KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI

DEPARTMENT OF BUILDING TECHNOLOGY

FACULTY OF ARCHITECTURE AND BUILDING TECHNOLOGY

COLLEGE OF ARCHITECTURE AND PLANNING

PROCUREMENT SYSTEMS AND PROJECT SUCCESS IN THE GHANAIAN CONSTRUCTION INDUSTRY

A PROJECT REPORT SUBMITTED TO THE DEPARTMENT OF BUILDING TECHNOLOGY IN PARTIAL FULFILMENT OF THE REQUIREMENT OF THE MASTER OF SCIENCE IN CONSTRUCTION MANAGEMENT

BY

KWADWO ASARE KYEI

MAY 2011

DECLARATION

I declare that I have wholly undertaken the research reported upon here-in under supervision".

……. Date…….

KWADWO ASARE KYEI
(Student)

I declare that I have supervised the student in undertaking the research reported herein and I confirm that the student has my permission to present it for assessment.

……. Date……

Prof. Edward Badu
(Lead Supervisor)

I declare that I have supervised the student in undertaking the research reported herein and I confirm that the student has my permission to present it for assessment.

……. Date……

Dr. Theophilus Adjei-Kumi
(Co-Supervisor)

I confirm that the student has duly effected all corrections suggested by the examiners in conformity of the Departments requirements.

……. Date……

Prof. Joshua Ayarkwa
(Head of Department)

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DEDICATION

I wholeheartedly dedicate this work to God for his protection; my family (my wife – Felicia, and children, Jennifer, Claudia, Michael and Annie-Pamela) for their unconditional love and my friends (Clement Owusu-Asamoah and Kwame Eshun) for their good counsel.

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ABSTRACT

The traditional procurement system has been in existence since the emergence of the building, architectural and quantity surveying professions. Since it's emergence, it has worked satisfactorily. However, in recent years, large and complex projects have proved difficult to manage. Generally, the construction industry is dynamic in nature due to the technological advancement and budgets and development processes which in constant change. The study of procurement systems and project success is aimed at improving the effectiveness of projects procurement. However, the concept of project success remains ambiguously defined in the mind of construction professionals. Moreover, very little research has been conducted to determine the relationship of procurement and project success or failure in Ghana. Literature is also silent on the impact of management oriented procurement systems on project success. These observed trends have necessitated many clients to resort to the popular traditional procurement system which has been condemned by researchers as inefficient. In order to avert this situation, a study which investigates best practised procurement system that leads to a project success is vital. This research fills this gap as adoption of it's findings can improve project success in the Ghanaian construction industry. The aim of this research was to investigate the effect of a procurement system on the success of construction projects. In order to achieve the aim, four objectives were set which include: identification of the extent to which procurement systems are being practised, factors that contribute to project success and importance to these factors to clients, consultants and contractors and the linkage between selection of procurement systems and the success of a project. This research took the form of literature review and survey using questionnaire approach and formal interviews. A deductive research methodological approach was adopted for the study. Information for the study was gathered firstly through the use of books, journals and professional magazines and secondly, through questionnaires that were sent to consultants, contractors and clients. Responses to the questionnaire were collected, collated and analyzed. From the literature review and the analysis of the survey results, six major findings were made as follows. Firstly, the traditional procurement system is

still the best known and applied system in the Ghanaian construction industry despite its numerous limitations. Secondly, the major problem with the traditional procurement system was the absence of input from contractors. Thirdly, the main reason cited by most respondents for not using the alternative procurement systems was lack of knowledge. Fourthly, a building procurement system has an influence on project's success and lastly the integrated procurement systems in Ghana have not been widely used and understood and hence its use may not be successful. Based on these results, it was recommended that there should be a formal education on the availability of alternative procurement systems for use by stakeholders in the Ghanaian construction industry. Also, seminars should be organized where experts from countries such as Asia, United Kingdom, the United States of America would share their experiences with their Ghanaian counterparts.

Keywords: Procurement Systems, Success Factors, Project Success, Construction Firms, Alternative Procurement Systems

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CHAPTER ONE

INTRODUCTION TO THE RESEARCH

1.1 BACKGROUND

As a developing country, Ghana faces a number of socio-economic challenges. These include, inter alia, inadequate housing stock, unemployment, lack of infrastructure, clear disparities between the poor and the rich. These challenges have a negative impact on the Ghanaian construction industry. According Obeng-Ayirebi (2002), construction evolved from the situation where, prospective building owners directly engaged contractors without drawings. The advent of architects and architectural practices which enabled clients engage the services of architects in the design of buildings was the genesis of the traditional procurement system.

1.2 GENERAL BACKGROUND OF PROCUREMENT SYSTEMS

Generally, the traditional system has not lived up to expectation worldwide and the Ghanaian construction industry is no exception. This is due to increasing construction project size and complexity, lack of integration of the design and construction phases' long overall project programme and cost overruns.

The integrated system is a generic term for many systems which seek to integrate the design and construction processes, while retaining the separation of responsibilities. It is a system which recognizes that the design, manufacturing and assembly processes of construction products can no longer be left to chance (Bennet and Grice, 1992). This suggests that there must be an integrated process to deliver quality, value for money, speed and higher productivity. This system does recognize the important role the modern contractor can play in the construction design, production and management. For this reason, the contractor does play an active and recognizable role in construction procurement system. As projects increase in size and complexity, but design time not increasing to allow all alternatives to be fully studied and specified, uncertainties increase. Moreover, the ability to take rational design decisions under the circumstances is limited. In order to overcome the foregoing factors and failure of the traditional system to respond effectively to the needs of the modern construction client, the construction industry may have to consider the adoption of the integrated system for the achievement of project success.

1.3 THEORETICAL BACKGROUND – PROJECT SUCCESS

Kerzner (2001) defined a project as any series of activities and tasks that have a specific objective to be completed within certain specifications, have funding limitations and consume resources (i.e. money, people, equipment). The process of construction (from inception, design, production and final handover to the client) fits Kerzner's definition of a project. Clients require the construction of various facilities (such as buildings, dams, roads) for different reasons. What is

common to all clients, however, is that they require their projects to be completed within specified time, budget and specific quality standards in order for the completed project to be acceptable or fit for use by the client or intended end user. All of this need to be achieved with limited resources, time, cost and quality or performance is the constraints on the project (Kerzner, 2001).

The focus of most studies of project success is on dimensions of project success (how to measure it) and factors influencing it. The traditional way of measuring project success is the so-called triangle of time, budget and required quality (Westerveld 2003). In addition, many studies have expanded project success criteria into other aspects, such as organizational objectives, stakeholders' satisfaction, customer's benefit, future potential to organization and so on. It is difficult for various authors to reach a consensus on project success criteria. For example, Morris and Hough (1986) use project function (finance function, technology function, etc.), project management (budget management, schedule management and technical standard), and contractor's business performance (short-term and long-term) to measure project success. Lim and Mohamed (1999) view project success by the use of micro and macro criteria. Their micro criteria include time, cost, quality, performance and safety, and their macro criteria include micro criteria plus the project product's actual benefit in the operation phase. Shenhar et al. (1995) discovered the four criteria of project success namely: efficiency, customer's benefit, organizational success and failure potential to organization. From the foregoing, project success means different thing to different people. However, according to the PMBOK Guide

published by the Project Management Institute (PMI, 2004), project success criteria include the golden triangle and the key project stakeholders' satisfaction of the project.

Latham (1994) argued that clients wishes on construction projects contribute to their wider objectives. These wishes will normally be the following: value for money; pleasing to look at; free from defects on completion; fit for purpose; supported by worthwhile guarantees; reasonable running costs; and satisfactory durability. A closer look at these indicates that the wishes mentioned by Latham (1994) can be classified in terms of cost and quality objectives. Value for money and reasonable running costs refer to cost as an objective, whereas, pleasing to look at, free from defects on completion, fit for purpose and supported by worthwhile guarantees refer to quality as an objectives on projects (especially construction projects) can mainly be classified in terms of time, cost and quality or performance. Notably, construction projects differ in nature, size and complexity. As a result, projects may attach different levels of importance to each of the three key client's objectives mentioned above. Cost, for example, may be traded off on a project that required very high standards of quality. Time on such a project may also be traded off in order to ensure that the high quality levels expected from the project are achieved. Projects may also have other secondary objectives that also vary form project to project. Latham (1994) reported that the public sector should deliberately set out to use their spending power to assist the productivity and competitiveness of the construction industry and thereby obtain value for money generally in the longer term.

1.4 PROBLEM STATEMENT

The traditional procurement system has been in existence since the emergence of the construction activities, architectural and quantity surveying professions (which surfaced at the end of the 18th century and stretching to the beginning of the 19th century). Since then, clients have relied on the Architect and/or Engineer (depending on the type of construction project planned) to design and supervise their construction projects. Generally, the traditional system has worked satisfactorily for many years. However, in recent years, the advent of large and complex projects has rendered the use of the traditional procurement system ineffective. Moreso, the complexity of demands, civil and industrial engineering construction projects resulting from technological advancement have, over the years, resulted in specialization within the construction industry. This could be attributed to various factors but, in essence, the expertise of the design orientated professions has proved insufficient to manage; as opposed to merely supervise, the numerous specialized and technically sophisticated contractors during construction. Rowlinson (1987) states that the traditional system has been criticized for its slowness due to the sequential nature of the work and the incidence of time and cost overruns attributed, in part, due to lack of input from the main contractor during the design phase.

According to Ramus (1989), many building owners and developers were of the view that the traditional procurement systems were no longer satisfactory due to the following:

- The rapidly spiraling cost of money that had to be borrowed to finance projects;
- High interest rates meant that the time occupied by the traditional procedures; resulted in substantial additions to construction cost; and
- High technological installations required a higher quality of construction.

Unfortunately, in Ghana, very little research has been conducted to determine the relationship between procurement and success or failure of a construction project. Moreso, literature is completely silent on the impact of management based procurement systems on project's success. These trends have influenced many clients to resort to the popular traditional procurement system which has been condemned by researchers as inefficient. In order to avert this situation, a study which investigates a procurement system that leads to a project success is vital. This research therefore fills a gap. It is hoped that the adoption of it's findings is likely to improve project success in the Ghanaian construction industry.

1.5 IMPORTANCE AND NEED FOR THE STUDY

The results of this investigation could adopted to:

(1) Promote other procurement systems besides the traditional system in the attainment of desired goals; and

(2) Educate those engaged in complex and large projects on the use of other procurement systems for the achievement of project success.

1.6 AIM OF THE STUDY

The aim of this research is to investigate the effect of a procurement system on the success of construction projects.

1.6.1 Specific objectives of the study

In order to achieve the above stated aim of the research, the following specific objectives are articulated:

(a) To identify the extent to which the current procurement systems (Traditional and Integrated) are practised in Ghana;

(b) To identify factors that contribute to the success of a construction project and the importance attached to the factors by clients, consultants and contractors;

(c) To establish a linkage between procurement systems and the success of a project; and

(d) To identify the variables that influence the success of construction project implementation.

1.7 RESEARCH METHODOLOGY

Achieving the objective of this research requires conforming to logical and scientific processes and empirical investigations from the viewpoint of clients, consultants and contractors. Information for this study was gathered as follows: Firstly, use of books, technical journals and professional magazines and secondly, through questionnaires to clients, consultants and contractors. Responses to the questionnaire were collected, collated and analyzed. The

analysis included ranking the different factors linking procurement systems and project success according to the relative importance indices for clients, consultants and contractors.

1.7.1 Data Sources

It has been mentioned earlier that multiple sources of information were used to address the research goals. The researcher deliberately decided to use multiple sources of data because of the added benefits (such as the validity of the data gathered) associated with multiple sources was enough motivation (Owusu, et al 2007a). However, this approach was time consuming and relatively expensive compared to single source of data. The approach for collecting data in this study was divided into two main parts. The first discusses the desk survey and the second discusses the field survey.

1.8.1 Desk Survey

The desk survey (literature review) forms an essential aspect of the research since it sets the pace for the development of field survey instruments using questionnaires, and interview (Fadhley, 1991) and Owusu, 2008). Secondary sources of information were identified and collected in books, articles, technical journals and from databases. The secondary source of information for this research were collected from two sources; mainly internal and external sources.

1.8.2 Internal Secondary Sources

These are published within companies or organizations, such as annual reports, information booklets, brochures, magazines, financial information memoranda, financial reports, plant and equipment registers. This type of internal secondary source of information for the research was collected from the selected construction companies, financial institutions, equipment dealerships and stakeholder institutions. The data collected by this means from the identified respondents were those concerned with the companies' financing practices and policy framework.

1.8.3 External Secondary Sources

Wahab (1996) described external secondary sources of data gathering as primary literature sources. Accordingly, they are the most accurate sources of information as it contains the original research. Alternative sources of external secondary sources of information include textbooks, technical journals, newspapers, magazines and internet sources.

1.8.4 Field Survey: Primary Data Source

The field survey is involved with the collection of empirical data. A single source approach of data gathering was adopted for the purpose of this research (using questionnaires).

1.8 SCOPE OF STUDY

The study was carried out exclusively in Ghana. The scope of the study was limited to contractors, consultants, large corporate and public clients in the Ashanti and Greater Accra Regions due to their large concentration in these two regions. Clients were chosen because they initiate and promote projects and are directly affected by their outcome. Consultants were chosen because they advise the client on suitable procurement system for their projects. Contractors were chosen because they undertake the construction of projects to the shape, size and quality depicted on the architect's drawings and specifications.

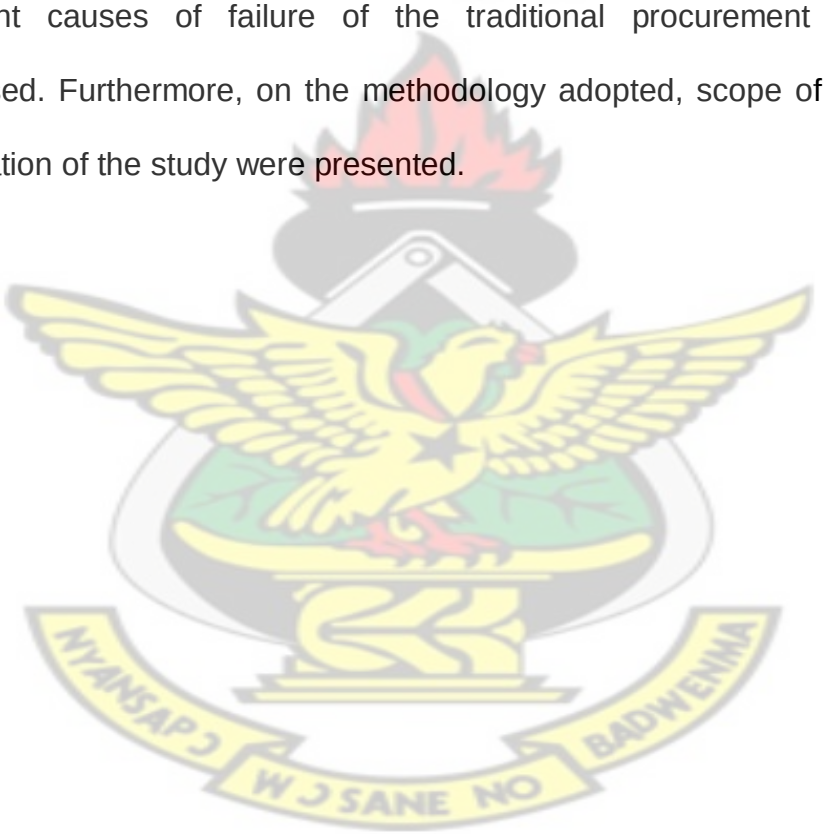
1.9 ORGANIZATION OF THE STUDY

The study is organized into five chapters. The first chapter comprises general introduction of the study, stating the aim, objectives and scope of the study. It also includes a problem statement for which the study was conducted. Chapter Two contains the literature review which considers in detail the various procurement systems (i.e. the separated and integrated systems) and various project successes. Some meaningful discussions on the discretionary and relationship based procurement systems are provided since the Public Procurement Act, 2003, Act 663 does not permit their use. Hence, the study mainly focused on the Traditional, Construction Management and Design and Build Procurement Systems. In Chapter Three, the methodology in the study is thoroughly discussed. Chapter Four of the study contains the analysis of data collected and the discussion of the results obtained from the analysis. Chapter

Five discusses the conclusions drawn from the analysis and the recommendations based on the conclusions.

