the need and establishing agreement is recognised and partially conducted.
1	The importance of defining the need is recognised but not conducted.
0	Aware of its importance but no interest in conducting.

3. Appointment of pre-project planning team

5	A team is always in place to perform pre-project planning.
4	A team is appointed to perform pre-project planning most of the time.
3	A team is occasionally appointed to perform pre-project planning.
2	The importance of team is recognised and partially used.
1	The importance of team is recognised but not used.
0	No interest in using a team.

4. Defining project objectives

5	Project objectives are fully defined through documented project strategy.
4	Project objectives are fully defined and produced most of the time.
3	Project objectives are understood and defined occasionally.
2	The importance of defining project objectives is recognised and project objectives are partially defined.
1	The importance of defining project objectives are recognised but not conducted.
0	Aware of importance of defining project objectives but no interest in conducting.

5. Communication of project objectives

5	Established system of communication is in place and fully used.
4	Established system of communication is in place and used most of the time.
3	Established system of communication is used occasionally.
2	The importance of communication is recognised and partially used
1	The importance of communication is recognised is but not established.
0	No recognition of importance.

6. Evaluation of project risk

5	Potential project risks are adequately and fully identified using well-established methods.
4	Project risks are regularly identified and assessed most of the time.
3	Project risks are identified and assessed occasionally.
2	The importance of identifying project risks is recognised and is partially identified and assessed.
1	The importance of identifying project risks is recognised but not conducted.
0	Aware of importance of identifying project risks but no interest in conducting.

7. Documentation of scope definition

5	Scope definition is well documented and evaluated before all projects authorised to start.
4	Scope definition is evaluated most of the time.
3	Scope definition is evaluated occasionally.
2	The importance of scope definition is recognised and partially evaluated.
1	The importance of evaluating scope definition is recognised but not conducted.
0	Aware of scope definition but no interest in conducting.

8. Outlining conceptual design

5	Conceptual design and estimates are always documented before the start of the project.
4	Conceptual design and estimates are documented most of the time.
3	Conceptual design and estimates are occasionally conducted.
2	The importance of conceptual design and estimates is recognised and partially documented.
1	The importance of conceptual design and estimates are considered but not conducted.
0	Aware of its importance but no interest in conducting.

B Factors that enable improvement of pre-project planning

1. Resources allocated for pre-project planning

5	Resources are always allocated for performing pre-project planning.
4	Resources for pre-project planning are allocated most of the time.
3	Resources are occasionally allocated.
2	The importance of allocating resources is recognised and partially conducted.
1	The importance of allocating resources is considered but not conducted.
0	No recognition of importance.

10. Representations of stakeholders and specialists

5	Stakeholders and specialists are always well represented during pre-project planning.
4	Stakeholders and specialists are well-represented most of the time.
3	Representation of stakeholders and specialists is occasionally conducted.
2	The importance of representation of stakeholders and specialists is recognised and partially conducted.
1	The importance of representation of stakeholders and specialists is considered but not conducted.
0	No interest in conducting.

11. Project leadership

5	Committed to developing effective leadership.
4	Project leadership is defined most of the time.
3	Project leadership is defined most of the time.
2	The importance of leadership is recognised and partially defined.
1	The importance of leadership is recognised but not used.
0	Aware of its importance but no interest in conducting.

12. Measurement of alignment during pre-project planning

5	Alignment indicators are always in place for measuring alignment.
4	Regular measurement and analysis of alignment problems that may happen.
3	Alignment measurement is occasionally conducted.
2	Measurement of alignment is considered and partially measured
1	Aware of the importance of measuring alignment but not conducted.
0	No recognition of importance of alignment.

13. Feedback and lessons learnt

5	Feedback and lessons learnt from previous projects are fully incorporated during pre-project planning.
4	Feedback and lessons learnt are incorporated most of the time.
3	Feedback and lessons learnt are occasionally incorporated.
2	Feedback and lessons learnt are considered and partially used.
1	Aware of the importance of feedback and lessons learnt but not used.
0	No recognition of importance.

14. Communication within team and with stakeholders

5	Established system of communication is fully implemented with effective feedback.
4	Established system of communication is implemented most of the time with some feedback.
3	System of communication exists and occasionally used
2	System of communication exists and partially used.
1	The importance of establishing system of communication is recognised but not conducted.
0	No recognition of importance.

15. Teamwork and teambuilding programs

5	Effective teamwork and teambuilding programs are fully used during pre-project planning.
4	Teamwork and teambuilding programs are used of the time.
3	Teamwork and teambuilding programs are occasionally used.
2	The importance of teamwork and teambuilding programs is recognised and partially used.
1	The importance of teamwork and teambuilding programs is considered but not conducted.
0	Aware of their importance but no interest in conducting.

16. Use of tools during pre-project planning

5	A comprehensive range of pre-project planning tools and techniques are fully used.
4	Tools and techniques are used most of the time.
3	Tools and techniques are occasionally used.
2	The importance of tools and techniques are recognised and partially used.
1	The importance of tools and techniques are recognised but not used.
0	Aware of importance of their existence but no interest in using them.

17. Identification of alignment barriers

5	Alignment barriers are fully identified during pre-project planning.
4	Alignment barriers are understood but not fully identified.
3	Alignment barriers are partially identified and alignment workshops occasionally help.
2	The importance of alignment is recognised but partially defined.
1	The importance of alignment is recognised but not performed.
0	No interest in investigating alignment barriers.