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THE INFLUENCE OF PROCUREMENT SYSTEMS ON CONSTUCTION PROJECT TEAM'S COMMUNICATION MANAGEMENT IN ASHANTI REGION

BY

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A Thesis submitted to the School of Graduate Studies, Kwame Nkrumah University of Science and Technology in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE
IN PROCUREMENT MANAGEMENT

Department of Building technology
College of Architecture and Planning

JUNE, 2014

DECLARATION

I hereby declare that this thesis is the result of my own original research towards the Master of Science degree and that to the best of my knowledge no party of it has been published by another person or presented for another degree in this university or elsewhere except where due acknowledgement has been made in the text.

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(Name of Student) Signature Date

I declare that I have supervised the student and approve of the submission of this work

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ABSTRACT

Construction covers several areas of specialization, and different procurement systems required construction project team members to communicate well for the successful execution of projects. Poor or lack of communication among project team members under these procurement systems causes conflict among the team members. The study was carried out to seek how procurement systems influence communication management among the project team. Therefore what is the impact of procurement systems on the communication management? This study was to determine the influence of selected procurement systems on communication management among project team members. This can be achieved through determination of the critical communication roles performed by the project team under the two procurement systems and to determine the challenges to the performance of the roles identified under each of the procurement systems. This study took the form of literature review and survey using questionnaire approach.

Data collected from 22 selected project team members, Architects, Quantity Surveyors, Engineers and Land Surveyors were analyzed using Descriptive statistics. The result showed that the procurement systems have some influence on communication management among the project team members. A key recommendation from the study was that communication channels must be well defined when procuring under the various systems especially for Design & Build which is the system normally adopted when time is the most important requirement.

DEDICATION

I dedicate this project to my late parents Mr. & Mrs. Asumadu who nurtured in me unwavering interest in the value of education. I thank them and may their souls rest in perfect peace.

ACKNOWLEDGEMENT

I wish to acknowledge my profound gratitude to Almighty God for His abundant strength, grace, care and love which has seen me through the course. I am grateful to Dr. Emmanuel Adinyira of the Department of Building Technology for his constructive suggestions as well as valuable time spent in supervising this work. I render my sincere thanks to my wife Mrs. Baaba Boateng and my children Nicolas Amoako Asumadu, Henry Kofi Asumadu Boateng, Kuukua Boateng and Nana Afia Amoanimaa Boatemaa Boateng for their prayers, encouragement and support which propelled ―daddy‖ towards the successful completion of the programme.

I am also grateful to Dr. De-Graft Owusu Manu, Dr. Baiden, Dr. Nani and Rev. Dr. Fugar all of the Department of Building Technology, KNUST for their direction and pieces of advice in getting this work completed.

I am also thankful to the professionals who avail themselves to be interviewed and answered my questionnaires

My sincere thanks goes to my siblings Rev. Fr. Joseph Asumadu, Mrs. Mary Ankrah, Michael K. Darfour and Margaret Yaa Owusuaa for their prayers. Finally, I wish to show appreciation to all those who helped me in divert way for successful completion of my course. Your efforts have not been in vain.

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CHAPTER ONE

GENERAL INTRODUCTION

1.1 BACKGROUND

―Effective Project Communication Management includes the processes required to ensure timely and appropriate generations, collection, distribution, storage, retrieval, and ultimate disposition of project information‖ (PMBOK, 2008, pg. 243). Communication has been identified as one of the core indicators in enhancing the practice of team integration in construction project (Ibrahim et al., 2001). In procurement, communication management has been seen as a critical area in project management practice that has gained attention through research in recent times (Hoezen et al., 2008; Sanbasive and Soon, 2006). There is an emerging view in the construction industry that better performance or better value for money can be achieved by integrating team work through communication for planning, design and construction of building project.

These are contingent in enhancing the successful delivery of the project (Hoezen et al., 2008). The efficiency and effectiveness of the construction process strongly depend on the quality of communication and also the sector could benefit immensely from improved communication. Effective communication has been diagnosed as a critical success factor which contributes to success in project implementation (Singer, 2008). As described by (Love et al., 1998), communication has been linked to team effectiveness. Lack of communication management between all the players in construction project in a multi-disciplinary team has led to difficulty in the development process for both project management and design implementation levels (Evbuomwana and Anumba, 1998).

Sharing information is also seen as a key indicator of team integration practice (Evbuomwana and Anumba, 1998). According to Baiden et al. (2006), project information should be available, open and accessible to all project team members as an input for efficient decision making and in order to create effective integrated project teams. The challenge is to ensure that the right information gets to the appropriate person at the right time (Baiden and Price, 2011). The lack of information or a response from project stakeholders becomes critical for progressing with project decisions (Jorgensen and Emmitt, 2009). According to Strategic Forum for Construction (2003), the integrated project team should be an environment for openness, where shared information is essential for mutual respect and effective collaboration. Each team member should meet regularly to share information, discuss the project plans, any issues raised and generate ideas in order to achieve the objectives of the project. Integration between all key construction players could be successful if there was a compatibility of management and information systems that can enhance the information flow between project teams (Dulaimi et al., 2002).

The construction project has attracted criticism for inefficiencies in outcomes such as time and cost overruns, low productivity, poor quality and inadequate customer satisfaction (Latham, 1994; Eqan, 1998; Ericsson 2002; Chan et al., 2003).

Practitioner‘s researches and society at large have therefore called for a change in attitudes, behavior and procedures in order to increase the chance for construction projects to be successful and result in improved end product (Love et al., 1998; Dubois and Gadde, 2002). Increased complexity, uncertainty and time pressure in construction project have increased the need for communication and cooperation among different project actors (Anvuur and Kumaraswamy, 2007).

The fact that project managers spared 80% to 90% of their time communicating on a project (Mulcahy, 2005) coupled with literature describing communication as the life blood of the project management practice exemplify how important communication is for registering success on projects during implementation (Drinkwater, 2007). Adequate and timely sharing of information and knowledge in all directions and practice communication management that overcomes undesirable organizational cultures, barriers and style are some of the important factors required for successful project implementation (Muller, 2003).

According to Chan (1996), the differences in procurement methods influence the time performance of construction projects. Time would be affected by the flow of project that is driven by different type of procurement method.

Naoum (1991) stated that the major factor affecting cost and time overruns were the procurement method adopted. Bowen et al. (1999) supported the view that one of the reasons contributing to the poor performance of the construction industry principally is the inappropriateness of selection of procurement method. These indicate the effect of using different types of procurement methods in project delivery. These differences invariably affects the communication of all project teams i.e. design team and construction team and this has great impact on the project success.

1.2 PROBLEM STATEMENT

There are different types of procurement systems which are currently used in the country (Ghana). All these systems are in an attempt by the Construction industry to provide better deal to its clients through innovative or ―fast-tracking‖ project procurement systems. However, these unique project procurement systems present unique methods, process and procedure of construction of projects for the client.