1.10 SUMMARY

This Chapter discusses the general and theoretical perspectives to the research area by defining the topic, the problem of setting the research objectives. Also, project success were highlighted from the theoretical point of view and the apparent causes of failure of the traditional procurement system were discussed. Furthermore, on the methodology adopted, scope of the study and justification of the study were presented.



CHAPTER TWO

LITERATURE REVIEW: WORKS PROCURMENT SYSTEMS IN USE AND PROJECT SUCCESS

2.1 INTRODUCTION

This chapter examines client's development objectives, constraints, procurement systems and project success. The final section combines the knowledge obtained from the preceding sections to determine whether (based on literature) alternative procurement systems, rather than the traditional one, can improve construction projects success.

2.2 PROCUREMENT PROCESS

Generally, procurement is the process of obtaining goods and services from another for some consideration. From time immemorial, man has been unable or willing to make himself totally self-sufficient and has had to trade with his neighbour.

Procurement may be defined as the organizational structure adopted by the client for the implementation and eventual operation of a project. Procurement is a combination of business and economic activities undertaken by clients to obtain a product.

2.2.1Procurement in Construction

Procurement in construction is the process of acquiring or obtaining construction project from the client's initial idea, through to his/her occupation. It is the framework within which construction is brought about, acquired or obtained. Hence, those aspects of design and production and related problems of briefing, documentation and organization which affect the cost of the product needs to be considered.

2.2.2 Procurement system

Procurement system may be classified in respect of the level of integration of design and production process. According to Kwakye (1997), generally, procurement systems may be classified in respect of the level of integration of design and construction process as either traditional system or the integrated system.

2.3 PROCUREMENT SYSTEMS WITH RESPECT TO CONSTRUCTION

Procurement with respect to construction is a system that describes the total process of meeting the client's need for a project, starting at the point where this need is first expressed and straight through to when it is finally met. In other words, it may be defined as the management system used by the client to secure the design and construction services required for the execution of a proposed project to a required cost, quality and within a specified time. A procurement system:

(i) Establishes the roles and relationships which make up the project organization;

(ii) Establishes the overall management structure and systems; and

(iii) Helps shape the overall values and style of the project.

According to Bennet and Brice (1992) some of the factors, prevailing in the UK construction industry that have introduced changes in procurement systems are as follows:

(i) The building industry is fragmented. There are number of designers and contractors involved and all work for different organizations. They are however, temporarily welded together to form a temporary organization with an objective of completing a specific product (building, bridge, road, etc.)

(ii) The selection of specialists (contractors and consultants) is done on a competitive basis and the contracts tend to be adversarial rather than cooperative between the client, consultants and specialists contractors. This "them" and "us" attitude reduces team spirit and chances of attaining project success diminish;

(iii) The role of specialist contractors is changing. Greater responsibility for detailed design and on-site supervision is given to specialist contractors, therefore, most procurement systems now include some form of contractual link between the client and the key specialist contractors;

(iv) Architects normally have a contractual right to get involved in all aspects of detail design, but this can be difficult when most of the specialist knowledge on certain design aspects resides outside the architects' own firms;

(v) Management has emerged alongside design and construction as a basic and fundamental responsibility within projects; and

(vi) Expert and experienced clients now play a more active role in building projects than in earlier times. Clients now challenge all aspects of the building industry's performance in search for better value, faster construction and higher profits.

According to Kwakye (1997), also, the procurement method adopted will depend on:

- ✓ Complexity and scale of the project
- ✓ Expectation of specific performance requirements
- ✓ Necessity for competition on price and to time
- ✓ Necessity for accountability on the part of those concerned in its administration
- ✓ Pre-commitments and existing relationships

The points discussed above make selection of procurement systems both difficult and very important owing to the number of systems that exist today. Literature indicates that there are various ways of not classifying these, but also of referring to each of them. Mastermann (1996) classifies project procurement systems into several categories based on the relationship and critical interaction between design and construction responsibilities:

1. Separated (Traditional procurement systems)
2. Management oriented procurement systems (thus, construction management, management contracting and design and manage.

3. Integrated procurement systems (thus, design and build procurement systems and variants, package deal and turnkey
4. Discretionary procurement systems (thus, partnering and alliancing)

Procurement paths can also be classified as:

- Design and Build path
- Traditional path
- Management Contract path

The different categories and sub-classification of construction procurement systems are shown in Figure 2.1 below:

For the purposes of this study, the Package Deal, Turnkey, Partnering and Alliancing Procurement Systems will not be discussed due to the fact the Public procurement Act, 2003 (Act 663) do not permit their use.

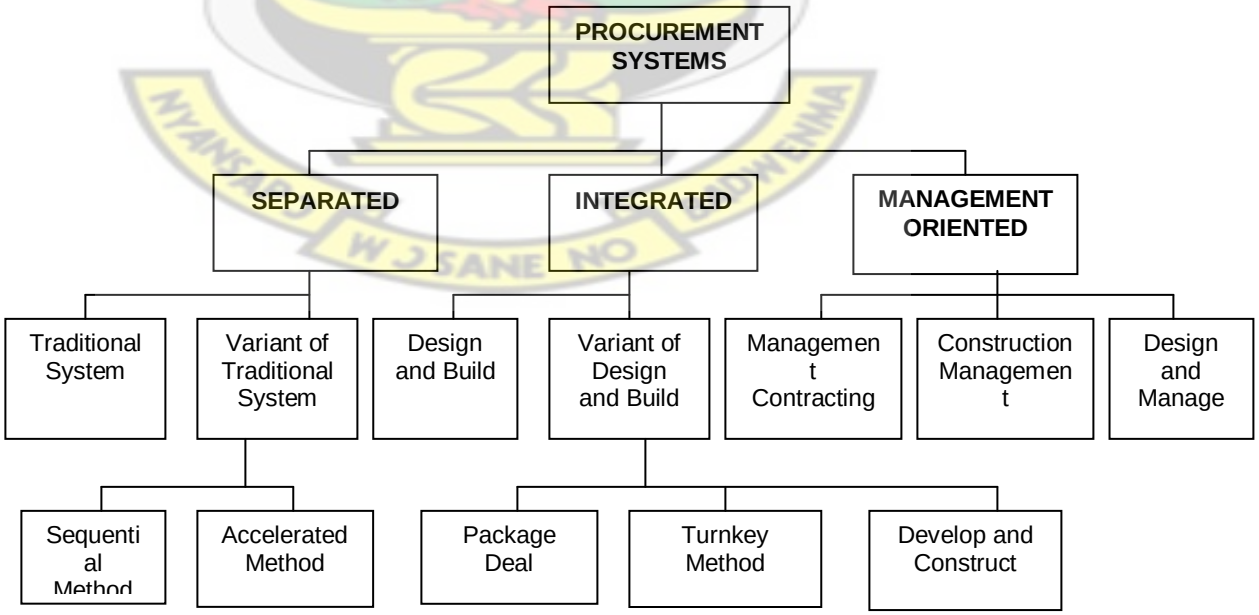


Figure 2.1 Categories of Building Procurement Systems: Source: Mastermann J.W.E. (1996)

Mastermann's diagram above conflicts with earlier definition of the integrated system and hence does not follow the standard definition of the integrated system.

2.3.1Traditional System

According to Kwakye (1997), in terms of timing and responsibility under this system, design is separated from construction and each stage of the production process managed separately. This procurement method may be characterized as a sequential approach: conception, development and implementation phases are each completed and approved before proceeding to the next as shown in Figure 2.2 below.

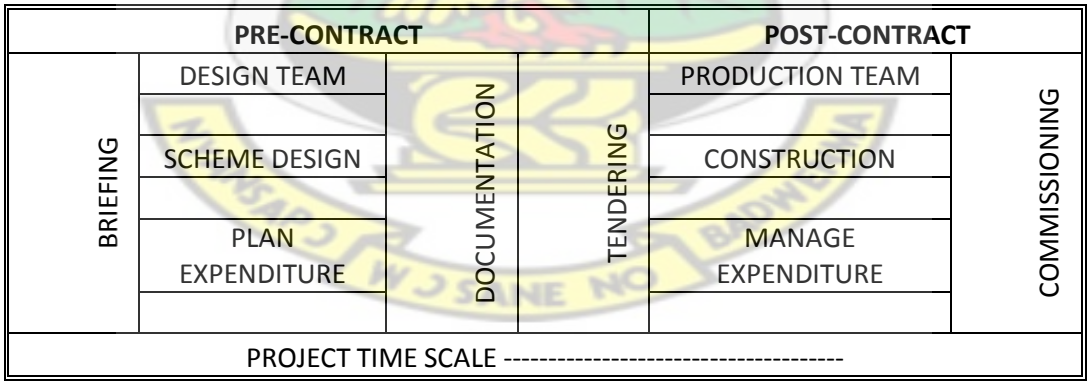


Figure 2.2 Sequential Stages of Production
Source: Kwakye (1997)

The traditional system has been in existence since the emergence of the building, architectural and quantity surveying professions (which surfaced at the

end of the 18th century and beginning of the 19th century). Since then, clients have relied on the architect and/or consulting engineers (depending on the type of construction project planned) to design and supervise construction projects. The client engages a designer to prepare the design of the complete facility, including construction drawings, specifications and contract package. Under the traditional system, the client contracts directly and separately with the designer and contractor(s).

Project delivery proceeds sequentially (i.e. whole design completed before invitation of tenders). In many cases, the lowest evaluated tenderer is selected to execute the construction. The successful tenderer may in turn to use domestic sub-contractors or directly employed operatives. Specialist sub-contractors are also normally nominated by the client to undertake the specialist works. Under the traditional system, the designer functions as the client's agent during construction. This provides the client with the dual safeguards of having an agent guarding him/her against defective work and having an arbiter of disputes between the him/her and contractor which, by their nature, affect the progress of work. The client retains decision making authority for the approval of materials and coordinates the activities of all the project participants.

Since its emergence, this system has generally worked satisfactorily, however, in recent years, large and complex projects have rendered this system ineffective. This could be attributed to various factors but in essence, the expertise of the design orientated professions has proved insufficient to manage; as opposed to merely supervise, the numerous specialized and technically sophisticated specialist contractors during construction. Rowlinson

(1987) states that the traditional system has been criticized for its slowness, due to the sequential nature of the work and the incidence of time and cost overruns attributed, in part, to the lack of input from the main contractor during the design phase. The organizational and contractual relationships involved in the traditional system are illustrated in Figure 2.3 below.

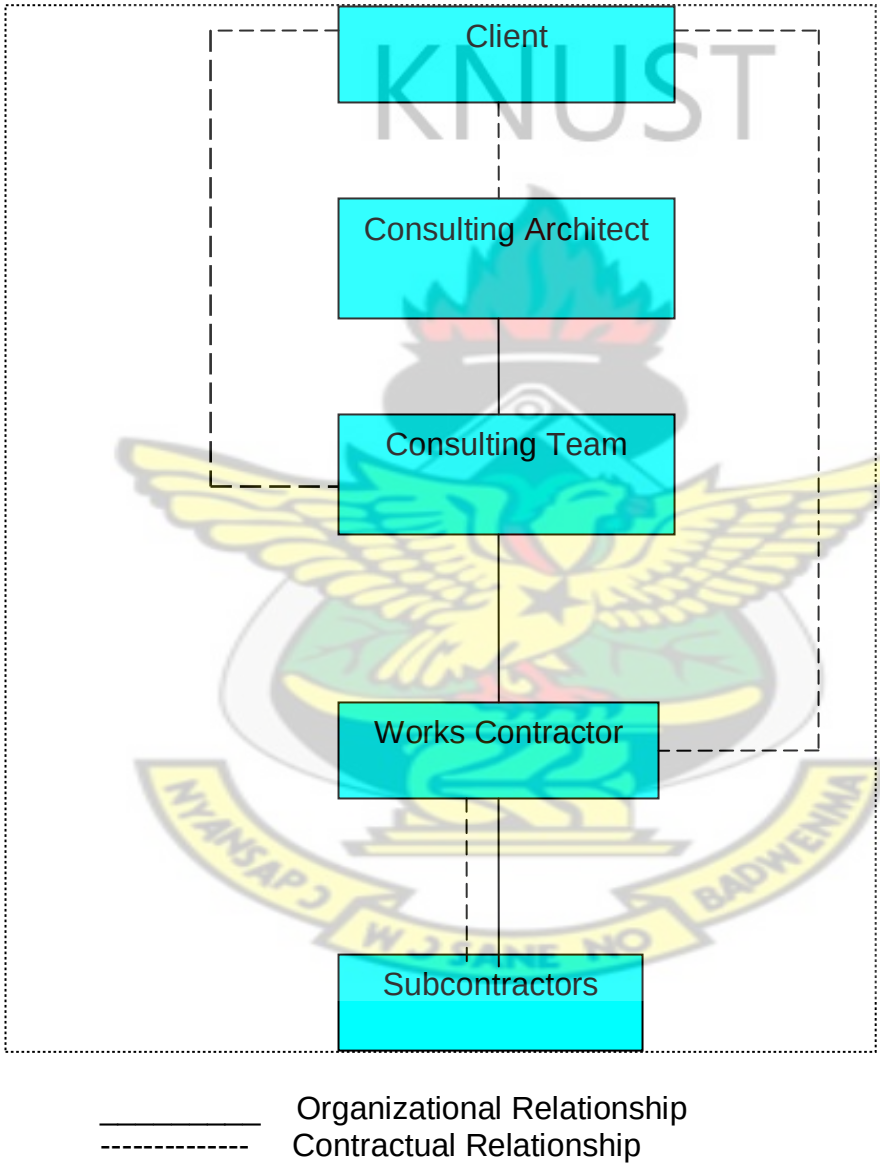


Fig. 2.3 Organizational and Contractual structure of the Traditional system
Source: Kwakye (1997)

Advantages of the traditional system

The advantages of the traditional system include the following:

1. This contracting system offers the advantage of being widely applicable, well understood, and with well-established and clearly defined roles for the parties involved. It is the most common approach for public such as government having to comply with states procurement statutes;
2. It offers the client a significant amount of control over the end product, particularly since the facility's features are fully determined and specified prior to selection of the contractor;
3. The project cost can be estimated, planned and controlled during the design and production phases to keep the cost within the client's budget;
4. The client's approximate financial commitment is known before contract and/or production; and
5. The existence of a bills of quantities enables interim valuations to be assessed easily and variations to be accurately valued by means of pre-determined rates.