These different systems also prescribe the variation of the organizational structure of the construction teams in terms of role, responsibility and authority hence impacts on project team communication. Poor or lack of communicated information of these systems has been the major cause of conflict among project teams (Allen, 2008). This study looked at how the different procurement systems affect project team communication performance considering that the method, process, procedure and organization vary according to the systems.

1.3 AIM OF STUDY

The aim of this study is to determine the influence of selected procurement systems on Communication Management among Project Team members.

1.4 OBJECTIVES

Specific objectives set for the study are:

- To determine critical communication roles performed by the project team under the two procurement systems.
- To determine the challenges to the performance of the roles identified under each selected procurement systems.

1.5 RESEARCH QUESTIONS

The research is designed to answer the following questions:

1. What are the roles of the project team under the various Procurement Systems?
2. What are the critical communication challenges to their performance of the roles under the various procurement systems and the impact of procurement systems on communication management among project team?

1.6 RESEARCH APPROACH AND PROCESS

The research was conducted using both primary and secondary data. The primary data collection involved the use of questionnaires and interviews of key stakeholders, project managers, design team, construction team and expert in project communication practice. Literature on the subject was also reviewed to identify correct practices and strategies in the area. Also, appropriate statistical tools were employed in performing statistical analysis of the data collected to meet the designed research objectives.

1.7 SCOPE OF STUDY

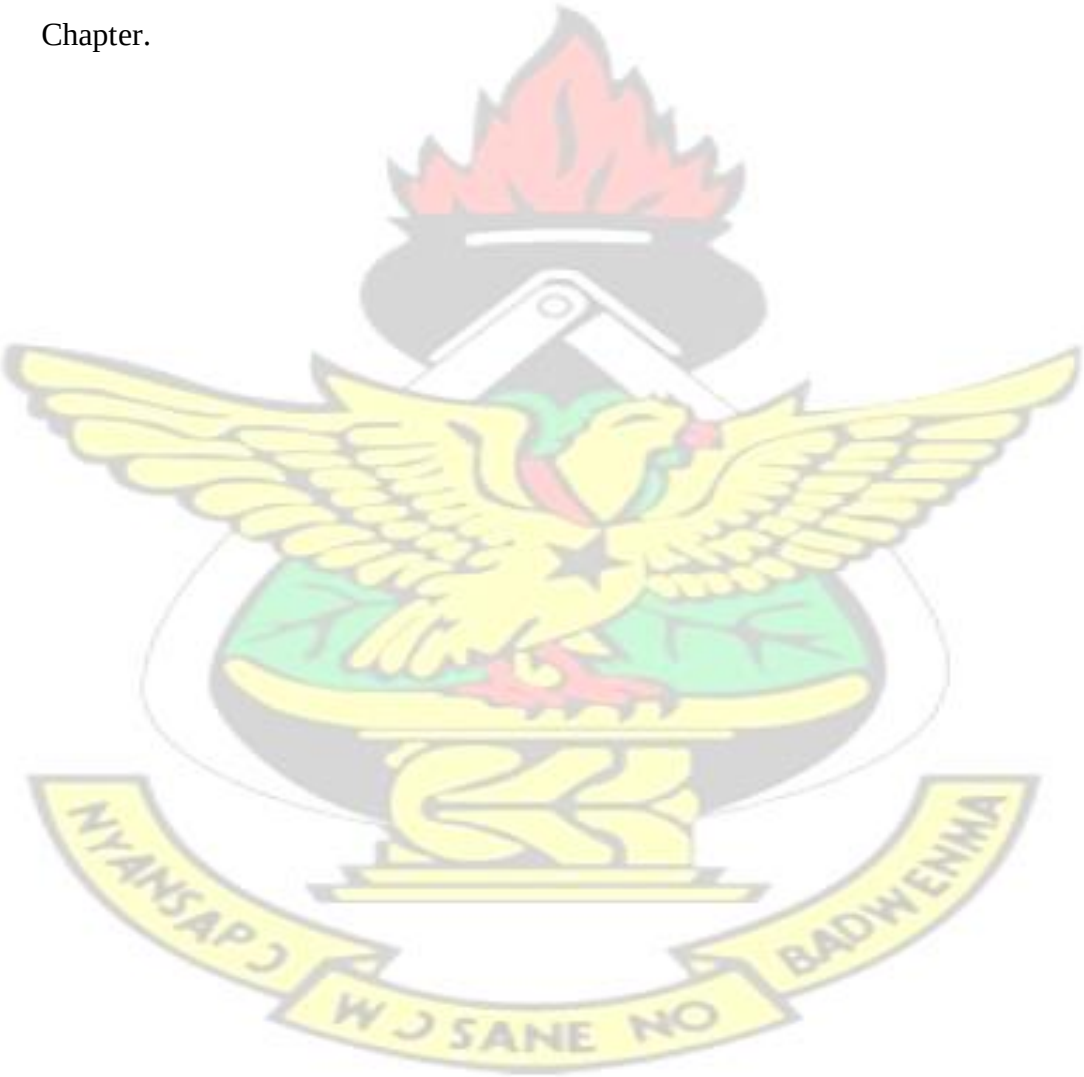
This study was limited to the two most widely used procurement systems in Ghana i.e. traditional procurement system and Design and Build procurement system. Data was sourced only from some selected construction project team members i.e. Architects, Quantity Surveyors, Engineers and Land Surveyors, who have used both Traditional, and Design and Build systems of procurement in Kumasi in the Ashanti region of Ghana.

1.8 ORGANIZATION OF THE STUDY

The research was structured in a way to present a logical order to the study finding and conclusion.

- Chapter one: Introduction – The introduction described the content of the study by introducing the topic, aims and objectives of the study, the approach to research and the scope of study.
- Chapter two: Literature review – This section gave an account of related works published by accredited researchers and scholars. It also discovered significant variables relevant to the study.

- Chapter three: Methodology – Methodology dealt with the structured process of conducting the research and also established the methods for data gathering.
- Chapter four: Research Analysis – This chapter presented the primary data analysis of surveys and interviews. The chapter also discussed the implication of the findings from the study.
- Chapter five: Conclusion – This chapter summarized the research work done. Recommendations based on the findings of the data analysis were stated in this Chapter.



CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

In this Chapter a review of literature on other works concerning the topic under consideration were presented. The following literatures were reviewed:

- Procurement systems: traditional, design and build
- Factors affecting communication among the construction project Team
- Construction project Team and their roles

2.2 PROCUREMENT SYSTEMS

Many authors have defined procurement but a few of the definitions are summarized under this section. Procurement has been defined as, "the purchase of merchandise or services at the optimum possible total cost in the correct amount and quality or simply as the procedure in which goods or commodities are bought when prices are low‖ (Cole, 2007). Moreover, according to Ghana Integrity Initiative (2007), procurement is the acquisition of goods and services at the best possible total cost of ownership, in the right quantity and quality, at the right time, in the right place for the direct benefit or use of governments, corporations, or individuals, generally via a contract.

The procurement process not only involves the purchasing of commodities but also adopting quality and quantity checks. Usually, suppliers are listed and predetermined by the procuring company.