Disadvantages of the traditional system

The disadvantages of the traditional system include the following:

1. The process is time-consuming since all design work must be completed prior to solicitation of the construction contract;
2. The designer may have limited ability to assess scheduling and cost ramifications as the design is developed which can lead to a more costly final product;

3. The client generally faces exposure to contractor claims over design and constructability issues since the client accepts liability for design in its contract with the contractor;
4. The traditional approach tends to promote more adversarial relationships rather than cooperation or coordination among the contractor, the designer and the client;
5. The contractor pursues a least-cost approach to completing the project, requiring increased oversight and quality review by the client; and

6. The absence of a contractor's input into the project design may limit the effectiveness and constructability of the design. Important design decisions affecting both the types of materials specified and means of construction may be made without full consideration of a construction perspective

2.3.2Integrated System - Management Oriented Procurement Systems

Kwakye (1997), states that, the integrated system is a generic terms for many systems which seek to overlap design and production of emergence processes. The reason for the adoption of the integrated system re due to the following:

- Dissatisfaction of construction clients
- Complexity of construction projects
- Faster project delivery
- Construction client active involvement
- Recognition of the value builders' advice on building and components selection
- Complexity of project organization

Under this approach, the client appoints the design team for the project as well as a separate entity (consultant or contractor) to focus on the management of the construction process in return for a certain fee. Works or Trade contractors are appointed to undertake construction work and are selected by negotiation or through competitive pricing. The appointment of such an entity is made during the appointment of the rest of the design team; therefore, this management approach allows the contractor to have an input in the design phase without disturbing the principle of divided responsibility. This approach believed to lead to rapid and efficient construction and may reduce price competition but add an extra consultant to the team and so additional fees. This process aims at integrating the design and construction processes of the project and are of two types as follows:

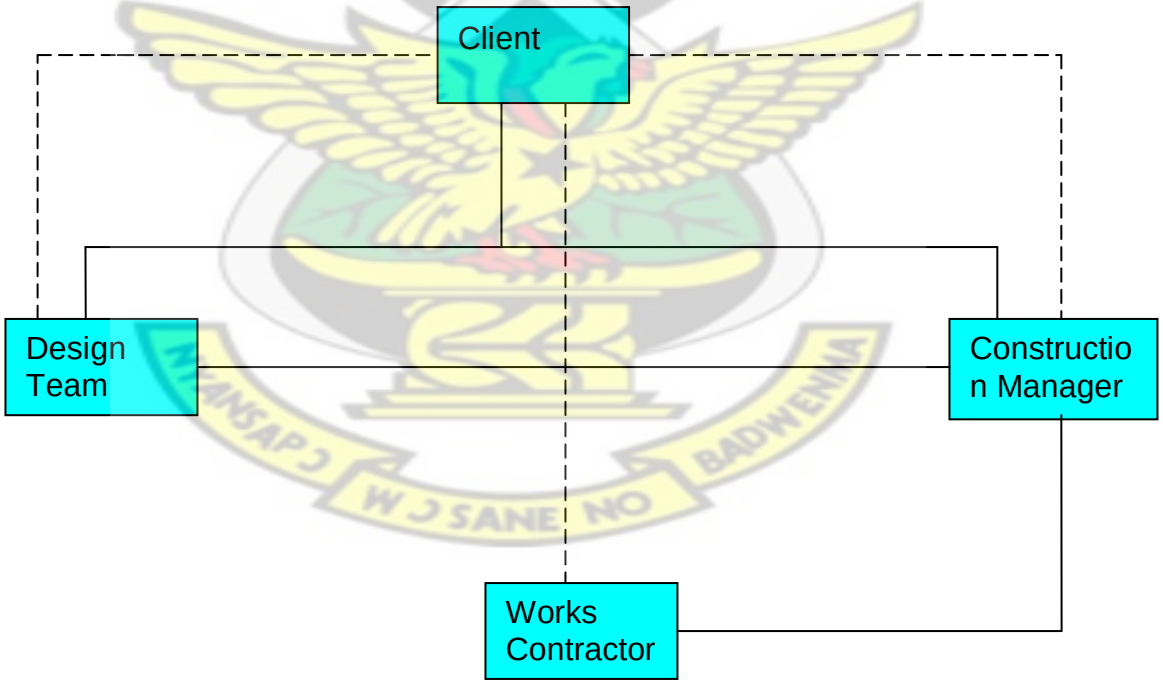
2.3.2.1 Construction Management

Construction Management is one of the management oriented procurement systems for delivering projects on time. The main features of the system are as follows:

- ✓ The construction manager is a consultant who is employed by the client for a purely managerial role and does not accept any liability for non-completion unless resulting from professional negligence.
- ✓ There is direct contractual relationship between the various Works Contractors and the client

- ✓ The design team and Construction Manager possess equal professional status
- ✓ It gives the client a direct responsibility for his/her project and flexibility in procuring the various specialist services
- ✓ The client assumes a greater share of the financial risks due to his/her positive and continuous involvement and by entering into direct contracts with the works contractors.

The organizational and contractual relationships involved in the construction management are illustrated in Figure 2.4 below.



---------- Contractual Relationship———————— Organizational Relationship

Fig. 2.4 Organizational and Contractual structure of the Construction Management System. Source: Kwakye (1997)

Advantages of Construction Management

The advantages of construction management include the following:

a. Overlap of design and construction;
b. Reduced confrontation between the design teams and production teams;
c. There are fewer contract variations;
d. Early involvement of construction management expertise;
e. More even development of documentation;
f. No need for nominated trade contractors;
g. Increased competition for construction works on large projects due to work packaging and splitting of the construction activities;

Disadvantages of Construction Management

The disadvantages of construction management include the following:

a. With the multi-packing of the work, it is not possible to obtain a total price on the project until the last bid package is awarded.
b. The Client is exposed to a high degree of risk as the Construction Manager does not take responsibility for the late completion, faulty workmanship and the like.
c. The client pays more in professional fees.

2.3.2.2 Management Contracting

Management Contracting is a procurement system in which the client appoints and organization or a company termed “management contractor” to manage and co-ordinate the design and production phases of the project. This Management

Contractor joins the design team at the pre-construction stage to ensure buildability of the project. Thus the principal characteristic of this system is that, the client employs a designer and a management contractor at the early stage of the project with the Designer undertaking the design of the project with input from the management contractor. An organizational chart representing their functional and contractual relationships is highlighted in Figure 2.5. The project is divided into work packages, which are sub-let to Works or Trade Contractors who enters into a contract with the management contractor. Thus the management contractor undertakes planning, organization and management of the construction operations as well as providing design inputs in co-operation with the client's other design consultants. Generally, he/she is responsible for the smooth running of the project within time, cost and quality parameters. The management contractor is paid for the provision of common use and service facilities in addition to an agreed fee based on a percentage of the estimated construction cost for his/her management input. The management contractor merely provides on-site supervision and management but does not physically undertake any work on site. The difference between this system and other construction procurement systems is that, the Contractor takes some contractual, time and price risks.

Advantages Management Contracting

The advantages of management contracting include the following:

a. Early contractor involvement in design may lead to better design and detailing which facilitates productivity and savings on production cost;

b. Design and construction are overlapped as well as overlapping of the various work packages. This saves overall project delivery;
c. Risk of potential contractual claims is minimized as the management contractor identifies contentious project information and recommends its modification prior to contract; and
d. The 'them and us' attitude is eradicated as the management contractor becomes part of the project team working together to achieve the client's project objectives.

Disadvantages of Management Contracting

The disadvantages of management contracting include the following:

a. Client's financial commitment is not known before commencement of production on site.
b. Problems of co-ordination between increased numbers of works contractors can lead to delays and be grounds for contractual claims;
c. Biased contract documentation may be drawn up which unfairly allocates responsibilities and risks to works contractors who may not be well equipped to perform;
d. Duplication of site services attendance is more likely to happen.

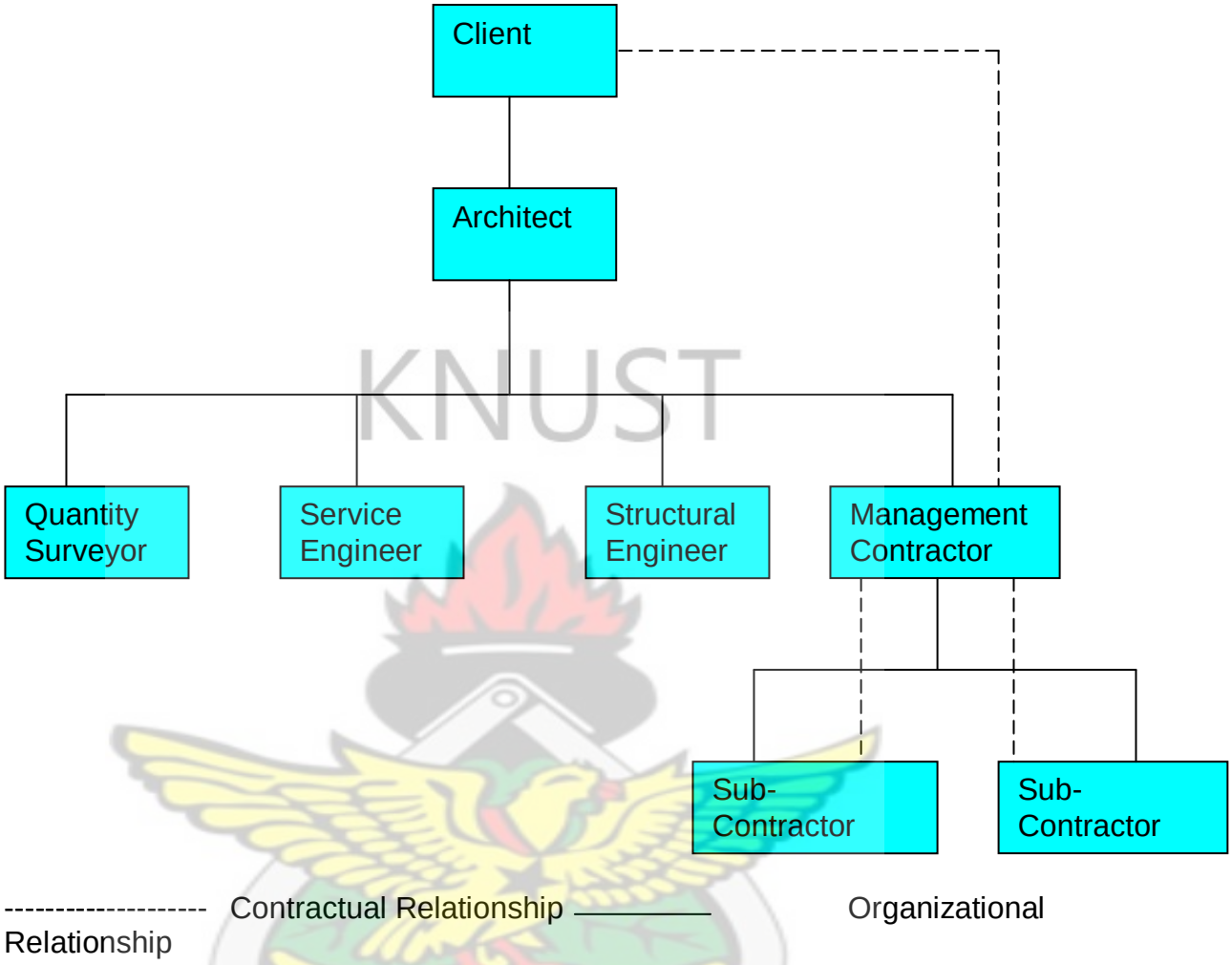


Fig. 2.5 Organizational and Contractual structure of the Management Contracting System
Source: Kwakye (1997)

2.3.2.3 Integrated Systems - Design and Build

This method of procurement allows one construction organization the opportunity to take full responsibility and carry sole liability for both design and construction of a building. In effect, apart from the client's role of design and build essentially combines all the fundamental tasks in project design,

production and management functions. Therefore, after the client has identified his/her need for a building, he/she states his/her requirement adequately in terms of physical design needs as well as intended physical use. A selected number of contractors are then invited to submit their proposals together with estimated cost. The system invokes design competition which is absent from the traditional systems of procurement and permits the optimization of design and production costs. This method is suitable for standard buildings, industrialized systems such as factories and warehouses, office buildings, residential buildings, educational buildings, hotels. On large complex or specialist projects, design and build companies may decide to appoint a designer from a consultancy firm. In such a case, the designer's responsibility is to the design and build company and not directly to the client. See figure 2.6 below.

There is also the need for the client to appoint agencies to work after his/her interest. These agents (Architect, Quantity Surveyor, Structural Engineer, Services Engineer, Clerk of Works) will evaluate contractors submissions, inspect works in progress, check contractor's claims, value and agree the cost of variations and final accounts.

Advantages of Design and Build

According to Kwakye (1997), the advantages and disadvantages of design and build include the following:

Advantages

a. The method allows for a simplified contractual arrangement between client and contractor with a single-point responsibility and improved communication channels between parties to the contract.

b. The integrated design and construction allows for design and management input from the contractor and this leads to production efficiency in terms of cost and time

c. Project duration is shortened due to contractor's familiarity with his/her system and parallel working on design and construction;

d. The closer contractor/client relationship leads to more efficient design;

e. Client obtains competition in design as well as in price.

f. Client obtains a design cost element lower than that which an independent designer would charge under other methods

g. Client's total financial commitment is known at an early stage and provided the client does not introduce major alterations, this will not change.

h. Construction projects using the system have the potential for early completion and lower overall costs.

i. Innovation in construction production is encouraged under this procurement system as the building contractor, being in charge of design, can reap the benefit of innovative products and processes.

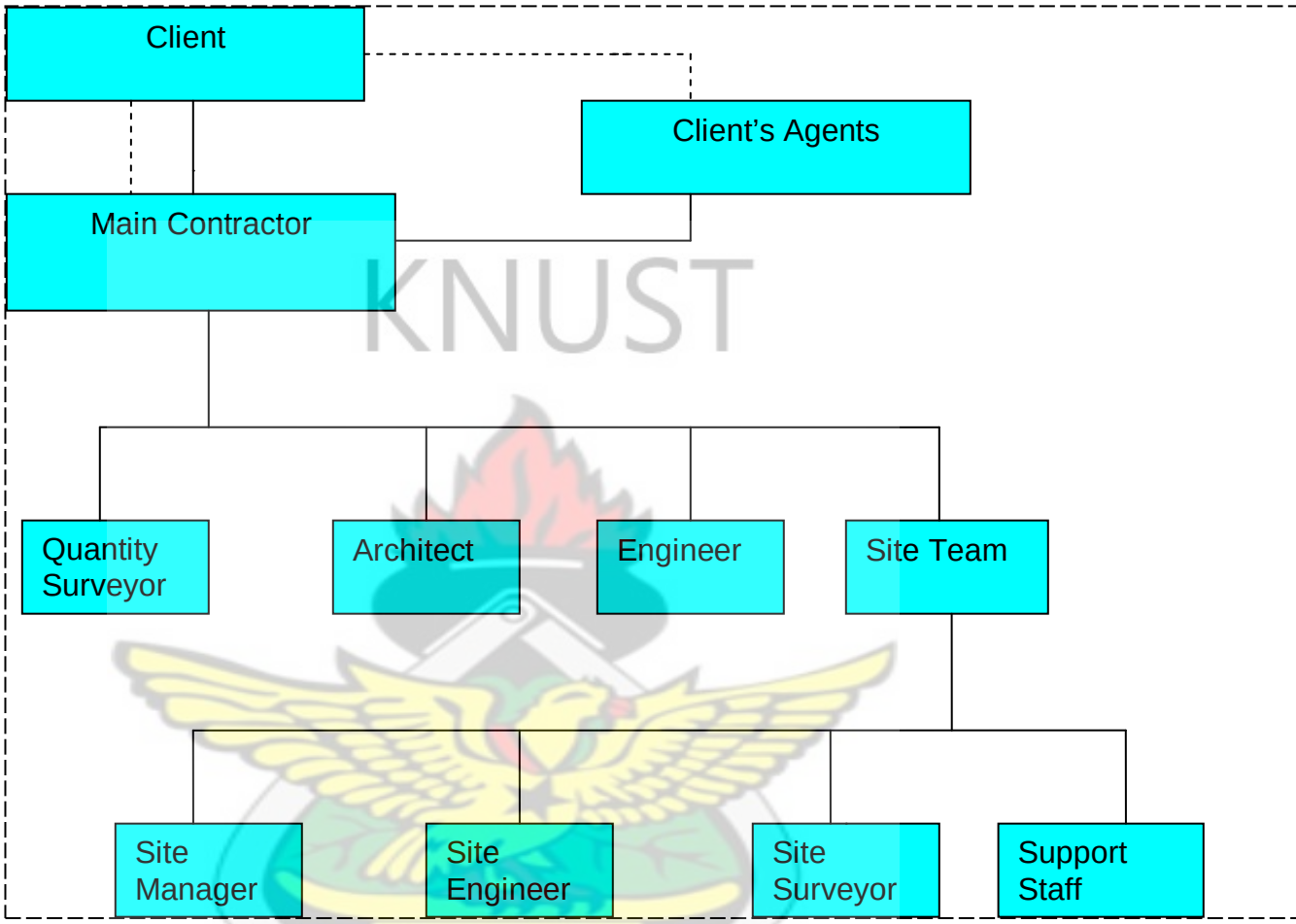
j. Late supply of information under this procurement system becomes a matter between the contractor and his/her building team

Disadvantages

The disadvantages of design and build include:

a. Tendering costs are high as contractor must design and produce accurate proposals as well as estimates
b. The contractor's in-house expertise may be insufficient to solve the client's construction project needs efficiently.
c. An inexperienced client still requires the expertise of professional advisers to prepare the briefing document, tender information and to evaluate quality and cost of design.
d. The Architect's professional indemnity insurance cover is assumed by all who have a design input in the proposed construction project and this can be a huge burden on the small sub-contractor who is a party to the design.
e. The building contractor requires an adequate insurance to cover design failures as he or she assumes the role of design as well as construction.
f. Responsibility for defective design can be complicated by liability dates and time limitations.
g. The client will find it difficult and/or costly to introduce variations once production has commenced on site.
h. Tender comparison becomes complex as it involves evaluation of design, quality of specification and construction cost.
i. The Client may become stranded with a construction product which is unsuitable for his/her needs.