It is very important at the very outset of the project to carefully consider all factors when selecting the most appropriate procurement approach for a construction project which communication among project team members cannot be ruled out. This is because each system has its own feature and peculiarity that will have effect on the

cost, time and quality of the project i.e. the project performance (Rosli et al., 2006). The procurement of construction project is vast in scope because it involves the gathering and organizing of myriads of separate individuals, firms and companies to design, manage and build construction products such as houses, office buildings, shopping complex, roads, bridges etc. for specific clients or ―customers‖.

Procurement comes from the word ―procure‖ which literally means ―to obtain by care or effort‖; ―to bring about‖ and ―to acquire‖. System is about ―organized method, approach, technique, process or procedure‖. In this context, project procurement is very much concerned with the organized methods or process and procedure of obtaining or acquiring a construction product such as a house, shopping complex or road and jetty. It also involves arranging and coordinating people to achieve prescribed goals or objectives. Masterman (1996) described project procurement as the organizational structure needed to design and build construction projects for a specific client. It is in a sense very true because the process of ―obtaining‖ a building by a client involves a group of people who are brought together and organized systematically in term of their roles, duties, responsibilities and interrelationship between them.

Today, there are several types or variations of project procurement systems being widely used in the construction industry. They range from the traditional system to the many variations of ―fast-tracking‖ systems such as turnkey, design and build, build-operate-transfer, management contracting, cost-plus contracting etc. The introduction of many variations of project procurement system was induced by the quest for more efficient and speedier project delivery system and better project performance. They are innovations to the traditional delivery method aimed at meeting the changing

demand of clients or customers. The different procurement systems present have brought changes not only to the process and procedure of project delivery but also the aspects of management and organization.

In the building industry, procurement describes the activities undertaken by the client to obtain a building. There are many different methods of construction procurement; however, the three most common types are:

1. Traditional (Design-bid-build)
2. Design and build
3. Management contracting

For the purpose of this study, only the first two construction procurement methods i.e. the Traditional method and the Design and Build method were considered.

2.2.1 TRADITIONAL METHOD (DESIGN-BID-BUILD)

The Traditional method is also known as Design–bid–build (design/bid/build, and abbreviated D–B–B or D/B/B accordingly) or Design–tender (design/tender) or hard bid. This is a project delivery method in which the agency or owner contracts with separate entities for the design and construction of a project. The traditional approach for construction projects consists of the appointment of a designer on one side, and the appointment of a contractor on the other side (Edward and Richard,

2012). There are three main sequential phases to the design–bid–build delivery method:

1. The Design phase
2. The Bidding (or tender) phase and
3. The Construction phase

2.2.1.1 THE DESIGN PHASE

In the Design Phase, the owner retains an architect (the engineer for infrastructure works) to design and produce tender documents on which various general contractors will in turn bid, and ultimately be used to construct the project. For building projects, the architect will work with the owner to identify the owner‘s needs, develop a written program documenting those needs and then produce a conceptual or schematic design. This early design is then developed, and the architect will usually bring in other professionals including mechanical, electrical, and plumbing engineers (MEP engineers), a fire engineer, structural engineer, sometimes a civil engineer and often a landscape architect to complete documents (drawings and specifications). These documents are then coordinated by the project manager and put out for tender to various general contractors.

2.2.1.2 THE BIDDING PHASE

In the bidding phase, bids can be "open", in which any qualified bidder may participate, or "select", in which a limited number of pre-selected contractors are invited to bid. The various general contractors bidding on the project obtain copies of the tender documents, and then put them out to multiple subcontractors for bids on sub-components of the project. Sub-components include items such as the concrete work, structural steel frame, electrical systems, and landscaping.

Once bids are received, the evaluation panel typically reviews the bids, seeks any clarifications required of the bidders, ensures all documentation is in order (including bonding if required), and advises the owner as to the ranking of the bids. If the bids fall in a range acceptable to the owner, the owner and consultant discuss the suitability of various bidders and their proposals. The owner is not obligated to accept the lowest

bid, and it is customary for other factors including past performance and quality of other work to influence the selection process. The project is usually awarded to the lowest bidder by a qualified general contractor. This method has some number of benefits and this includes:

1. The design team is impartial and looks out for the interests of the owner.
2. The design team prepares documents on which all general contractors place bids. With this in mind, the "cheaper is better" argument is rendered invalid since the bids are based on complete documents. Incomplete, incorrect or missed items are usually discovered and addressed during the bid process.
3. Ensures fairness to potential bidders and improves decision making by the owner by providing a range of potential options. It also identifies new potential contractors.
4. Assists the owner in establishing reasonable prices for the project.
5. Uses competition to improve the efficiency and quality for owners.

2.2.1.3 THE CONSTRUCTION PHASE

After the project has been awarded, the construction documents may be updated to incorporate addenda or changes and they are issued for construction. The necessary approvals (such as the building permit) must be achieved from all jurisdictional authorities for the construction process to begin. In most instances, almost every component of a project is supplied and installed by sub-contractors. The general contractor often provides work with its own forces, but it is not uncommon for a general contractor to limit its role to management of the construction process and daily activity on a construction site.

However, the traditional system of procurement is bedeviled with a number of problems such as:

1. Failure of the design team to be current with construction costs, and any potential cost increases during the design phase could cause project delays if the construction documents must be redone to reduce costs.
2. Redesign expense can be disputed should the architect‘s contract not specifically address the issue of revisions required to reduce costs.
3. There is little opportunity for input on effective alternates being presented as the general contractor is brought to the team post design.

2.2.2 DESIGN AND BUILD

Design–build (design/build, and abbreviated D–B or D/B accordingly) is a project delivery system used in the construction industry. It is a method to deliver a project in which the design and construction services are contracted by a single entity known as the **design–builder** or **design–build contractor**.

Design-build procurements award a single contract for both architectural/engineering design and construction. Design-build is well suited for civil engineering works example highway and bridge construction. But this contracting method is particularly valuable as well for construction after disasters, such as tornadoes, floods and hurricanes (Pabor and Pennington, 2012).

The design–build procurement route changes the traditional sequence of work. It answers the client's wishes for a single-point of responsibility in an attempt to reduce risks and overall costs (Pabor and Pennington, 2012).

Design–build is sometimes compared to the "master builder" approach, one of the oldest forms of construction procedure.

Using the design and build procurement method, the client contracts with an agent (usually an architect, a quantity surveyor or a project manager) to administer the contract on its behalf. The client also enters into a separate contract with a contractor for it to carry out the design and construction of the building works (Royal Institute of Charted Surveyor, 2012).

The agent does not enter into a direct contract with the contractor. In carrying out the work, the contractor normally employs both subcontractors and suppliers of services, goods and equipment (Royal Institute of Charted Surveyor, 2012).

Privity of contract, as discussed above, is particularly relevant. Therefore, collateral warranties are commonly used in design and build to provide a direct contractual link between parties that require such a direct contractual link, for example, between the contractor, subcontractors and a funder (Royal Institute of Charted Surveyor, 2012).

Under the design and build approach of procurement, the contract price (normally a lump sum price, subject to adjustment only as a result of variations) is usually the price for the works provided by a contractor and this is most often based on a set of drawings and a specification of the works to be provided (Royal Institute of Charted Surveyor, 2012).

The design and build procurement approach is popular as the liability for both the design and the build is with the contractor, and there is less chance of a liability of a defect 'falling between the two stools' of design and construction (Royal Institute of Charted Surveyor, 2012).

Some of the advantages of the Design and Build procurement approach are:

1. Speed of delivery from concept to completion of a construction project. There is normally a much quicker delivery time than for traditional procurement. In its simplest form, design and build allows work on site to begin earlier (that is before the design is fully complete) than under traditional forms of contract, because of the level of design control given to the contractor. Normally, the design and build procurement approach allows programs and budgets to be more easily met and the speed of construction is also often quicker.
2. Single point responsibility - The contractor is responsible for the design and the construction. Therefore the client should have a single point of responsibility and liability against the contractor. This is more advantageous than the traditional forms of contract where the client has entered into separate construction and design agreements. A common problem with the latter approach being that if a claim is made, the contractor, architect or other design consultants may argue over the extent of their own individual responsibilities. Consequently, there is less likelihood of claims being made by the contractor in respect of the split responsibility of design, and the contractor will be unable to make a claim for late design instructions being issued (other than for changes subsequently made by the client).
3. Acceptance of design - Because the contractor is responsible for the design and the construction, the contractor and his/her supply chain are involved in the production of the design to be used, and hence 'buy in' to that design. Also, it follows that the design is more likely to be 'buildable' than may be the case under other procurement methods.

4. Novation of design - There is normally the facility for the client's own designers to be innovated to the contractor. This approach has several perceived benefits, including; the client may have used those designers many times previously and will be happy with the quality of their work; the design team is likely to be more attuned to the client's requirements; the design team can continue with the contractor where they left off with the client; and some clients believe that through the novation of their own designers they (in effect) have an independent voice in respect of the contractor's subsequent design intentions,
5. Cost certainty - It is generally the case that, as the contractor can use his experience and expertise in providing a design that allows him to buy goods and services which allows him to obtain the best buying margins, the design and build procurement route can be more cost effective and can provide more cost certainty - provided, of course, that the client does not continually change the brief.
6. There is less client management/consultant involvement required post contract, and this therefore results in lower management costs and lower consultants' fees.
7. Unless a contract states otherwise, the law implies a duty of fitness for purposes on a design and build contractor. This is more onerous than the normal duty of 'reasonable skill and care' imposed on a design consultant. Of course, often the contract does state otherwise, and the contractor's design obligation is limited to a duty of reasonable skill and care. One of the reasons for this is that most professional indemnity insurance policies do not cover for a fitness for purpose obligation.

8. With regard to advantages, the contractor is selected based on qualifications, capabilities, experience and price, thus avoiding some of the pitfalls from contract awards solely based on low price. The design and construction are performed by a single team, under one contract. This reduces the owner's risk from diffused responsibility for design and construction. Time can be saved because ordering of materials and site work begin before the total design is complete. There is a close, contractual relationship between the design and construction teams, resulting in fewer change orders by the owner that arise from occasional revisions in design by an owner's A/E. Overall, design-build contracting has greater potential to save time and reduce cost (Pabor and Pennington, 2012).

Some of the disadvantages of the 'design and build' procurement approach are as follows:

1. Post-contract variations can be more expensive, and it is often more difficult to monitor the additional charges raised (particularly where works are priced on the basis of a specification and drawings - for example).
2. Inflexibility – There is only limited scope for the client to make changes to his requirements once the client's requirements and contractor's proposals have been agreed otherwise the cost consequences may be prohibitive. If the client does not have a firm and robust set of client's requirements he may be given a design that he did not want, or may be required to pay considerably more to obtain the design that he did require;
3. Design quality – Because it is often perceived that the contractor is driven by price rather than by design standards, it is often considered that the design and

build procurement route is not the appropriate route to use where a high quality design is required, unless a robust specification is included within the client's requirements;

4. There is the potential of dual loyalties of a novated architect. Also there could be complex legal issues in relation to the novation process. Following the decision in Blyth & Blyth v Carillion [2001] CILL 1789; a Scottish case with persuasive authority in England and Wales where the court ruled that the novation in that case did not entitle the contractor to recover loss for a failure by the employer's engineer to perform its services with reasonable skill and care prior to the novation - contractors need to ensure that they are able to pursue claims against the novated consultants for any pre-novation losses they may suffer as a consequence of breaches of duty by the consultants prenovation;

2.3 COMMUNICATION IN PROJECT CONSTRUCTION

Axley (1984) considered communication as metaphorical pipeline along which information is transformed from one individual to another.

Thomas (1988) defines communication as the lifeblood of any system of human interaction as without it no meaningful or coherent activity can take place.

The ―process of exchange of information between sender and receiver to equalize information on both sides‖ is called communication (Otter and Prins, 2002). This definition is consistent with ―sharing of meaning to reach a mutual understanding‖ (Otter and Emmitt, 2008) and as a ―cognitive and social process by which messages are transmitted and meaning is generated‖ (Maier et al., 2008), but places less emphasis

on others‘ requirement that communication must intend ―to gain a response‖ (Otter and Emmitt, 2008).

Communication is a skill that requires the exchange of information in a way that it creates a common understanding of an idea, expectation or an opinion. And good communication means one that has achieved its goal of making your audience understand what you have tried to convey (Mridula, 2012). Good communication is critical in achieving better cooperation and coordination across organizations in the business world (Al-Reshaid and Kartam, 1999).

In organizations good communication involves two-way exchange of information via different mediums such as emails, verbal dialogues, memos, newsletters, etc., with all members of a team at all levels (Mridula, 2012). Successful organizations align their business and communication objectives through various good practices, so that the employees understand what is expected of them. This leads to higher employee morale and employees perform better. Such good communication practices must be mapped within smaller project teams also (Mridula, 2012).

It is found that good internal communication among team members and project managers leads to benefits that have a direct effect on the success of a project. Benefits of effective communication are essential for the leadership role of a project manager, since effective communication acts as one of the props needed to achieve project objectives (Mridula, 2012).

Communications management is the systematic planning, implementing, monitoring, and revision of all the channels of communication.

It seems to be the root cause of the success or failure of a project to deliver the expected results to the stakeholders always comes down to one item –

_communications‘. How well the project team performs is directly proportional to the timeliness and effectiveness of the teams‘ ability to communicate among each other. Go back and look at project postmortems, or PIR‘s (post implementation reviews), or the new politically correct term of _project retrospectives‘ and you‘ll find a reference to _lack of‘ or _miscommunications‘ referenced in some manner or form. Research has proven that when projects fail, someone in the team knew it was going to happen beforehand – but because no one asked, the knowledge could not be acted upon.