Figure 2.9 below indicates the contractual and organizational relationships between the client and the other parties involved in a design and build system



---------- Contractual Relationship ———— Organizational Relationship

Fig. 2.6 Organizational and Contractual structure of the Design and Build system
Source: Kwakye (1997)

2.4 BUILDING PROCUREMENT SELECTION TO ATTAIN CLIENT OBJECTIVE AND PROJECT SUCCESS

The building procurement systems discussed above are all suitable for different types of projects in different types of scenarios. According to Holtzhausen (1998:67), citing Franks (1984), no single building procurement system can be applied universally on all construction projects. As a guideline, a table indicating the suitability of various building procurement systems to different types of scenarios is depicted in Table 2.1 below (1 indicates low performance and 5 indicates high performance):

Table 2.1: Rating of various procurement models

Clients' Performance Requirements or Expectations	Separated	Integrated	Management oriented/ Discretionary
Technical complexity	4	4	5
High aesthetic or prestige requirements	5	3	3
Economy / minimum cost	3	4	4
Exceptional size and/or administrative complexity	2	5	4
Time is of essence	2	4	4
Price certainty required as soon as possible	4	4	2
Facility for variation control by the client during progress	5	1	5

(Adapted from Holtzhausen, 1998)

Holtzhausen (1998) stated that there is no "best buy" among procurement systems. According to Siyabonga (2003), three golden rules of thumb can be applied to the selection of procurement models:

i) The traditional system and its variants will enable a project to be implemented efficiently, provided that complete project documentation is based upon tried and trusted construction methods is available at tender;

ii) Where design documentation is not sufficiently complete to allow the project to be effected in accordance with the client's timing requirements, it will be necessary to implement the works by non-conventional procurement systems;

iii) Non-conventional methods of procurement produce better performances, in terms of speed, in both the design and construction phases of projects.

The application of the above rules of thumb would, however, have to be applied with caution in the Ghanaian context. This is due to the country's unique client needs that also need to be taken into account when procurement systems are selected.

2.5 PROJECT SUCCESS

According to a research conducted by Saqib et al (2008), success criteria or a person's definition of success as it relates to a building often changes from project to project depending on participants, scope of services, project size, sophistication of the client related to the design of facilities, technological implications and a variety of other factors. On the other hand, common trends relating to success criteria often develop not only with an individual project but across the industry as we relate success to the perceptions and expectations of

the client, designer or contractor. Differences in a person's definition of success are often very evident.

In any business, it is of paramount importance that the client or customer is kept satisfied with the product and / or services that the client or customer receives from the manufacturer, seller or service provider. The construction industry does not differ in terms of this requirement. As outlined earlier in Chapter 1 that on typical Ghanaian projects, especially public sector projects, project objectives may be defined in terms of time, cost and quality. It follows, therefore, that in order to establish project success or failure, project constraints, meeting or exceeding project expectations, as determined by the customer or client, should indicate project success and vice versa. Literature indicates that project success or failure may result from many sources. Siyabonga (2003) citing Nahapiet and Nahapiet (1985) attributed the reasons of project failure to the following: inaccurate briefing by the client; unrealistic project objectives; incorrect project team selection; excessive client involvement; difficult project characteristics, etc. Siyabonga (2003) again citing Nahapiet and Nahapiet (1985) found that one of the major contributions to good performance (faster and lower cost) were contractual arrangements. On construction management projects, for example, contracts were seen to provide clients with regular and detailed information on the cost implications of decisions, sometimes through value engineering, and to create the flexibility to implement changes without delay or difficulty.

However, Bennet and Grice (1992) also stressed that the type of procurement system, establishment of the client's objectives and deciding on the nature of the product are the three most important aspects for attaining projects success. Logical synthesis of the foregoing discussions indicates that contractual arrangements and type of procurement systems have a major impact on the success or failure of a construction project. Again, Latham (1994) stated that, after the client is satisfied with the brief and the feasibility of the project, a typical client's instinctive reaction is to get into a "ring up an architect or engineer syndrome". He argues that this is too big a step to take as it closes off other potential procurement options (i.e. construction procurement systems). He argues that the next step should be the use of, inter alia, risk assessment to devise a contract strategy. This implies that there should be no automatic allocation of a specific construction procurement system. This argument is echoed by Bennet and Grice (1992) when they stated that each project needs to be evaluated to determine the type of construction procurement system to use prior to finally selecting the leader of the project, as well as the rest of the professional or design team to be utilized on the project.

Procurement is a word recently encountered in the context of construction work and, therefore has a different meaning to many people Kwakye (1997). In his paper on Construction Procurement Method, he intimates that the term Procurement is considered to include the total process of procuring construction project from the client's initial idea through to his/her occupation of the completed facility. As noted in section 1.0 of this report, the definition of project

success goes beyond the traditional meaning of meeting time, budget and conformance to requirements. Over the years, this intriguing question has been studied by a number of researchers. For example, according to Pinto and Slevin (1988) concluded from their research work that “Project Success is a complex, but nonetheless it is of crucial importance to effective project implementation” and “Project Success is suggested to have two major components: issues dealing with the project itself and issues dealing with the client.” In addition, they stressed the necessity of developing an adequate program in terms of knowing when to determine project success.

Burnett and Youker (1980), in analyzing the project environment identified a process called “stakeholder mapping.” That is, mapping out which people or groups have a stake in the project’s success or failure. These people ranged from the project owners and sponsors to those who might be marginally (yet critically) affected by the project.

If a project is to be perceived as successful, then its stakeholders must be satisfied with its end result. Since this encompasses a wide range of people, they may not all be equally satisfied but at least they should be satisfied in some degree (i.e. the majority should be satisfied). For most projects, this is a major consideration. It is typically the driving force behind a strenuous public relations effort and an imaginative public launch and promotion of the facility or product upon its completion.

2.6 REFLECTIONS ON PROJECT SUCCESS

Projects usually involve attention to a variety of human, budgetary and technical variables. Although many definitions exist, most researchers agree that projects generally possess the following characteristics: Limited budget, schedule, quality standards, a series of complex and interrelated activities (generally project-based or matrix structure). With respect to project success, historically, projects have been managed as technical systems instead of behavioural systems. That is, there has been a tendency to use a mechanistic approach focused on result with the main objective of attaining target dates, achieving financial plans and controlling the quality of the final product. In regard to critical success factors, numerous lists and models have been proposed by other researchers. For instance, one literature suggested that the following four dimensions should be considered when determining project success: project efficiency, impact on the customer, direct and business success, and preparing for the future.

To date, the most important empirical studies on the critical factors in project success have been conducted by Pinto (1987) and Sleven (1988) who developed a project model and identified ten (10) critical success factors. Their principal research question was: “Are project implementation critical success factors of equal and stable importance over the life of a project, or does their relative importance (weighting) change as the project moves through different stages of completion”

Literature synthesis revealed that different factors were significantly related to project success in the four different stages. For instance, in the conceptual stage, project mission and client consultation were the two variables significantly linked to project success while in the termination stage, technical tasks, project mission, and client consultation explained 60% of the variance in project success. Surprisingly, the personnel factor "was the only factor not found to be significantly predictive of project success in a least one of the life cycle stages". Walid and Oya (1996) argue that there are many factors that are outside the control of management which could determine the success or failure of a project. They allege that earlier study on project success factors assumed that if a project's completion time exceeded it's due date, or expenses overran the budget, or outcomes did not satisfy a company's predetermined performance criteria, the project was assumed to be a failure.

Today, we know that determining whether a project is a success or failure is far more complex. Delays in project completion times are common and because of these delays, project managers sometimes pay penalties which increase overall project costs. Yet, these projects are still considered to be successful. On the other hand, a project perceived as a success by a project manager and team members might be perceived as a failure by the client. Apparently, there can ambiguity in determining whether a project is a success or a failure. There are two main reasons for this ambiguity. First, as mentioned by Pinto and Slevin (1998), it is still not clear how to measure project success because the parties who are involved in projects perceive projects success of failure differently. A

project which is considered to be a success by the client might considered as a failure by top management, if the project outcome does not meet top management specifications, even though it might satisfy the client. In this case both parties are evaluating project success differently. The second reason is that the lists of success factors vary in various studies in literature. In addition, addition, Chua et al. (1999) identify cost, quality and time as 'major goals' construction projects and state that there are factors which lead to project success in terms of those objectives. They produce a hierarchical model for construction project success (figure 2.7) which clarifies inter-positions of performance indicators against success factors. Budget, schedule, and quality performance in this model represent ingredients of the main goal of construction projected to be finished successfully.

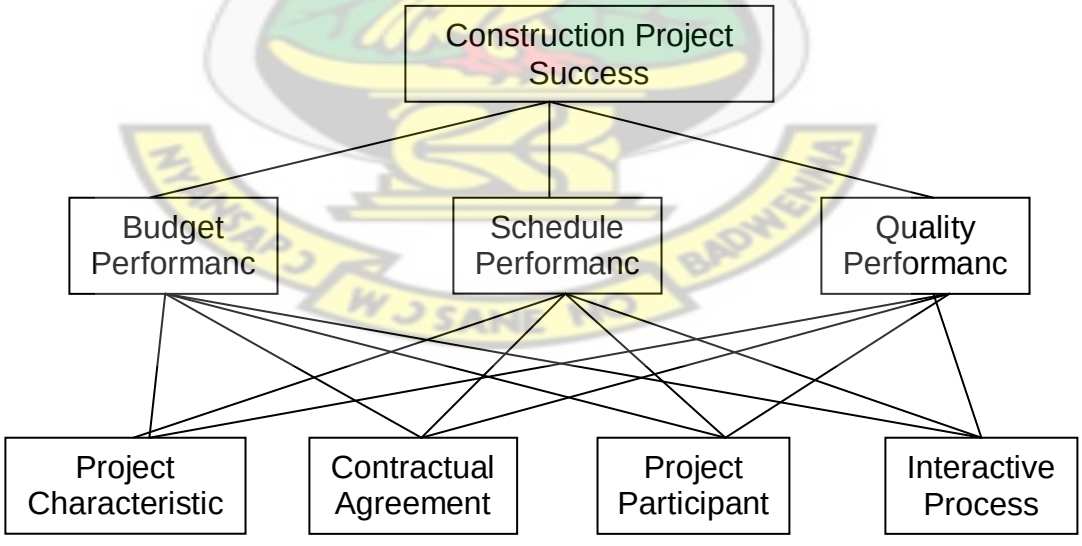


Figure 2.7 – Hierarchical Model of Construction Project Success

Source: Chua et al. (1999)

2.7 PROJECT SUCCESS PARAMETERS

There is a general trend in project management literature toward greater client focus and client satisfaction. It is also believed that there is too much emphasis on the traditional measures of project success (i.e. the triad of time, budget and specification, see figure 2.8). Rigorously sticking to these yardsticks can in certain circumstances actively detract from project success.

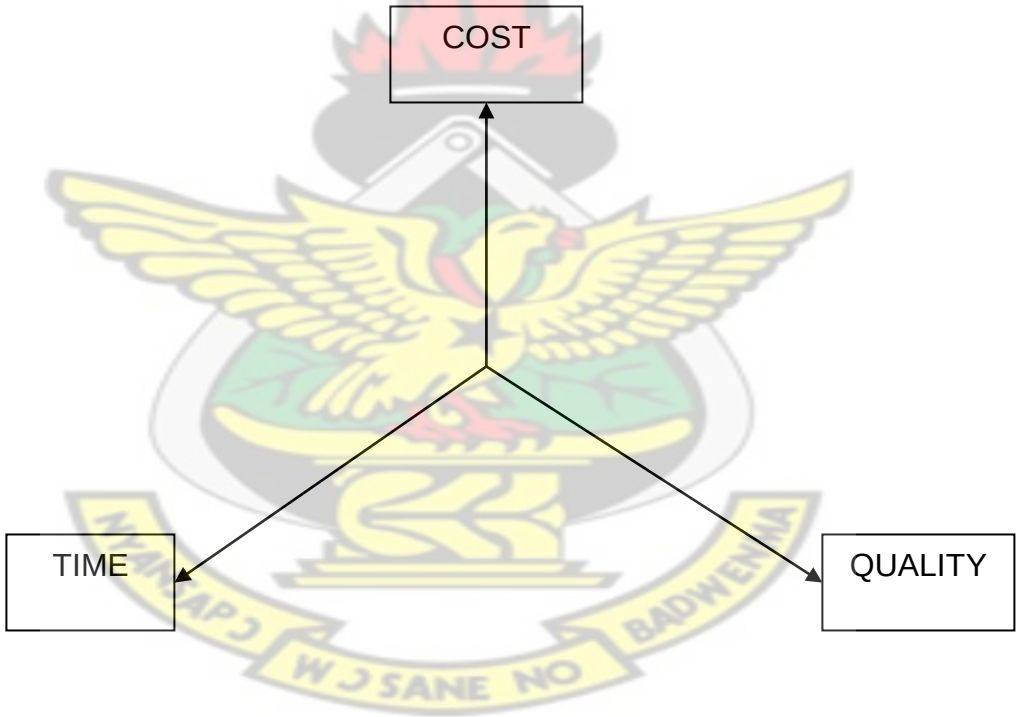


Figure 2.8 – The Triangle of Project Objectives (adapted from Barnes and Wearne, 1993)

The ability to identify key attributes of project success is important to clients, consultants and contractors alike. Understanding the attributes of success

contributes to the efficient execution of the construction projects, however, the challenge in determining project success is the lack of a standardised approach. Construction professionals have recognised that on some projects, safety performance can be the primary determinant of success, regardless of the outcome of the other classical metrics. This is especially true of public sector construction projects. While cost, schedule, performance and safety provide objective metrics that are fairly quantifiable, there are other aspects of a project, including the level of quality achieved, that may be subjective. Additionally, when subjectivity is involved, the "eye of the beholder" becomes a major factor in evaluating how well a project performed and how successful it was perceived.

Traditionally, a successful project was seen as one in which the triad of time, budget and specification was achieved at a profit. Current project literature places more emphasis on customer satisfaction as a fourth important success parameter. There is a general trend in project management literature toward greater customer focus and customer satisfaction. It is also believed that there is too much emphasis on the traditional measures of project success (i.e., the triad of time, budget and specification). Rigorously sticking to these yardsticks can in certain circumstances actively detract from project success. Verzuh (1999) defines a successful project as one in which the project objectives were reached on time, on budget, and with a product of high quality. Quality in turn would be measured by functionality and performance. At the same time, he stressed that a successful project must meet stakeholders' expectations (See Figure 2.9 below).