The importance of effective communication to individuals, teams and organizations cannot be overstated. Virtually every text on how to manage people will contain important principles of how to communicate effectively with the workforce. At an individual and team level, people find it difficult to function in the industry if they do not develop a mutually agreed communication modus operandi to underpin their work activities. Similarly, the management of organizational processes also demands that robust and effective communication channels are developed which enable their various components to be conjoined appropriately (Armstrong, 2001).

This Communications Management Plan sets the communications framework for this project. It will serve as a guide for communications throughout the life of the project and will be updated as communication needs change. This plan identifies and defines the roles of persons involved in this project. It also includes a communications matrix which maps the communication requirements of this project. An in-depth guide for conducting meetings details the communications rules and how the meetings will be conducted, ensuring successful meetings. A project team directory is included to provide contact information for all stakeholders directly involved in the project.

2.3.1 COMMUNICATIONS MANAGEMENT APPROACH

First, there is exchange of information on a project, which is found in collaboration literature (Kvan, 2000) and project information management literature (Froese and Han, 2009). Laufer et al. (2008) and Otter and Emmitt (2008) provide an overview of literature on within-project communication in AEC, and Laufer claims, but does not provide evidence for a link between communication challenges and complexity on construction projects. Below are various practices that makes communication effective in projects.

- **Generate Progress Reports:** Generate weekly progress reports so that deviations can be caught early on. These progress reports must be shared with all the team members so that everyone understands the distress points and propose solutions for dealing with those distress points (Mridula, 2012).
- **Conduct Meetings:** It is advisable to meet with your team at least once a week. If travel is not feasible and you use virtual project management tool, then you must do web conferencing at least once a week to better connect with your team members. All the meetings must be held against a pre-set agenda which should be distributed to the team members in advance (Mridula, 2012).
- **Minutes of the Meeting:** Although it is often ignored, this is a very good practice that should be implemented. Every meeting must be summarized and documented in the form of minutes. The minutes must be circulated to all the attendees. Additionally, a deadline must be set before which the team members should be allowed to correct and/or add to the summary, just in case they feel otherwise about some decisions that were made during the meeting. Post deadline, the minutes of the meeting should _freeze' and should be used for

reference during any disagreements (Mridula, 2012).

- **Providing Feedback:** This practice is also often ignored by project managers, but feedback must be provided and should be an on-going event. It need not be only on a formal basis. Both negative and positive feedbacks must be given more often rather than giving feedback only on the day of formal scheduled appraisal cycle. Providing feedback often will allow a team member to mend his performance sooner (Mridula, 2012).
- **Recognition:** This must be practiced often so that the strengths and achievements of a team member are highlighted. Sincere efforts should be recognized publicly with all the team members. This helps in encouraging other team members as well. It also helps in restoring both short-term and long-term project goals with the team members (Mridula, 2012).
- **Listening:** Listening is one of the key levers of effective communication. Active listening is also a sign of good leadership skill. If you actively listen then you, as a project manager, gain the trust and confidence of your team members (Mridula, 2012).

These communication practices are essential for project managers since these practices make the team members feel valued. It naturally motivates them and keeps their morale high even during the stress times.

The Project Manager will take a proactive role in ensuring effective communications on this project. The communications requirements are documented in the Communications Matrix presented in this document. The Communications Matrix will be used as the guide for what information to communicate, who is responsible for communicating, when to communicate and to whom to communicate.

Gorse (2002) investigated and explained the functioning of design team meetings and its effectiveness for team communication. A review of design and construction professionals‘ use of communication media identified a clear preference for face to face communication over other forms e.g. drawings, emails etc.

2.3.2 FACTORS AFFECTING COMMUNICATION AMONG THE CONSTRUCTION PROJECT TEAM

Communication management is one of the nine knowledge areas that can be found in the Project Management Institute‘s (A guide to the Project Management Body of Knowledge). This is a really tough challenge and time-consuming task to any project manager despite the fact that ineffective communication management will result in project interruption or even failure

The important role of communication management within construction project team was clarified. During construction phase, interactions within the main contractor‘s team members and between the main contractor and subcontractors were analyzed. Communication problems were classified into three categories, i.e. coordination, information distribution and interpersonal communication (Ibrahim, 2013).

Poor communication between construction parties: this leads to estrangement between the parties and misunderstandings regarding the contract requirements. Thus, this result illustrates the importance of rising awareness among the contracting parties to ensure a culture of team work and to achieve their desires of a less adversarial working climate. This result is supported by several of the investigated studies (Mahamid, 2011; Alghbari et al., 2007; Sambasivan and Soon, 2007).

1. Due to lack of knowledge in this area communication management is usually skipped or approached shallowly.
2. Problems related to interpersonal communication (such as face-to-face meetings), intra-group communication (such as interactions between team members) or inter-group communication (such as interactions between main contractors and sub-contractors) occur very frequently at many projects. Consequently, projects communication often breaks down and projects are likely to be fail.
3. Unable to determine project stakeholders‘ needs for information, unable to determine communication channels in projects, insufficient interaction between project management and team members, or between main contractor and sub-contractors, or within team members, inappropriate communication media, etc.
4. Timing of distributing information, correct information to correct stake holders, wasting a large amount of time and resources for unnecessary meetings, etc.
5. Unable to combine verbal communication and non-verbal communication in order to achieve targets.
6. Abusive way of using bad emotional methods during interaction between project management and team members such as fear and threats, aversive stimulation, etc.

2.4 CONSTRUCTION PROJECT TEAM AND THEIR ROLES

In construction, the project team consists of the owner, contractors, designers, and other parties who need to work together to achieve common goals. The project team needs to communicate over the life cycle of the project efficiently (i.e. with minimum

time and resources) and effectively (i.e. different parties receive same interpretation) (Al-Reshaid and Kartam, 1999).

2.4.1 Architect

An architect is a person trained to plan and design buildings, and oversee the construction. Architecture is derived from the Latin ―architectus‖, which derives from the Greek ―arkhitekton‖ (arkhi-chief and tekton-builder), i.e., chief builder. To practice architecture means to provide services in connection with the design and construction of buildings and the space within the site surrounding the buildings that have as their principal purpose human occupancy or use. Professionally, an architect's decisions affect public safety, and thus an architect must undergo specialized training consisting of advanced education and a practicum (or internship) for practical experience to earn a license to practice architecture.

The architect is responsible for creating a design concept that meets the requirements and provides a facility suitable to the required use. In that, the architect must meet with and question the client to ascertain all the requirements and nuances of the planned project. This information, known as a program or brief, is essential to producing a project that meets all the needs and desires of the owner—it is a guide for the architect in creating the design concept. The Architects responsibility is to interpret and develop the Clients brief during the various stages of the project. The Architect will define the Client‘s requirements, identifying constraints, advise in terms of feasibility studies and option appraisals, arrange site investigations, establish the preferred solution, advise on sustainability, manage health and safety issues, develop the design, prepare room data sheets, obtain Client sign off of the design at appropriate stages, advise on materials selection, provide space planning services, advise on furniture/equipment

selection, prepare construction drawings and specifications, etc. and with due respect to the client‘s brief , prepare a design which meets all the clients requirements, including budget and timescale (APUC, 2011).