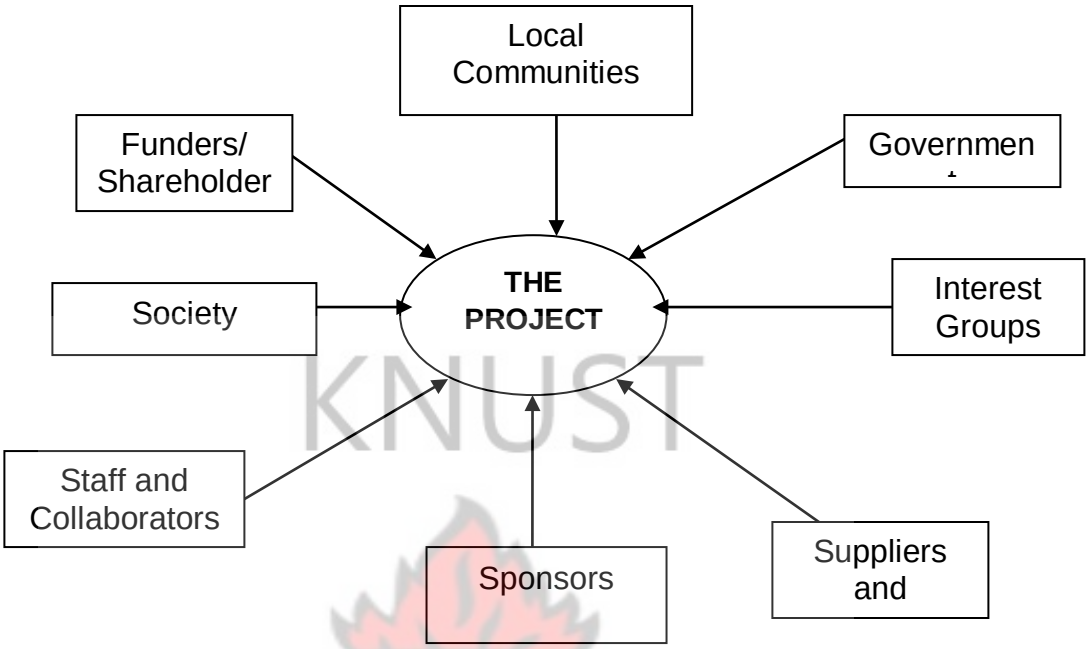


Figure 2.9 –Primary and Secondary Stakeholder Map (adapted from Smith N.J., 2002)
Engineering Project Management, Second Edition, Blackwell Science, (2002)

Verzuh (1999) listed the five project success factors as follows: agreement among the project team, the customer and management on project goals, a project plan that shows the overall path and clear responsibilities, constant and effective communication, controlled project scope and management support. Meredith and Mantel (2000) also recognized the same three traditional factors for project success, but they state that the triple constraints of time, budget, and specification are rapidly being replaced by a new model that invokes a fourth hurdle for project success: (i.e. client satisfaction). Baccarini (2005) distinguishes between the components of project success as being the following:

- Project management success; and
- Product success.

Project management success focuses on the project process and the successful accomplishment of cost, time, and quality objectives. Product success in turn focuses on the effect of the project's final product. It was noted that project managers largely interpreted successful projects as meeting the project management criteria such as budget and schedule, whereas customers interpret successful projects as those meeting product success criteria such as response time and reliability. Project managers therefore tend to focus more on short-term criteria relating to the project process, but customers focus more on the longer-term criteria relating to the project's product. If the project manager has the client's interest at heart, he/she must place traditional project success indicators lower on the importance scale than the customer's overall interest. However, the project must also appear successful from the customer's point of view.

Belout (1998) stated that a synonym for success is effectiveness, (i.e. the degree of achievement of objectives). The client typically employs the project manager as a tool to improve or optimize his or her own profitability. That is the client's overriding objective and to be successful, the project manager should be effective in helping the customer achieve his or her objectives. The PMBOK Guide, by PMI, confirms that all projects should be supportive of the performing organisation's strategic goals. It is, therefore, imperative for project managers to

understand the business environment and view their project as part of the client company's struggle for competitive advantage, revenue and profit.

To complicate matters further, Shenhar et al. (1995) suggested that the relative importance of project success dimensions change with time. As in a relationship different periods being different expectations. In the early stages, internal dimensions (i.e. meeting schedule, budget, and specifications) are most important. Later in the project cycle, external dimensions (i.e. customer needs and satisfaction) become more important. To the project manager, this has a special significance as it is in the later stages of the project that the customer decides on an increase in the scope of work. Shenhar, et al. (1995) dealt specifically with those projects that are perceived as successful by persons involved in their implementation, yet are poorly received by their customer. They draw attention to the importance of viewpoints in defining project success and report that success can only be meaningful if considered from the following two vantage points:

- The degree to which the project's technical performance objective was attained on time and within budget; and
- The contribution that the project made to the strategic mission of the promoter.

Shenhar, et al. (1997) further expanded the definition of project success further by including the level of satisfaction of the following four stakeholders: the customer organization, the developing organisation, the project team and the end-user. This viewpoint turns all of the project stakeholders into customers that must be satisfied.

Success has always been the ultimate goal of every activity and a construction project is no exception. Due to the varied definitions of project success and the different perceptions of participants towards this concept, it is be difficult to tell whether or not a project is successful as there is a lack of consensus. In the past, time, cost and quality have been the criteria used to evaluate the performance of a construction project. However, such a list has been criticized as not being conclusive.

2.8 SUCCESS FACTORS AND SUCCESS DIMENSIONS

The concept of success in projects has been widely discussed in management literature and has been central to the literature on Project Management. Success can indeed be evaluated only when the evaluation dimensions are adequately defined. For the project manager, evaluation dimensions generally correspond to the traditional constraints of time, cost and the client's terms of reference or "quality". Here one can identify the influence of the industrial and engineering sectors; sectors upon which project management has established itself in the past centuries. In these professions, success is judged primarily through the assessment of the technical quality of outputs and through the evaluation of the management performance whose dimensions are objective,

perfectly defined and well-accepted. The classical project manager does not view his or her project beyond the scope of his or her professional duties and responsibilities.

The client's agenda is significantly different be it private or public. The client cannot evaluate the success of its project without referring to the objective that shaped the conception, the formulation and the project design. The raison d'etre of a project lies in the satisfaction of one or more objectives. The client's perspective is therefore, more of a global one. It is important to judge the project's success not only by auditing the way in which the project team manages the inputs and delivers the outputs or "project management success", but also by evaluating the project's contribution to the initial objectives or "project success" as stated in the logical framework. Beyond time, cost and quality, it is pertinent to consider another evaluation dimension which we will refer to hereafter as the "project impacts" since that is the accepted terminology used in the development community.

One dimension is preferred over another, depending upon whether the evaluation is performed by a project manager, a client or one of the key stakeholders. Each stakeholder perceives the success according to dimensions, and a hierarchy or dimensions that comply with his or her own agenda. There is no "absolute" success or consistency in overall success appreciation over time; there is only "perceived success".

One may be tempted to prioritise dimensions of management when one performs an evaluation. On the other hand, one will naturally pay more attention to the economic, political or social impacts, when the evaluation is conducted at the end of the project. This is more evident when the project evaluation is performed with a historical perspective. Even when everybody agrees with a list of criteria, measurement of project success remains a rather difficult task. Schedule and budget management may be assessed through direct measures and quality management through pass or fail criteria or some kind of characteristics testing. Therefore, any stakeholder may draw valid conclusions on project management performance. However, client's satisfaction is not objectively measurable and it is the same, (i.e. from the experience gained from the project, or the magnitude of organisational impacts or any other benefits induced). In spite of the differing points of view, a review of the literature makes it possible to outline a set of evaluation dimensions which appear regularly although not with the same occurrence:

- Respect of the three traditional constraints,
- Satisfaction of the client;
- Satisfaction of the objectives as outlined in the logical framework;
- Project impacts;
- Institutional or organisational capacity built in the organisation by the project;
- Financial returns (in the case of productive project) or the economic or social benefits (in the case of public sector projects); and

- Project innovative features (outputs, management or design).

2.9 CRITERIA FOR MEASURING PROJECT SUCCESS

The measurement of project success in the construction industry has traditionally been grounded in the industry-accepted classic objective success metrics, mainly cost, schedule, performance and safety. Initial research has indicated that there are more subjective considerations that can have important impact on perceptions of project success. During the research, the authors recognized the need for a measurement tool that would account for subjective as well as objective metrics in assessing project success. The tool would have to provide the flexibility necessary to account for the fact that every project is different. The resulting Construction Project Success Survey (CPSS) instrument is designed to investigate how experienced construction project management personnel perceive project success, both objectively and subjectively. The engineering manager can use this tool to identify important success metrics before the start of a project and to evaluate the level of success achieved at project completion. The ability to identify key attributes of project success is important to clients, consultants and contractors.

According to Chua, et al. (1999), understanding the attributes of success contributes to the efficient execution of the construction project. Dvir and Dyer (1992) argued that the challenge in determining project success is the lack of a standardized approach. On the other hand, Kerzner (2003) stressed that traditionally, the industry-accepted classic objective success metrics for

construction projects have been cost, schedule, performance and safety. While cost, schedule, performance and safety data provide objective metrics that are fairly easily quantifiable, there are other aspects of a project, including the level of quality achieved that may be subjective. Additionally, when subjectivity is involved, the 'eye of the beholder' becomes a major factor in evaluating how well a project performed and how successful it was perceived. According to Saqib et al. (2008), success criteria or a person's definition of success as it relates to a building often changes from project to project depending on participants, scope of services, project size, sophistication of the owner related to the design of facilities, technological implications and a variety of other factors. Saqib et al. (2008) further proposes an un-prioritized summary of success criteria for building clients, designer and contractors are as follows: owner's criteria for measuring success: designer's criteria for measuring success and contractor's criteria for measuring success.

2.9.1Client's criteria for measuring success

This school of thought assumes that a successful project is the one which is completed on schedule, within budget, meets functional requirements and minimise aggravation in producing a building.

2.9.2Designer's criteria for measuring success

The designer's criteria of project success include: satisfied client, quality architectural product, met design fee and profit goal; professional staff fulfilment, met project budget and schedule; marketable product/process, minimal construction problems, socially accepted and well defined scope of work

2.6.1Contractor's criteria for measuring success

From the contractor's standpoint, a successful project is the one that meets schedule (preconstruction, construction, design); profit; under budget (savings obtained for owner and/or contractor); quality specification met or exceeded; no claims (owners, subcontractors); safety, client satisfaction (personal relationship); good subcontractor buy out, good direct communication (expectations of all parties clearly defined); and minimal or no surprises during the project.

2.10 SUMMARY

The chapter discussed the procurement process, procurement systems with respect to construction. It further provided discussed project success and project success factors. Terminologies such as success parameters, success factors and success dimensions were given expanded introduction. The criteria for measuring project success were also discussed. The chapter also emphasized on works procurement types and procurement selection criteria. The chapter highlighted that client objectives may mainly be classified in terms of time, cost and quality performance. Procurement is a term used to describe the total process of meeting the client's need for a building, starting at the point where this need is first expressed till where this need is fully met to the satisfaction of the client.

CHAPTER THREE

RESEARCH METHODOLOGY, ANALYSIS AND RESEARCH STRATEGY

3.1 INTRODUCTION

The last two Chapters were devoted to defining the research objectives and review of earlier works. This chapter discusses the research methodology, research approach, data collection approach, sample frame and data analysis techniques adopted for the study.

3.2 RESEARCH APPROACH

This research took the form of literature review and survey using questionnaire approach and interviews from major stakeholders in the Ghanaian construction industry. Owusu (2008) quoting Thurairajah, et al 2006 stated that research approach and strategy are about organizing research activity embodying data collection in ways that are most likely to achieve the research aims. Making decisions about research approach, strategy and design is fundamental to both

the philosophy underpinning the research and the contributions that the research is likely to make (Thurairajah, et al 2006; Harty and Leiringer, 2007; Dainty, 2007b). These in turn influence the actual research methods that are used to investigate the problem and collect, analyze and interpret data. Accordingly, Thurairajah et al (2006) reported that a continuum of methods that underlie philosophical position of research is largely manifested as experiment, survey, interviews, case study and action research.

3.3 DATA COLLECTION AND SURVEY DESCRIPTION

As mentioned earlier, this aspect of the research methods addresses data collection instruments, methods, and procedures. It provides detailed explanations of each method employed and how the methods adopted were used to address the aims, objectives and research questions.

3.3.1Questionnaires Development

Questionnaires were used as data collective tools in this research due to the number of respondents involved. Therefore, the questionnaires were designed to address the study concerns. It was important to first establish the information to be gathered so that relevant questions are solicited (Nachimias and Nachimias, 1996). Once the survey questionnaires were drafted, they were pre-tested by trying it out on a small number of respondents having characteristics similar to those of the target group of respondents. This helped to re-design the questionnaires, making it more consistent focusing it on strategic issues.

3.3.2 Content of Questionnaires

Having identified the respondents for the questionnaires and their characteristics, the next step was focused on the design of the actual questions that were asked to solicit the requisite information for the study. The way in which survey questions were presented would affect the quality of the responses and therefore it was important to ensure that the right questions were asked, well understood and asked in the right way (Wahab, 1996). The questionnaires consisted of twenty-seven questions mainly; closed-ended and scaled-response type and the questions are type-setted on standard A4 sheets with front and back cover pages. The questionnaire consisted of close ended questions. For the purpose of the study, the questions were grouped under three categories. The first series of questions related to the respondent's profile: this was intended to find out the background and experience of respondents. The second group of questions sought to find out the relationship between client objectives, project success and building procurement systems. The third section, sought to the linkage between construction procurement systems and project success. In designing the questionnaires, the researcher utilized some of the questions in the works previously reviewed, more especially by Obeng-Ayirebi (2002) and Songer et al (1997).

Table 3.2 below demonstrates a summary of the questions, the rationale for asking the questions and the type of analysis that was performed on the data collected. The full detail of the questionnaire is attached as an appendix to this document. (See Appendix 1).

3.4 DEVELOPING THE SAMPLE SIZE

Israel (1992) reported that there are several approaches used in determining the sample size. These, include using a census for small populations, imitating a sample size of similar studies, using published tables, and lastly applying formulas (e.g. Kish formula) to calculate a sample size. It was therefore imperative for the researcher to clearly define the target population and sampling size. The population was defined keeping in mind the objectives of the study. The study adopted census approach as suggested by Israel (1992). The main reason for adopting census approach was partly motivated by the relatively small number of the targeted respondent construction firms in Ghana. However, Israel (1992) reported that the use of census approach requires no statistical calculation to determine the sample size

3.4.1Characteristics of Sample Size

Levy and Lemeshow (1991) reported that a suitable sample size from the population being sampled should have the following characteristics:

- The size should contain a list of members of the defined population
- The size should be a complete, up-to-date list of the population
- Devoid of multiple listing of members of the population, this suggests that no population member should be listed more than once.
- The list should contain information about each individual that could be used for stratifying the sample.

3.4.2Criteria for Selection of Respondent Firms

The population samples for the research were:

(i) All D1 and K1 building and civil engineering contractors. However, due to the apparent lack of updated list of construction firms by Ministry of Water Resources Works and Housing at the time of the survey, the researcher had to rely on the registered membership and paid-up lists of the Association of Building and Civil Engineering Contractors of Ghana (ABCCG). The ABCCG is the umbrella organization for both building and road construction firms in Ghana, which is responsible for their day-to-day operations. The list consisted of 50 registered and operational D1K1 building contractors and 23 registered and operational A1B1 road contractors, totaling 73 firms. Out of this total number, 40 were randomly selected from the Greater Accra and Ashanti regions. The decision to focus on these two regions was based on the list obtained from the Association of Building and Civil Contractors which showed that about 54% of Building Contractors located in Accra and Kumasi, 28% in Central and Volta regions and 18% representing the remaining regions. In addition, the limited time available for the study and financial constraints did not allow the researcher to travel to the other regions

consultants comprising mostly quantity surveyors, architects and clients.

(ii) Only registered architectural and quantity surveying firms as published at their respective websites in June 2007 (see Appendix 2).

(iii) Due to the large population sample of the client organizations (corporate, public and individuals), a sample size of 26 was randomly selected.

3.4.3Survey Coverage and Response Rate Validity

The sampling approach was adopted to distribute the survey questionnaires the targeted construction firms in Ashanti and Greater Accra Regions. According to Israel (1992), the census approach eliminates sampling errors and provides data on all individuals in the population. In addition, the approach allows virtually the entire population to be covered, in small population to achieve a desirable level of precision. The locational contact addresses and telephone numbers of the respondent firms obtained from ABCCG made the distribution of the questionnaires considerably convenient and simple. The researcher personally did the distribution of the questionnaires.