Architects deal with local and federal jurisdictions about regulations and building codes. The architect might need to comply with local planning and zoning laws, such as required setbacks, height limitations, parking requirements, transparency requirements (windows) and land use. The Architect will prepare and lodge the Planning Application and Building Warrants in co-ordination with the rest of the Team. During the works on site, the Architect will assist the Clerk of Works in monitoring quality on site. At handover the Architect will assist in ensuring that the works are complete and that the client needs have been met, and will continue their involvement through the Defects Liability period, and the final resolution of defects. After novation (in the case of a Design & Build Contract), the Architect will work for the contractor and will no longer be in the direct employment or control of the client (APUC, 2011). Architects typically put projects to tender on behalf of their clients, advise on the award of the project to a general contractor, and review the progress of the work during construction. They typically review contractor shop drawings and other submittals, prepare and issue site instructions, and provide construction contract administration and Certificates for Payment to the contractor.

In many jurisdictions, mandatory certification or assurance of the work is required.

2.4.2 The Quantity Surveyor

A quantity surveyor (QS) is a professional working within the construction industry concerned with building costs. The Quantity Surveyors (QS) roles are primarily in connection with providing cost advice to the Client throughout all stages of the project. During the pre-contract stage, the QS will assist the Project Manager in providing

advice on procurement routes for the main contractor, preparing the tender documentation, receiving and analysing tenders and preparing the tender report for the Client and recommendations for approval. The QS will prepare the contract documentation on behalf of the Client. Where the client has procurement department it is essential the QS liaise with procurement throughout the procurement process (APUC, 2011).

During the contract period, the QS monitors the project spend, providing regular reports to the Client, and will receive valuations of the Main Contractor and will check these, before authorizing the Architect to approve payment in the form of an Architect‘s Certificate. The QS will also assist with negotiations with the Contractor if any variations (changes) occur during the project, which have a financial impact. Following completion of the Construction Works, the QS will liaise with the Contractor in agreeing the Final Account. It is normal for this to take up to 12 months after completion, but this could take longer if the project is complex and there were many variations during the project (APUC, 2011). Other responsibilities are: life cycle cost analysis, preparing the elemental cost plan, preparing bills of quantities if required, assisting with selection of and interviewing of tendering contractors, and dealing with contractors queries (APUC, 2011).

2.4.3 The Construction Engineer

A construction engineer is the individual who directs a construction project. They will handle everything from the design of the construction project to being on hand during the daily construction activities to make sure that everything is going as planned. Depending on the particular project, the role of the construction engineer will vary. However, many construction engineers share the same tasks in various projects. A

construction engineer may design the plans for roads, bridges, pipelines, sewage systems, railroads and more.

In general, a construction engineer is responsible for the planning of the construction project. This includes conducting surveys, engaging in research, analyzing results, planning the construction and overseeing it along the way. The construction engineer will also provide information to the pertinent parties and general public to keep them informed and in the case that any issues arise before, during and after the construction. A construction engineer is the one who plans the project and advises the workers.

A construction engineer will have to fulfill a variety of specific duties on a daily basis. Prior to even thinking about starting a construction project, the construction engineer will have to survey the area. In conjunction with this they will need to produce reports and environmental statements detailing how the project will be done and what areas it will affect. During the pre-construction phase, the construction engineer will prepare diagrams, charts and surveys showing specific information about the area and the desired project. Once the reports, charts and data have been compiled, the construction engineer will then need to discuss such items with related parties such as builders, environmental agencies and local, state and federal entities.
These items may also have to be made available to the general public for their objections to be heard.

The construction engineer must also inspect the site to ensure that the building which will be taken place can be accommodated by that area. Tests will be performed relating to the ground and water level. The construction engineer may also have to determine the grade and elevation levels of the area. Some construction engineers must determine the costs of their construction projects. This is done by proposing bids and determining

the costs of labor and materials to ensure that the project can be carried through in keeping with the budget that has been set aside. This will be an estimation on the part of the construction engineer but it must be as close to the true number as possible. The construction engineer must also provide technical advice to all parties involved with the project. This may relate to any number of topics including the construction of the site to abiding by certain laws, codes and regulations. A construction engineer is something of a jack of all trades in many respects and therefore will be consulted on a number of issues.

2.4.4 Service Engineer

Building services engineering comprises of mechanical engineering, electrical engineering and plumbing, or public health (MEP) engineering. Building services engineers work closely with other construction professionals such as architects, structural engineers and quantity surveyors. They influence the architecture of a building and play a significant role on the sustainability and energy demand of a building. Within building services engineering, new roles are emerging, for example in the areas of renewable energy, sustainability, low carbon technologies and energy management. With buildings accounting for around 50% of all carbon emissions, building services engineers play a significant role in combating climate change. The building services engineer has the following specific roles;

1. Design: designing layouts and requirements for building services for residential or commercial developments.
2. Construction: supervising the construction of the building services, commissioning systems and ongoing maintenance and operation of services.

3. Environmental: developing new energy saving methods for construction, designing new and improved energy conservation systems for buildings.
4. Heating, ventilation and air conditioning (HVAC): specializing in the design, development, construction and operation of HVAC systems.
5. Electrical technology: specializing in the design and development of electrical systems required for safe and energy sustaining operation of buildings.

Construction engineers have a lot of responsibilities in their job. Certain tasks have to be completed everyday in order to get the job done correctly. Analyzing reports is a main part of their job description. They must analyze maps, drawings, blueprints, aerial photography and other topographical information. Construction engineers also have to use computer software to design hydraulic systems and structures while following construction codes. They have to calculate load and grade requirements, liquid flow rates and material stress points to ensure that the structure can withstand stress. Keeping a safe workplace is crucial to having a successful construction company. It is the construction engineer‘s job to make sure that everything is conducted correctly. In addition to safety, the construction engineer has to make sure that the site stays clean and sanitary. Surveying the land before construction begins is also a job of the sure that there are no impediments in and around the site for the proposed structure and if there is, take measures to eliminate them. They also must estimate costs and keep the project under budget. Construction engineers have to test the soils and materials used for adequate strength. Finally, construction engineers have to provide construction information, including repairs and cost changes, to the managers

2.4.5 Other Consultants

Dependant on the scope and scale of the project, the Client may wish to appoint other consultants such as; Interior Designer, Space Planner, Legal Advisers, Ecologist, BREEAM adviser, Landscape Designer, Sustainability Adviser, Fire Engineer, Landscape Designer, Façade Engineer, Service Providers etc. (APUC, 2011).

2.5 SUMMARY OF LITERATURE REVIEW

From the literature above, it is realized that every construction project team needs some form of good communication channels. Communication among project team members cannot be ruled out when considering all factors in selecting the most appropriate procurement approach at the very outset of the project. It is realized that the root cause of the success or failure of a project to deliver the expected results to clients is lack or poor forms of communication. It is obvious from the foregoing that how well the project team performs is directly proportional to the timeless and effectiveness of the teams' ability to communicate.