The involvement of the research assistant was necessary due to the geographically dispersed nature of the population and considering the time allotted for the study. Follow-up visits were made to remind the respondents of the completion of the survey. From Table 3.3 below, one hundred and twelve (112) questionnaires were returned completed. However, six (6) of the questionnaires were discarded because most of the questions were not completely answered. The reason for this was not known to the researcher. One hundred and six (106) were therefore usable for the analysis, representing a response rate of 76 percent. The response rate is the proportion of completed questionnaires in the total number of eligible respondents and literature assumes that higher response rate demonstrates validity of the study findings (Coffey, et al 1996). With this mind, the researcher had to ensure considerable high response rate from the survey questionnaires.

The relative high response rate of 76 percent comparable to that registered in the study by Obeng-Ayirebi (2002), which had a respective response rate of 60.8% and validates the response rate of the study. This could be attributed to the strict adherence to the techniques employed in distributing the questionnaires and the approach by which the field survey was conducted. The analytical procedures employed were aimed to achieve the research objectives as outlined in chapter one. Weights were assigned to level of agreement attached to variables on a five-point scale. The mean rating of the variables were obtained using the sum total of point obtained and the number of responses for that particular variable. The data from the survey were mostly categorical data with groupings of variables; therefore, relative importance index analysis was the main statistical tool used. However, descriptive statistics, frequencies, chi-square test and relative merit points were used to present some aspects of the results.

Table 3.3 Response Rate of Respondents

TYPE OF RESPONDENTS	NO. OF QUESTIONNAIRE SENT	NO. RETURNED	NO. RESPONSIVE	PERCENTAGE RESPONSIVE
Consultants	70	58	55	83
Contractors	35	26	25	71
Clients	35	28	26	74
Other				
TOTAL	**140**	**112**	**106**	**76**

Source: Researcher's field survey, 2008

3.5 LIMITATIONS OF THE SURVEY

Some of the limitations of this survey were as follows:

(i) Due to time and financial constraints, a national survey could not be undertaken. In order to obtain a reasonably representative sample of the population being surveyed, two of the largest regions in terms of population, resources and construction activity were targeted, namely, Greater Accra and Ashanti Regions.

(ii) Most associations representing the targeted population (construction industry clients, construction managers and construction project managers) approached, were unwilling to share their list of members with the researcher. This made the creation of a representative and large enough sample difficult.

3.6 STATISTICAL TOOL

Based on the information provided by the Contractors, Consultants and District Assemblies, the relative importance indices of the respondents were computed to deduce their rankings as below. The data was analyzed by ranking the various factors that affected project success of construction projects. The ratings of identified factors made by respondents against the five-point scale were

combined and converted to deduce the Relative importance indices of the various factors as follows:

$$RAx = \frac{\Sigma r}{A \times N}$$

Where Σr = summation of the weightings given to each factor.

A = highest rating and N= Total number of respondents for that factor.

Example for the Level of Knowledge of Procurement Systems

Weight = 1(4) + 2(3) + 3(7) + 4(10) + 5(10) = 121

$$\text{Relative Importance index} = \frac{121}{5(4 + 3 + 7 + 10 + 10)} = 0.71$$

The factor with the highest relative importance index was then ranked as 1, and then followed by two as the next higher rank and so on. Based on analysis of responses from respondents, ratings of the level of knowledge of procurement systems, benefits of a procurement system and critical success factors were computed based on the total sample size involving contractors, consultants and clients together, the weightings and relative importance indices of the Rax, Rbx and Rcx were combined as follows:

- Adding the product of the Relative Importance indices for each group and
- Adding the product of the proportion of respondents from the corresponding group (as a proportion of the total response).

For example, the overall Weighting Rz for Level of Knowledge of the Traditional System is calculated as follows:

= (((0.726 x (55/106)) + (0.731 x (55/106)) + (0.760 x (26/106))) = 0.965

The weighting for each factor was computed separately and then used to rank the identified factors in the order of importance as shown in Tables 4.16, 4.17 and 4.18.

3.7 SUMMARY

This chapter has started by introducing the research methodology adopted for the study. The distinction between research methodology and research methods was discussed. A review of the research methods revealed that survey was the most appropriate approach for eliciting the relevant data. The survey characteristics including the sampling frame, the sample size and techniques for eliciting the relevant data have also been explained. The analytical tool employed has been given expanded introduction. The next two chapters now address the analysis of the data which involves descriptive analysis

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS FINDINGS

4.1 INTRODUCTION

The aim of this study has been to identify whether there is a correlation between Procurement Systems and Project Success. It is also to establish whether other procurement systems other than the traditional building procurement system are widely used.

4.2 DISCUSSION OF RESULTS

This section deals with the analysis of the information gathered from the questionnaire survey issued to the respondents. Findings and discussions will be presented in order to realize the objective of the study.

4.2.1 Respondents' Level of Knowledge of Building Procurement Systems

A question in the questionnaire was aimed at determining the respondent's level of knowledge of construction procurement systems. The results obtained from this question are discussed below: Consultants were also requested to list the procurement systems they frequently recommend to their clients or the system favoured by their clients. From Table 4.1 below, the most frequently used system is the traditional system followed by the management contracting, construction management. The least used systems are the design manage and design build.

Table 4.1 – Consultant's Level of Knowledge of Procurement Systems

LEVEL OF KNOWLEDGE	RATING	WEIGHTING	RAX	RANK

OF PROCUREMENT SYSTEMS	1	2	3	4	5			
Traditional	6	5	10	15	18	196.000	0.726	1
Management contracting	5	10	10	13	15	182.000	0.687	4
Construction management	5	6	17	12	15	191.000	0.695	3
Design and build	6	8	9	17	15	192.000	0.698	2

Source: Researcher's field survey, 2008

Contractors were asked to state the procurement system they are familiar with. Table 4.2 below shows that the construction management, management contracting and turkey procurements systems were the less familiar. The traditional system ranked 1 with a relative index of 0.726 remains the most familiar followed by design and build with a relative index of 0.698.

Table 4.2 – Contractors Level of Knowledge of Procurement Systems

LEVEL OF KNOWLEDGE OF PROCUREMENT SYSTEMS	RATING 1	2	3	4	5	WEIGHTING	RAX	RANK
Traditional	2	2	4	8	9	95.000	0.760	1
Management contracting	3	4	6	6	6	83.000	0.664	5
Construction management	1	4	7	6	7	89.000	0.712	3
Design and build	2	3	5	8	7	90.000	0.720	2

Source: Researcher's field survey, 2008

As shown in Table 4.3 below, clients stated that they were more conversant with the traditional system followed by design and build and management contracting. Most of the bigger clients like Anglo Gold Ashanti and Newmont Ghana stated that all their major infrastructural projects like metallurgical plants

and shafts were procured through design and build whilst administrative buildings were procured through the traditional system.

Table 4.3 – Clients Level of Knowledge of Procurement Systems

LEVEL OF KNOWLEDGE OF PROCUREMENT SYSTEMS	RATING 1	2	3	4	5	WEIGHTING	RAX	RANK
Traditional	3	2	5	7	9	95.000	0.731	1
Management contracting	2	5	5	6	8	91.000	0.700	4
Construction management	2	3	8	6	7	91.000	0.700	3
Design and build	3	3	4	9	7	92.000	0.708	2

Source: Researcher's field survey, 2008

4.2.2 General Comment

The foregoing findings confirm that traditional system is still the best used procurement system in Ghana construction industry. This is because it's familiarity and hence widely used despite it's limitation in the handling of complex and large projects. It is interesting to note that construction management comes in second after the traditional system, followed by management contracting in Ghana. This indicates that there is a reasonable level of knowledge of construction management; however, not all respondents were familiar with the system. It is also interesting to note that design and build, a system that has been used on some large public sector prison projects recently, is the least known system out of the four, coming in after design and build.

4.2.3 Respondents Perception of Success Factors

Respondents were asked to rank their perception of how contract documentation (Form of Agreement, Conditions of Contract, Specifications, Bills of Quantities and Drawings), Production /Construction of Project, Quality of Design, Inception (Clarity of Client brief), Project duration, Feasibility, Occupational Evaluation (Client Satisfaction/Satisfaction of Project objectives) and Commissioning could contribute to the success of a construction Project on a scale of one (1) to five (5) as follows:

5 - Highly Important, **4** - Very Important, **3** - Averagely Important, **2** - Least Important, **1** - Not Important. Their responses are discussed below:

4.2.3.1 Consultants

From Table 4.4 below, contract documentation (Form of Agreement, Conditions of Contract, Specifications, Bills of Quantities and Drawings) was ranked highest followed by Production /Construction of Project, Quality of Design inception(Clarify of client brief), Project duration, Feasibility, Occupational Evaluation (Client Satisfaction/Satisfaction of Project objectives)with commissioning of the Project being the least ranked.

This confirms Bennet and Grice's (1992) statement that the contractual arrangements and type of procurement systems have a major impact on the success or failure of a construction project. This is also contrary to the general

trend in project management literature that project success depends on the traditional triad of time (duration) budget and costs.

Table 4.4 – Consultants Perception of Success Factors

	RATING							
	5	4	3	2	1	WEIGHTING	RAX	RANK
Documentation ((Form of Agreement, Conditions of Contract, Specification, Bills of Quantities and Drawings)	15	10	4	1	0	129.000	0.860	1
Production/Construction of Project	14	10	5	1	0	127.000	0.847	2
Quality of Design	14	9	6	1	0	126.000	0.840	3
Inception (Clarity of Client Objectives)	12	9	6	2	1	119.000	0.793	4
Project duration	13	8	5	3	1	119.000	0.793	5
Feasibility	7	12	5	5	1	109.000	0.727	6
Occupational Evaluation (Client Satisfaction/Satisfaction of Projective objectives)	5	6	12	6	1	98.000	0.653	7
Commissioning	2	4	6	11	7	73.000	0.487	8

Source: Researcher's field survey, 2011

4.2.3.2 Clients

Clients were also asked to rank the same set of success parameters. From Table 4.5 below, clients ranked Occupational Evaluation the highest. This satisfies Literature Review in chapter 2 of this research which intimates that a private firm or an institution, the client cannot evaluate success of it's projects without referring to the Project design. It also affirms Latham's (1994) argument that after the client is satisfied with the brief and feasibility of the project, a typical client's instinctive reaction is to appoint an architect. Clients also ranked project duration second. This implies that clients attach a great deal of importance on how long a project takes from inception to completion. Clients

ranked Commissioning as not important. This means that client's preference is for a construction project to be completed within schedule and not the pomp and pageantry associated with the commissioning of a project.

Table 4.5 – Clients Perception of Success Factors

	RATING							
	5	**4**	**3**	**2**	**1**	**WEIGHTING**	**RAX**	**RANK**
Quality of Design	13	11	4	1	1	124.000	0.827	1
Project duration	13	8	5	3	1	119.000	0.793	2
Production/Construction of Project	9	10	8	2	0	113.000	0.779	3
Inception (Clarity of Client Objectives)	8	13	6	2	1	115.000	0.767	4
Documentation ((Form of Agreement, Conditions of Contract, Specification, Bills of Quantities and Drawings)	8	9	11	1	1	112.000	0.747	5
Feasibility	9	8	7	5	1	109.000	0.727	6
Occupational Evaluation (Client Satisfaction/Satisfaction of Projective objectives)	5	8	12	4	1	102.000	0.680	7
Commissioning	4	6	6	7	7	83.000	0.553	8

Source: Researcher's field survey, 2011

4.2.3.3 Contractors

Contractors ranked the Production / Construction of the Project highest, followed by project duration, Quality of Design, Documentation, Client Satisfaction, Feasibility, Inception and Commissioning. Since contractors are solely responsible for the Production / Construction of a Project, their high ranking of this success parameter satisfies general perception. Generally, every efficient contractor would like to complete a given project within the project schedule and these ties in with the contractors second highest ranking of 0.74 as shown in Table 4.6 below. Walid and Oya (1996) argue that there are many factors that are outside the control of management which could affect the success or failure

of a project. They allege that earlier study on project success assumed that if a project's completion time exceeded it's due date or expenses overrun the budget or outcomes did not satisfy the client's predetermine criteria, the project was assumed to be a failure. Contractors being businessmen view completion of projects within schedule as a success factor that can enable them maximum profit.

Table 4.6 – Clients Perception of Success Factors

	RATING							
	5	**4**	**3**	**2**	**1**	WEIGHTING	RAX	RANK
Production/Construction of Project	10	10	6	3	1	115.000	0.767	1
Project duration	8	10	8	3	1	111.000	0.740	2
Quality of Design	7	11	8	3	1	110.000	0.733	3
Documentation ((Form of Agreement, Conditions of Contract, Specification, Bills of Quantities and Drawings)	10	8	6	4	2	110.000	0.733	4
Occupational Evaluation (Client Satisfaction/Satisfaction of Projective objectives)	10	8	6	4	2	110.000	0.733	5
Feasibility	6	8	10	5	1	103.000	0.687	6
Inception (Clarity of Client Objectives)	5	7	10	6	2	97.000	0.647	7
Commissioning	2	5	6	10	7	75.000	0.500	8

Source: Researcher's field survey, 2011

4.2.3.4 General Comments

While responses were similar for the Clients, Consultants and Contractors, there were several distinctions that related directly to the parties (Clients, Consultants and Contractors) and the type of services they provide. For example, a priority item and one that appears in all three region dent responses (Clients, Consultants and Contractors) in some form is Production / Construction of the Project. The Contractor, Consultant and the Client ranked Production as Highly important, very important or important.

These explain the importance parties to a construction project attach to project success. In other words, Production/Construction of the project is a major criteria for measuring project success.

Also, almost all respondents ranked commissioning as not important. This means that all stake holders of a construction project view success as how the well the project is conceived, the client giving a very concise brief, the consultants producing very good designs, quality tender, contract documentation, selection of a competent contractor, completion of a project within time and most importantly, the client's expectations of the project met.

4.2.4 Critical Success Factors on Construction Projects

4.2.4.1 Contractors

Contractors were asked to rank pre-determined success factors on construction projects (based on literature) from 1 (most important) to 8 (least important). This was to analyze the significance of each project success factor in the Ghanaian construction industry. The results from this question are outlined below:

As shown in Table 4.7, it can be seen that the most important criteria for judging procurement success is the early and correct selection of a contractor with the second most important success factor that the completed project meeting the client's/user's expectations. The third most important success factor is that the project is completed project has a high standard of workmanship.

Table 4.7 – Critical Success Factors on Construction Projects (Contractors ranking)

CRITICAL SUCCESS FACTORS ON CONST. PROJS.	RATING 1	2	3	4	5	WEIGHTING	RAX	RANK
Clarity of roles	7	6	7	5	0	60.000	0.480	7
Early and correct contractor selection	1	5	4	6	9	92.000	0.736	1
Cost control and value engineering during design	6	12	6	1	0	52.000	0.416	8
Project is completed within budget	5	5	5	4	6	76.000	0.608	4
Project is completed within contract period	5	9	4	1	6	69.000	0.552	6
Completed project meets user's expectation	1	5	5	6	8	90.000	0.720	2
Completed project meets accepted standards of workmanship	2	4	5	6	8	89.000	0.712	3
Client's project staff is not unduly burdened as a result of the construction process	6	5	4	4	6	74.000	0.592	5

Source: Researcher's field survey, 2008

4.2.4.2 Consultants

Consultants were asked to rank the critical success factors on construction projects. From table 4.8 below, the most important criteria for judging procurement success is that a completed project meets the client's/user's expectations followed by a high standard of workmanship, early and correct

contractor selection, cost control and value management during design. To consultants, clarity of roles of the stakeholders was the least critical project success factor.