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

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

3.2 RESEARCH DESIGN

This research took the form of literature review and survey using questionnaire approach and interviewing 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 POPULATION OF THE STUDY

The population for this study was construction project team members who used both Traditional and Design and Build procurement systems in Kumasi Metropolis of Ashanti region. This population was undefined.

Location of study area within the map of Ghana and Ashanti Region

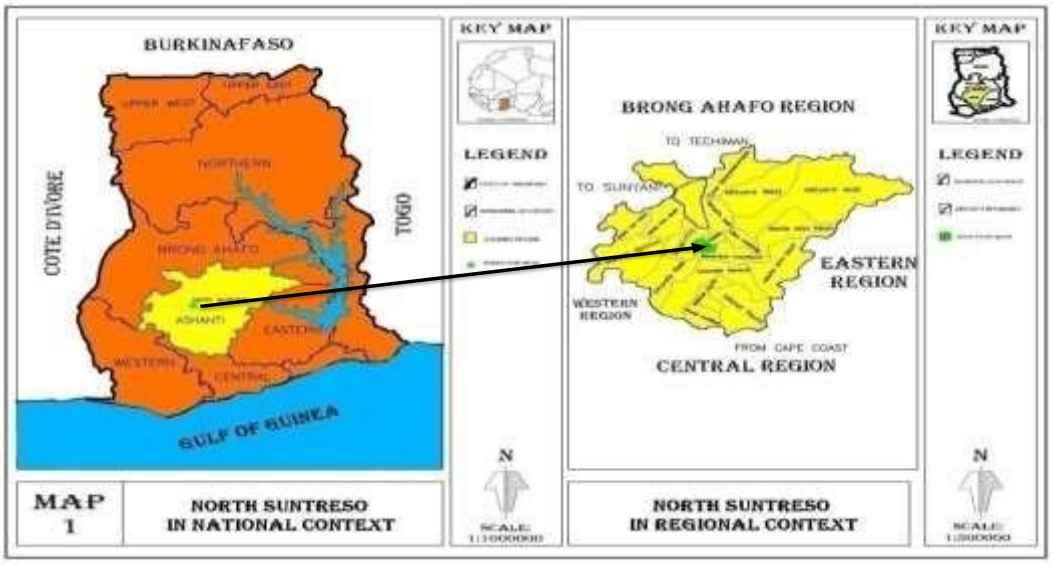


Figure 3.1 Location of the Study Area

3.4 SAMPLING TECHNIQUE AND SAMPLE SIZE

The difficulty of collecting data from the whole population due to financial, time and other constraints make sampling inevitable element in research work. According to Agyedu (1999), the process of sampling makes it possible to limit a study to a relatively small portion of the population. A sample is thus a representative selection of a population that is investigated into in acquiring statistical information of the whole.

In this study, snowball sampling technique was employed in the identification and selection of construction project team members. This technique was used because the required sample characteristics are uncommon and it was difficult to reach out to the respondents. The study further identified and selected four groups of project team in construction industry and these were architect, quantity surveyor, engineers and surveyor who were permanently engaged in procurement and construction activities with specific roles. Purposive sampling was what was needed in some cases – study such as community, or some other clearly defined and relatively limited group and

helps to identify most suitable respondents (Patton, 1990; Kuzel, 1999). Purposive sampling can be applied to research in a number of ways such as, sampling informants with a specific type of knowledge or skill (Li et al., 2006; Prance, 2004; Vargas & Van Andel, 2006)

In selecting the sample size for the respondents, the study made reference to work done by Leedy and Ormrod (2001). They asserted that rather than sampling a large number of respondents with the view of making generalizations, qualitative research tends to select few respondents who can best shed light on the phenomenon or study under consideration. In view of this the study sampled 22 members of the construction team. The number was as a result of an unknown population which was going to be identified through the snowball technique of sampling. The breakdown for each group of construction team members is given in the Table below.

Table 3.1: SAMPLE OF EACH CONSTRUCTION TEAM MEMBERS

Construction Team Members	Sample Size
Architect	3
Quantity surveyor	5
Engineers	12
Land Surveyor	2
Total	22

Source: Field Data, 2013

3.5 COLLECTION AND PROCESSING OF DATA

This looks at the data collection instrument employed and how the data collected was processed. The data required for the research included the procurement systems used by construction team members, roles, authority and power of construction project team

under each procurement system, the effectiveness of communication and challenges among construction team communication management under each procurement system.

The study used both secondary and primary sources of data. The secondary sources included both published and unpublished reports on the subject under investigation. Annual reports of the department on the subject matter were made use of. The primary data was gathered through direct interviews using structured questionnaires.

3.6 DATA COLLECTION INSTRUMENTS AND METHOD

The selection of data collection tools and methods is very significant in research both scientific and social. This is due to the fact that the choice of an appropriate tool offers adequate flexibility in addressing respondents differently while investigating into the phenomenon understudy. The data collection instruments employed for the research was questionnaire. In the questionnaire, a number of close and few openended questions were posed and administered, targeting only construction project team who have worked on both traditional and design and build procurement systems. The questionnaire was made up of;

1. Procurement systems
2. Roles, authority and powers of construction team under each procurement system
3. Challenges of communication among the construction team under the procurement system.
4. The effectiveness of communication under both procurement systems.

3.7 DATA PRESENTATION AND STATISTICAL TOOLS USED FOR ANALYSIS

The data were presented in tables using standard deviation, mean and ranking. The analyses of data were done descriptively using Statistical Packages for Social Sciences (SPSS). Each research question was analyzed and discussed and data on each research question was presented in tabular and chart form. The analytical process was undertaken focusing on the main objectives of the research work which was;

- To determine critical communication roles performed by the project team under the two procurement systems.
- To determine the challenges to the performance of the roles critical roles identified.

3.8 LIMITATIONS OF THE SURVEY

One of the limitations of this survey was:

Most of team members representing the targeted population (team members used both traditional and design and build procurement system), were difficult to locate and the population size unknown. This made the creation of a representative and large enough sample difficult.

3.9 SUMMARY

The above discussion informs of the methods adopted in carrying out the research work. The data analysis method used in analyzing the data was explained. The section showed how the sample size and sampling population were determined. Construction team members formed the sampling units of this study for the purpose of the research. They were not selected based on available data but through the snowball sampling technique.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 INTRODUCTION

The aim of this study is to determine the influence of procurement systems on communication management among Project Team members. This section deals with the analysis of the information gathered from the questionnaire survey. Data from the survey was analyzed using descriptive statistics. The SPSS tool was employed in analyzing the data. The presentation and discussion of results is organized in accordance with the arrangement of objectives of the study. However, the characteristics of the respondents is first presented and discussed to demonstrate the quality of the data collected.