Table 4.8 – Critical Success Factors on Construction Projects (Consultants ranking)

CRITICAL SUCCESS FACTORS ON CONST. PROJS.	RATING 1	2	3	4	5	WEIGHTING	RAX	RANK
Clarity of roles	26	9	11	8	1	114.000	0.415	3
Early and correct contractor selection	18	26	9	2	0	105.000	0.382	4
Cost control and value management during design	15	12	23	4	1	129.000	0.469	1
Project is completed within budget	20	24	10	0	1	103.000	0.375	5
Project is completed within contract period	19	30	5	0	1	99.000	0.360	7
Completed project meets user's expectation	21	25	6	2	1	102.000	0.371	6
Completed project meets accepted standards of workmanship	14	25	7	8	1	122.000	0.444	2
Client's project staff is not unduly burdened as a result of the construction process	27	13	15	0	0	98.000	0.356	9

Source: Researcher's field survey, 2008

4.2.4.3 Clients

As shown in Table 4.9, Clients were of the opinion that the most important critical project success factors on construction projects is cost control followed by the completed project meeting a high standard of workmanship followed by

clarity of roles of the project stakeholders. Early contractor selection, completion of project within budget, completion of project within contract period were all considered less important critical success factors. This confirms that involvement and the use of the expertise of all stakeholders during the design stage of a project can result in a successful project. The first five factors can be categorized under cost, time and quality which corroborates with the literature review.

Table 4.9 – Critical Success Factors on Construction Projects (Clients ranking)

CRITICAL SUCCESS FACTORS	RATING					WEIGHTING	RAX	RANK
	1	2	3	4	5			
Clarity of roles	11	5	5	4	1	57.000	0.438	3
Early and correct contractor selection	8	13	4	1	0	50.000	0.385	4
Cost control and value engineering during design	7	6	10	2	1	62.000	0.477	1
Project is completed within budget	8	12	5	0	1	52.000	0.400	5
Project is completed within contract period	9	14	2	0	1	48.000	0.369	7
Completed project meets user's expectation	11	10	3	1	1	49.000	0.377	6
Completed project meets accepted standards of workmanship	7	10	4	4	1	60.000	0.462	2
Client's project staff are not unduly burdened as a result of the construction process	12	7	7	0	0	47.000	0.362	9

Source: Researcher's field survey, 2008

4.2.5 Consideration of all building procurement systems at Pre-Contract Stage

4.2.5.1 Consultants

Consultants were asked if they have ever considered all building procurements systems at Project initiation stage. As shown in Table 4.10, 73% answered in the affirmative whilst others stated that they did not. Consultants who did not consider all building procurements systems explained that most of the projects they undertook suited the adoption of the traditional system with which most clients are conversant.

Table 4.10 – Consideration of all Building Procurement Systems during project initiation (Consultants)

	RESPONSE		PERCENTAGE	
QUESTION	YES	NO	YES	NO
Do You Consider All Possible Building Procurement Systems When You Start A New Project	40	15	72.73%	27.27%

Source: Researcher's field survey, 2008

4.2.5.2 Clients

Majority of Public Sector clients stated that they did not consider all building procurement systems because of the restrictions imposed by the Public Procurement Act, 2003 (Act 663) on the use of alternative procurement systems. Private Sector clients stated they do not want to incur the high cost of using alternative procurement systems due to lack of knowledge and expertise in using them.

Table 4.11 - Consideration of all Building Procurement Systems during project initiation (Clients)

	RESPONSE		PERCENTAGE	
QUESTION	YES	NO	YES	NO
Do you consider all possible building procurement systems when you start a new project	10	16	38.46%	61.54%

Source: Researcher's field survey, 2008

4.2.5.3 General Comments

From the foregoing, some respondents considered all building procurement systems at Project inception stage whereas others stated that they do not. This indicates that other procurement systems are considered alongside the traditional system.

4.2.6 Reasons for not using integrated procurement systems

4.2.6.1 Consultants

Consultants were asked the reasons for not utilizing alternative procurement systems.

Table 4.12 below indicates that the main reason from most consultants (i.e. 73%) for not using alternative procurement systems was due to lack knowledge. The second reason was the prohibition by the Public Procurement Act, 2003 (Act 663).

Table 4.12 – Reasons for not using integrated procurement systems (Consultants)

REASONS	RESPONSE	%
Insufficient knowledge	25	73%
No suitable project has come up yet	2	6%
Client preferred the use of particular proc. System	5	15%
Principal/agent preferred the use of particular proc. System	1	3%
Other project members preferred the use of particular proc. System	1	3%

Source: Researcher's field survey, 2008

4.2.6.2 Contractor

Contractors were asked to rank the factors that are important when considering whether or not to tender for projects based on alternative procurement systems. It can be seen from Table 4.13 below, that the most important reason contractors considered was the potential for fewer disputes. This was followed by their quest to be involved in the initial stages of the project and the ability to take control of the project. Less competition and higher profit margin were the least important reasons assigned by contractors in considering whether or not to tender for projects based on alternative procurement systems.

Table 4.13 – Factors considered in sourcing for projects based on integrated procurement systems (Contractors)

FACTORS	RESPONSE	PERCENTAGE
Higher profit margin	1	18.00%
Early involvement	8	32.00%
Less competition	2	8.00%
Fewer disputes	11	44.00%
Ability to take control	3	12.00%

Source: Researcher's field survey, 2008

This implies that stakeholders need education on the alternative procurement systems. Therefore it would be helpful if the Public Procurement Act, 2003 (Act 663) is reviewed to accommodate the use of alternative procurement systems.

4.2.7 Relationship between building procurement selection and project success

Respondents were asked whether or not they believed that there is a correlation between building procurement selection and project success.

Table 4.14 – Relationship between building procurement selection and project success (All respondents)

	YES	NO	RELATIONSHIP	NO RELATIONSHIP
Is there a relationship between building procurement selection and project success	78	28	74%	26%

Source: Researcher's field survey, 2008

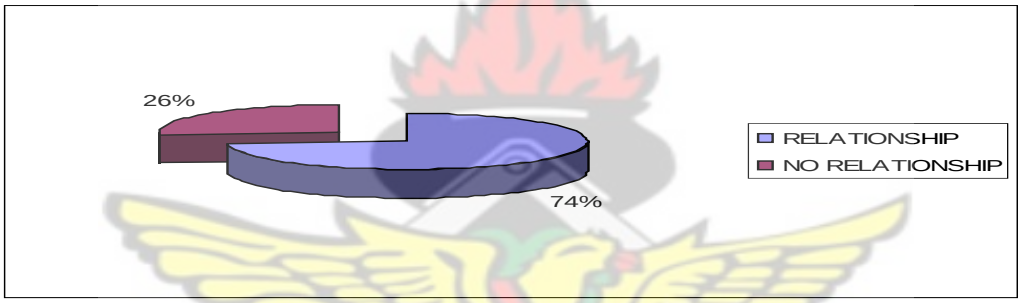


Figure 4.1 – Relationship between building procurement choice and project success

As shown in Figure 4.1 above, an overwhelming 74% of respondents felt that there was a relationship between building procurement selection and project outcome. This clearly indicates that clients, consultants and contractors are aware that there is a correlation between building procurement systems selection and the attainment of client and project objectives/outcome.

4.2.7.1 T – Test of Relationship between building procurement selection and project success

Let the hypothesis:

"There is no significant relationship between procurement selection and project success" be the Null hypothesis and denoted by H_0.

Let the alternative hypothesis

"There is a significant relationship between procurement selection and project success and denoted by H_1.

From the pair sample T – Test in Appendix 3, the error involved is 0.021 meaning that there is a 2.1% error. Hence, we reject the null hypothesis that there is no statistical significance between the responses in favour of the alternative hypothesis. Therefore, the conclusion that there is a relationship between procurement selection and project success is confirmed.

4.2.8 Factors considered in choosing a particular procurement system

Using the Ranking system described below, respondents were asked to rank the most important to the least important factors they considered in choosing a procurement system. From Table 4.15 below, the five most important factors considered were cost optimization, project objective, complexity of project, quality level and time savings. This corroborates literature reviewed which indicates that there is a correlation between the selection of a particular type of construction procurement system and the outcome of a project. The outcome of a project (success or failure) was defined in terms of the attainment of client objectives (i.e. time, quality, cost) and other client requirements and also, the fact that project success and procurement systems have a linkage.

Table 4.15 – Factors considered in choosing a particular procurement system

FACTORS	RATING					WEIGHTING	RAX	RANK
	1	2	3	4	5			
Project's objective	15	13	22	4	1	128.000	0.465	2
Cost optimization	15	12	23	4	1	129.000	0.478	1
Source of Funding	25	11	9	9	1	115.000	0.426	7
Quality level	14	26	7	7	1	120.000	0.444	4
Time savings	15	26	6	7	1	118.000	0.437	5
Ease of use	25	10	10	9	1	116.000	0.430	6
Complexity of Project	14	25	7	8	1	122.000	0.452	3
Dispute avoidance	26	9	11	8	1	114.000	0.422	8
Experience	26	11	9	9	0	111.000	0.411	9
Risk avoidance	28	11	9	8	0	109.000	0.403	10

Source: Researcher's field survey, 2008

4.2.9 Combined Relative Indices for Level of Knowledge of Procurement Systems, Benefits of a Good Procurement System and Critical Success Factors

Based on analysis of responses from respondents, ratings of the level of knowledge of procurement systems, benefits of a good procurement system and critical success factors were computed based on the total sample size involving clients, consultants and contractors together, the weightings and relative importance indices of the Rax, Rbx and Rcx were combined as shown in Tables 4.16, 4.17 and 4.18.

The analysis as shown in Table 4.16 confirms that the traditional procurement system is the most popular procurement method employed by construction clients, consultants and contractors. This might be attributable to the fact that clients, consultants and contractors are conversant with the traditional system and prefer to use it in spite of its limitations when it comes to large and complex building projects. This fact is also supported by literature reviewed. Management

contracting seems not to be a popular procurement method. However, the results may suggest that design and build could be an alternative procurement method for major stakeholders in the construction industry.

Table 4.16 – Combined Ranking of Respondents on Level of Knowledge of Procurement Systems

LEVEL OF KNOWLEDGE	CONTRACTORS Rax RxX	Rank	CONSULTANTS Rax	Rank	CLIENTS Rax	Rank	Weighting	
Traditional	0.760	1	0.726	1	0.731	1	**0.74**	1
Management Contracting		0.664	5	0.687	4	0.700	4	
	0.68	4						
Construction Management		0.712	3	0.695	3	0.700	3	
	0.70	3						
Design and Build								
	0.720	2	0.698	2	0.708	2	**0.71**	2
Turnkey/Boot	0.672	4	0.607	5	0.615	5	**0.62**	5

Source: Researcher's field survey, 2008

4.2.9.1 Combined Relative Indices Respondents on Level of Knowledge of Procurement Systems

From the rankings in Table 4.17 below, cost reduction scored the highest weighting of 0.56, which was followed by quicker delivery/achievement of level of quality (0.53), design flexibility (0.50) and full control of construction process (0.40) respectively. Based on these results, one would conclude that cost reduction is the most dominant factor of a good procurement system and this could lead to project success. The rankings obtained in Table 4.17 corroborate the group responses from the respondents, which suggested that cost reduction is the major benefit derived from a good procurement system.

Table 4.17 – Combined Ranking of Respondents on Benefits a Good Procurement System

BENEFITS	CONTRACTORS Rax RxX	Rank	CONSULTANTS Rax	Rank	CLIENTS Rax	Rank	Weighting	
Cost Reduction	0.536	1	0.575	1	0.562	1	**0.56**	1
Design Flexibility	0.512	3	0.487	4	0.515	4	**0.50**	3
Full control of const. proc		0.360	5	0.404	5	0.431	5	
	0.40	4						
Quicker delivery	0.487	4	0.535	2	0.546	2	**0.53**	2
Achievement of quality	0.520	2	0.544	3	0.508	3	**0.53**	2
No conflict of inetrest	0.000	6	0.000	6	0.000	6	**0.00**	5

Source: Researcher's field survey, 2008

4.2.9.2 Combined Relative Indices for the Benefits of a Good Procurement System

From Table 4.18 below, the highest ranked critical success factor was; completed project meets accepted standard of workmanship. This observation is consistent with the literature review which indicated that clients require the construction of facilities (such as buildings, dams, roads etc.) for various reasons. What is common to all clients, however, is that they require specified facility to be completed within specified budget and quality standards for the acceptability of the facility by the client or intended user. However, as suggested by Chua et al. (1999), a project which is considered to be a success by the client might be considered as a failure by the contractor's top management, if the project outcome does not meet top management's specifications.

Table 4.18 – Combined Ranking of Respondents on Critical Success Factors

CRITICAL SUCCESS FACTORS	Rax	Rank	Rax	Rank	Rax	Rank	Weighting	RxX
Roles Clarity	0.480	7	0.415	3	0.438	3	**0.44**	5
Early & correct contractor sel.	0.736	1	0.382	4	0.385	4	**0.47**	2
Cost control and value mgt.	0.416	8	0.469	1	0.477	1	**0.46**	3
Completion within budget	0.608	5	0.375	5	0.400	5	**0.44**	5

Completion in time	0.552	4	0.360	7	0.369	7	**0.41**	6
User's expectation met	0.720	2	0.371	6	0.377	6	**0.45**	4
Std. of workmanship met	0.712	3	0.444	2	0.462	2	**0.51**	1
Less burden on client's Project staff	0.592	6	0.356	9	0.362	9	**0.41**	6

Source: Researcher's field survey, 2008

4.2.10 The Effect of the different Procurement Systems on project performance

Having considered the concept the process and procedure of the various project procurement systems, I am going to examine the general effect of each system on project performance. As discussed in Chapter one, the aim of this research is to investigate the effect of a procurement system on the success of construction projects and also, one of the objectives was to establish a linkage between procurement systems and the success of a project. Also, as noted in my literature review, most of the researchers agree that project success is predominantly measured by time, cost, quality and client satisfaction. Therefore, I shall examine how these characteristics contribute to the success or otherwise of construction projects from the clients point of view.

Time

Traditional System

Delays in project completion times are endemic and contractors sometimes pay liquidated and ascertained damages which increase projects production costs. Yet, most of these projects are still considered to be successful. Due to its sequential approach, the traditional procurement system has been classified as the slowest mode of project delivery. However, this approach is preferable to

other methods because it provides clear public accountability, better design and control by the client. Since the pre-contract stage of this system is longer, more time is available for the client and the design team to evaluate the design before production. Therefore, it is not suitable for construction projects on fast track. Due to it's slow delivery mode, clients who regard time as an indication of project success will not choose the traditional system for their project.

Time

Integrated System

The design and production processes are integrated in order to achieve expedited project delivery. This, in effect, enables detail design and construction to run concurrently, thus reducing the overall project development period considerably. Early start of construction is acquired under this approach.

Where, a single entity is responsible for both the design and construction, the contractor is able to control not only the construction time but also the time reserved for the design of the project, thus reducing the overall project duration. Time (Project duration) was ranked the second highest by clients, consultants and contractors. Therefore clients who regard time as an indication of project success will certainly select one of the integrated systems for its projects.

Cost
Traditional System

The Traditional Procurement System provides more price certainty and hence the client is able to know its financial commitment at the very early stage of the project. As the design has been evaluated and working drawings have been fully

developed and detailed out prior to tendering, it eliminates costly contentious design detailing as well as costly omissions and surprises. The system also lends itself to better cost control and also variations are minimized. Hence clients who regard cost an indication of project success will be tempted to adopt the traditional system for their project.

Cost
Integrated System

Unlike the traditional system, the integrated system is suitable for clients with flexible budgets. Clients who adopt this system are unable to know their total financial commitment before contract. Also, as the whole design is not completed and evaluated before production, costly variations during production is endemic. Cost control is difficult and therefore clients regard cost as an indication of project success would shun this procurement system.

Quality
Traditional System

Respondents gave varying ratings to quality as one of the success factors of construction procurement systems. From literature reviewed, the traditional procurement system provides a high degree of quality certainty and functional standards. The traditional system provides an opportunity for the client to combine the best design, management and construction expertise of consultants and contractor. It also enables the client and consultants to evaluate the design and specification before production and hence a good quality end product

assured. However, this system does not provide opportunities for contractor to contribute to the design.

Quality
Integrated System

The overlap of design and construction allows the contractor to advise on buildable design and choice of components leading to a more efficient design. However, there is no evidence of poor quality end product of projects in which the integrated system has been adopted.

Satisfaction

As outlined earlier in this study, traditionally, a successful project was seen as one in which the triad of time, budget and specification was achieved at a profit. Current project literature places more emphasis on customer satisfaction as a fourth important success parameter. There is a general trend in project management literature toward greater customer focus and customer satisfaction. For that matter, there are different schools of thought on how clients' satisfaction can contribute to project success.

It can therefore be concluded that client's satisfaction is based on a project success.

4.3 SUMMARY

In the survey, it was established that there is a relationship between the selection of a procurement system and the outcome of a project. As the research results show, a project's overall success has a relationship with it's cost, time and quality. Therefore, generally speaking, consultant's evaluation criteria are consistent with the commonly agreed golden triangle of time, cost and quality. Among the three elements, consultants view time and quality more important than cost in rating project success. Clients play the most important role in determining project success. Contractor's performance is also significantly related to the time, cost and quality criteria of project success. Based on these outcomes, the findings of the survey and those of the literature review will be compared in more detail in the next chapter, to determine whether or not the survey findings support the literature review.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This concluding chapter provides insights into the major findings of the study. It further provides key recommendations to policy implications and also outlines ecommendations for further research.

5.2 Summary of Findings

From the literature review and analysis of the survey results, the findings are summarized below:

a) Although most clients and consultants are familiar with the management and integrated works procurement systems, the traditional building procurement system is still the best known and the most widely used in the Ghanaian construction industry. This is because it is understood by most clients and they know their financial commitment on acceptance of the recommended contractor's tender sum. However, the separation of the design and construction processes tend to foster a 'them and us' attitude between the clients and the contractors which reduces the team spirit that is vital for the attainment of client's development objectives.

b) The top three critical success factors of any procurement system are in the following order:

- Production of a Project
- Project duration
- Quality of design.

c) Most clients and their project team do consider all building procurement systems when starting a new project because most respondents also believe that there is a relationship between building procurement system and project success, however, the traditional system is selected most times.

d) The selection of an appropriate building procurement system contributes to the attainment of client objectives with respect to time, cost and quality for construction projects, therefore, project success.

e) Integrated procurement systems will only work if project participants understand how to make it work and want to make it work.

5.3 Conclusions

Based on the above literature review and the analysis of the survey results it could be concluded that all the research objectives have been achieved (under the consideration of the research methods adopted and the limitations of the study) as follows:

(i) The choice of a building procurement system does influence project success;

(ii) Procurement systems other than the traditional system can improve the attainment of client objectives on building projects;

(iii) The integrated procurement systems in Ghana have not been widely used and understood hence may have failed in its use thus far;

(iv) The top three critical success factors of any procurement system are in the following order:

- Production of a Project
- Project duration
- Quality of design

(v) The selection of an appropriate building procurement system contributes to the attainment of client's objectives with respect to time, cost and quality for construction projects' hence project success.

(vi) If stakeholders can predict probability of project success better, they can take steps to avoid factors that lead to and identify projects worth pursuing

(vii) Each procurement system has its own feature and peculiarity on the cost, time and quality of the project (i.e. the project performance).

5.4 Recommendations for Policy Implications

Based on the findings of this research, the following recommendations can be made:

- On commencement of construction projects, consultants must advise their clients on building procurement systems available.

- Roles and responsibilities of all the project participants (i.e. clients, consultants and contractors) should be clearly defined at project inception stage for the other procurement systems;

- There should be an informal education through institutional journals, digests, magazines and periodic seminars and workshops on the availability of other procurement systems apart from the traditional system for project participants.

- The general public should be made aware of the benefits all procurement systems through the media by the various construction professionals' institutions such as the Ghana Institution of Surveyors. Also, the course content of tertiary institutions for construction should be expanded to offer students more exposure to procurement systems.

- The right environment should be created by the government of Ghana for smooth adoption of the various procurement systems for technological advancement and growing needs of clients in the construction industry.

- Capacity building of academia, industry, clients and government in the area of integrated procurement systems for improvement of efficiency and productivity of the construction industry.

5.5 Recommendation for further research

This section provides a brief overview of carrying out research in different areas in order to add knowledge to construction procurement success factors.

It is recommended that further research to be done to explore the following areas:

- ✓ Development of guidelines for the implementation of other procurement systems for the management of building construction projects in Ghana.

- ✓ The procurement success criteria and performance factors such as suitability for development objectives, source of funding and cost optimization.

- ✓ Review of the existing procurement laws to establish the position of the Public Procurement Act, 2003 (Act 663) on the other procurement systems to assist consultants in the Public Sector.

- ✓ Another approach to develop this research to a higher level might be carrying out similar research in different countries in the West Africa sub-Region.

- ✓ The responses from Public and Private client organizations were lumped together and analyzed. Future research could explore the possibility of analyzing the responses from Private and Public client organizations since these bodies have peculiar procurement requirements.

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APPENDICES

Appendix 1: Questionnaires

PROCUREMENT SYSTEMS AND PROJECT SUCCESS IN GHANAIAN CONSTRUCTION INDUSTRY

QUESTIONNAIRE

INTRODUCTION

This questionnaire is aimed at determining the extent Procurement Systems contributes to success of Construction Project execution in Ghanaian Construction Industry.

Kindly compete the questionnaire carefully and send the completed questionnaire to:

Attention: Mr. Kwadwo Asare Kyei
AngloGold Ashanti
Contracts Department
A.G.A Ltd.
P.O. Box 10,
Obuasi
email: kkyei@anglogoldashanti.com.gh

Please feel free to disseminate the questionnaire to your colleagues that are involved in Building Construction Projects.

COMPLETION OF THE QUESTIONAIRE

For purposes of this questionnaire, please take note of the following abbreviations and definitions:

- **Building Procurement Systems**

Procurement with respect to construction is a system that describes the total process of meeting the client's need for a project, starting at the point where this need is first expressed and straight through to when it is finally met.
In other words, it may be defined as the management system used by the client to secure the design and construction services required for the execution of a proposed project to a required cost, quality and within a specified time.

It unites a three party team of a client, the design team and professional construction manager, who is responsible for the coordination of various trade contractors, with a common goal to best serve the needs of the client.
Building Procurement systems broadly fall under the following categories:

1. Separated

- Traditional procurement systems

2. Management oriented procurement systems

  - Construction management
  - Management contracting

- Design and manage

3. Integrated procurement systems

- Design and build Procurement systems and Variants
- Package Deal
- Turnkey

4. Discretionary procurement systems

- Partnering
- Alliancing

- **Project Success**

  Attainment of Client Objectives in terms of budget, time, quality and safety implies that a Project is successful. The success criteria parameters are defined in the table below:

Success Criteria	**Definition**
On Budget	The project is completed at or under the contracted cost (i.e. contract sum)
On Time	The project is completed on or before the contracted finish date
Quality	The completed project meets or exceeds all technical performance specifications provided by the Client
Conforms to User's Expectations	The completed project meets or exceeds the user's envisioned functional goals (fitness for purpose)
High Quality of Workmanship	The completed project meets or exceeds the accepted standards of workmanship in all areas
Minimizes Construction Aggravation	The construction process does not unduly burden the Client's Project Management Staff

This questionnaire consists of two sections:

Section A must be completed by all respondents

Section B is to be completed by clients/developers and built environment professionals that have been involved in projects using construction both the traditional and management oriented/integrated procurement system.

SECTION A BIOGRAPHICAL DETAILS – TO BE COMPLETED BY ALL RESPONDENTS

1.1 What is your occupation, relative to the construction industry?

- ☐ Consultant
- ☐ Contractor
- ☐ Client / Developer
- ☐ Other, please specify: _____

1.2 What is your professional background?

- ☐ Construction Manager
- ☐ Construction Project Manager
- ☐ Architect
- ☐ Quantity Surveyor
- ☐ Civil and/or Structural Engineer
- ☐ Electrical and/or Mechanical Engineer
- ☐ Other, please specify: _____

1.3 If practicing as a consultant, have you applied for registration with the Ghana Institution of Surveyors, Ghana Institute of Engineers, Ghana Institute of Architects and/or Ghana Institute of Construction?

- ☐ Yes
- ☐ No
- ☐ Not Applicable (N/A)

1.4 Which region are you based in?

- ☐ Ashanti Region
- ☐

Greater Accra Region

Other: Please specify: _____

2.0 CLIENT OBJECTIVES, PROJECT SUCCESS AND BUILDING PROCUREMENT SYSTEMS

2.1 Kindly indicate your level of knowledge of the following building procurement systems on a scale of 1 (no knowledge at all) to 5 (excellent knowledge):

Traditional System	
Management Contracting	
Construction Management	
Design and Build (including turnkey)	
Design and Manage (including Build, Operate and Transfer etc.)	

2.2 Do you always consider all possible building procurement systems when you start a new construction project?

☐ Yes

☐ No

2.3 Do you believe that there is a relationship between building procurement selection and the attainment of client objectives (project success)?

☐ Yes

☐ No

2.4 Have you recently (past 10 years) been involved in Ghana construction project whereby any of the above mentioned procurement a system was used?

☐ Yes

☐ No

If you have not used any of the procurement systems before, kindly indicate your reasons for it:

Insufficient knowledge of the system	
Suitable project has not come up yet	
Client did not prefer to use Management based procurement system	
Principal agent did not prefer to used Management based procurement system	
Other project team members did not prefer the used of management based procurement system	

Other: Please specify:
_____
_____
_____
_____

2.5 In your opinion, which of the following built environment professionals are best suited to offer management based procurement services (please tick applicable one/s)?

- ☐ Construction Manager
- ☐ Construction Project Manager
- ☐ Architect
- ☐ Quantity Surveyor
- ☐ Civil and/or Structural Engineer
- ☐ Electrical and/or Mechanical Engineer

Other, please specify: _____

2.6 In your opinion, which of the following organizations are best suited to offer quality procurement services (Please tick applicable one/s)?

- ☐ Building and/or Civil Contractors
- ☐ Professional / Specialist Project Management Firms
- ☐ Architectural Firms

☐ Civil and/or Structural Engineer Firms

☐ Electrical and/or Mechanical Engineering Firms

☐ Other, please specify: _____

If your answer to 2.4 was yes, please proceed to answer section B. If your answer was no, then you may proceed to the end of the questionnaire. Thank you for participating in the survey.

SECTION B: (To be completed by respondents with other management oriented, integrated and discretionary procurement system experience in the Ghana Construction Industry only).

3.0 FORMS OF CONSTRUCTION PROCUREMENT SYSTEM

3.1 Which form of procurement system have you used on your projects?

☐ Traditional Procurement system

☐ Integrated Procurement System

3.2 Which variant/s of the above mentioned forms of construction Procurement System are you familiar with and / or have you used previously? ***(Please indicate yes with Y and no with N, in both columns)***

Variant of Construction Procurement Systems	**Familiar with**	**Used Previously**
Traditional System		
Integrated System)		

4.0 ROLE PLAYERS IN CONSTRUCTION PROJECTS MANAGEMENT

4.1 Which member of the professional team was appointed as the client's principal agent?

☐ Quantity Surveyor

☐ Construction Project Manager

☐ Architect

☐ Other: Please specify: _____

4.2 What was the client's level of involvement on the project/s?

☐ High

☐ Average

☐ Low

4.3 What was the level of inter-organizational conflict on your projects?

☐ High

☐ Average

☐ Low

5.0 AN ARGUMENT FOR AND AGAINST PROCUREMENT SYSTEMS AND PROJECT SUCCESS

5.1 In your opinion, which of the following are the benefits of a good procurement system?

Please indicate by ranking each option from **4** - Highly Important, **3** - Very Important, **2** - Averagely Important, **1** - Least Important, **0** - Not Important.

1.	Inception (Clarity of Client Objectives)	
2.	Feasibility	
3.	Quality of Design	
4.	Documentation ((Form of Agreement, Conditions of Contract, Specification, Bills of Quantities and Drawings)	
5.	Production/Construction of Project	
6.	Commissioning	
7.	Occupational Evaluation (Client Satisfaction/Satisfaction of Projective objectives)	
8.	Project duration	
9.	Others:	

10.		

5.2 Management oriented/Integrated procurement is a better suited building procurement system on projects whereby empowerment of emerging contractors is of paramount importance in the success of the project as work is broken down into smaller and more manageable packages to allow smaller business to participate.

☐ Agree

☐ Do Not Agree

Please state reasons for your answer in 5.2 above:

_____

_____

_____

6.0 RECIPES FOR SUCCESS OR FAILURE

6.1Why did you decide to use a particular procurement system?

Please indicate by ranking each option from **4** - Highly Important, **3** - Very Important, **2** - Averagely Important, **1** - Least Important, **0** - Not Important.

☐ Ease of use

☐ Suitability of development objectives

☐ Cost optimization

☐ Experience

☐ Time saving/speed

☐ Dispute Avoidance

☐ Risk/Responsibility Avoidance

☐ Quality Level Required

☐ Level of design complexity

☐ Source of Funding

☐ Other: Please state ……

……

6.2 Did the use of as a building procurement system worsen or improve your attainment of the following client objectives (tick applicable box i.e. worsened or improved)?

No	Client Objective	Improved	Worsened
1.	Cost / Budget		
2.	Time		
3.	Quality		
4.	Conformance to user's expectations		
5.	Overall Client Satisfaction		

6.3 Please indicate what you consider to be critical success factors on construction projects?

Please indicate by ranking each option from **4** - Highly Important, **3** - Very Important, **2** - Averagely Important, **1** - Least Important, **0** - Not Important.

1.	Clarity of Roles and Responsibilities between client, professional team and contractor	
2.	Early and correct selection of contractor	
3.	Proper management of interfaces between trade contractors	
4.	Cost control and value engineering during design	
5.	Development of a realistic budget	
6.	Development of a realistic schedule / programme	

7.	Development of adequate contracts for consultants and trade contractors	
8.	Application of critical chain techniques to further shorten project duration	
9.	The project is completed at or under the contracted cost (i.e. contract sum)	
10.	The project is completed on or before the contracted finish date	
11.	The completed project meets or exceeds all technical performance specifications provided by the Client	
12.	The completed project meets or exceeds the user's envisioned functional goals (fitness for purpose)	
13.	The completed project meets or exceeds the accepted standards of workmanship in all areas	
14.	The construction process does not unduly burden the Client's Project Management Staff	

6.5 Which of the following forms of contract did you use on your project? Which of these do you feel best suits favourite procurement system?

Suite/Form of Contract	**Used**	**Best Suited**
Institution of Civil Engineers Contract Conditions		
FIDIC Short Form of Contract		
FIDIC Conditions of Contract for Civil Engineering Works		
Ghana Government Building Conditions of Contract (Pink Form)		

6.6 What problems did you encounter on your project/s?

☐ Loss of control of the Project

☐ Inadequate control of the Project

☐ Inadequate involvement in the Project

☐ Difficulty in the verification of quality and value for money

☐ Other: Please state ……

……

6.7 How were these problems resolved and what lessons were learnt?

_____
_____
_____
_____
_____

6.8 Do you intend using on some of your projects in future?

☐ Yes

☐ No.

6.9 Would you like to obtain a summary of the results of this survey?

☐ Yes

☐ No

6.10 If so, kindly provide us with your contract details below:

Name (optional): _____

E-mail Address: _____

Fax Number: _____

Appendix 2: Classification of Consulting Firms

ITEM	TYPE OF FIRMS	TOTAL NUMBER
A	Registered Architectural Firms	101
B	Registered Surveying Firms General Practice – 35 Quantity Surveying - 42 Land Surveying - 10	87

Source: Ghana Institute of Architects – Website (www.archghana.org, June 2007)

Ghana Institution of Surveyors –Website (www.ghanasurveyors.org) Membership Directory, March - December, 2006, Volume 4

Ghana Institution of Engineers - Website (www. ghana.org, June 2007

Appendix 3: Test Hypothesis on the Relationship between Procurement Selection and Project Success

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	yes	29.3333	3	4.04145	2.33333
	no	8.3333	3	6.50641	3.75648

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	yes - no	21.00000	5.29150	3.05505	7.85518	34.14482	6.874	2	.021