4.2 PERSONAL DATA (DEMOGRAPHIC)

As shown in the questionnaire (Appendix A), personal data of the respondents who were all construction team professionals who have used traditional and design and build procurement systems in the past and based in the Kumasi Metropolis were composed of three items, namely:, age and years of experience, highest educational qualification as well as membership of professional bodies.

TABLE 4.1: CROSS TABULATION OF RESPONDENTS DEMOGRAPHICS.

Variable	Architect	Q.S	Engineers	Land Surveyor	Total

Age :					
25-34	0 (0%)	0 (0%)	2(100%)	0 (0%)	2 (100%)
35-44	1 (14.3%)	0 (0%)	5 (71.4)	1 (14.3%)	7 (100%)
45-54	2 (25%)	4 (50%)	1(12.5%)	1(12.5%)	8(100%)
55 and above	0 (0%)	1 (20%)	4 (33.3%)	0 (0%)	5(100%)
Years of Experience:					
1-5 years	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
6-10 years	1(8.3%)	2(16.7%)	8 (66.7%)	1 (8.3%)	12(100%)
11-15 years	1 (25%)	2 (50%)	1 (25%)	0 (0%)	4(100%)
16 years & above	1 (16.7%)	1(16.7%)	3(50%)	1(16.7%)	6(100%)
Educational level					
HND /CTC	0(0.0%)	2(40%)	3(60%)	0(0%)	5(100%)
BSc.	3(20%)	3(20%)	7(46.7%)	2(13.3%)	15(100%)
Msc. / Mphil	0(0%)	0(0%)	1(100%)	0(0%)	1(100%)
Above Msc / Mphil	0(0%)	0(0%)	1(100%)	0(0%)	1(100%)
Professional Qualification					
GIA	3(100%)	0(0%)	0(0%)	0(0%)	3(100%)
GhIS	0(0%)	0(0%)	0(0%)	2(100%)	2(100%)
GhIE	0(0%)	0(0%)	1(100%)	0(0%)	1(100%)
IIE	0(0%)	0(0%)	2(100%)	0(0%)	2(100%)

From **Table 4.1**, 2 respondents forming 9.1% fell within the age group 25-34 years. 7 respondents forming 31.8% were within the ages 35-44. 8 respondents (36.4%) had their ages fall between 45 and 54. Only 5 respondents constituting 22.7% had their ages above 55 years.

The finding from the study is confirmed by (CIOB, 2010). The sector stands to lose valuable skills and experience with the retirement of the older generation in the next five to 10 years (CIOB, 2010). Moreover, the Strategic Promotion of Ageing Research Capacity (SPARC) research programme (Leaviss, Gibb and Bust, 2008) noted not only the void left behind from lost experience, but also how older workers reluctant to retire can still add value to the workforce. Older workers in the construction industry were found to be committed, valued and appreciated for their skills, but as they age they slow down and become less productive and this affect performance of role by the design team.

From **Table 4.1**, 54.5%, 18.2% and 27.3% of the respondents have had 6-10 years of working experience in the profession, 11-15 years of working experience in the profession and above 16 years of working experience in the profession respectively. The year of experience in the table show that, respondents have acquired enough experience in their area of profession.

The **Table 4.1** also shows that 22.7% of the respondents have acquired HND or CTCIII. 68.2% of the respondents have a Bachelor of Science Degree. MSc or MPhil constituted 4.5% and another 4.5% of respondents have above MSc or MPhil . This indicates that, the professionals have good educational background. Out of 22 respondents only 8 were members of professional bodies representing 36.36%. All three (3) Architects are with Ghana Institute of Architects. There was only one (1) engineer who belonged to the Ghana Institute of Engineers with two (2) from the Institute of Incorporated Engineers. The two (2) Land Surveyors belongs to Ghana

Institute of Surveyors. From the table it shows that most of the QS and Engineers practice without professional certificate, they practice with only the academic certificate.

4.3 CRITICAL COMMUNICATION ROLES OF RESPONDENTS

The importance of communication roles executed by the various project team members under Traditional and Design and Build procurement systems were indicated by their Mean scores. The highest mean being 5 and 3 being the average. The communication indicators were: Weekly progress report are generated, Meetings are conducted among the team once a week, Minutes of meetings are documented and circulated, Feedback often provided, Team members are recognized for their strength and achievement.

4.3.1 CRITICAL COMMUNICATION ROLES OF ARCHITECTS

The level of Architect's key roles being performed under Traditional and Design and Build procurement systems were indicated by (**Mean**), the highest being 5 and 3 being the average. Roles identified were: developing and interpreting client brief rank (5.0, 3.5) preparation of design (4.7, 3.3); advice on material/ furniture/ equipment selection (4.3 3.3,); management of health and safety issues (2.0, 2. 3) and team leader (4.7, 2.7).

This study suggests that the critical roles performed were the same by the Architects under both the Traditional and Design & Build system i.e. developing and interpreting client brief, preparation of design, advice on material/ furniture/ equipment selection, and leader of project team. The findings are summarized in

Table 4.2

TABLE 4.2: ROLES OF ARCHITECT

Roles	Traditional	Design & Build

	Mean	Std. Dev.	Rank	Mean	Std. Dev.	Rank
Developing and interpreting client brief	5.0	0	1	3.7	0.6	1
Preparation of design	4.7	0.58	2	3.3	0.58	3
Advice on material/ furniture/ equipment selection	4.3	0.58	4	3.3	0.58	4
Manage health and safety issues	2.0	0.00	5	2.3	0.58	5
Leader of project team	4.7	0.58	3	2.7	0.58	2

Source: Field Data, 2013

4.3.2 CRITICAL COMMUNICATION ROLES OF QS

The level of Quantity Surveyor's key roles being performed under Traditional and Design and Build procurement systems were indicated by (**Mean**) the highest being 5 and 3 being the average. Roles identified were; advice on preparation on tender document (4.6, 4.4); monitoring construction expenses (2.8, 4.2); advice on evaluation of variation in contract (4.4 ,4.4); preparing valuation report on work done for payment (4.2, 3.8) and regular report on project to client (3, 3.4) under the traditional method. The study identified that quantity surveyors under both systems performed their roles all the time with the exception of monitoring construction expenses under Traditional system. The findings are summarized in Table 4.3

TABLE 4.8: ROLES OF QUANTITY SURVEYOR

Roles	**Traditional**			**Design & Build**		
	Mean	Std. Dev.	Rank	Mean	Std. Dev.	Rank
Advice on preparation on tender document	4.6	0.55	1	4.4	0.55	1

Monitoring construction expenses	2.8	0.45	5	4.2	0.45	3
Advice on evaluation of variation in contract	4.4	0.55	2	4.4	0.89	2
Preparing valuation report on work done for payment	4.2	0.45	3	3.8	0.70	4
Regular report on project to client	3.0	0.00	4	3.4	0.55	5

Source: Field Data, 2013

4.3.3 CRITICAL COMMUNICATION ROLES OF ENGINEERS

The level of surveyor's key roles being performed under Traditional and Design and Build procurement systems were indicated by (**Mean**) the highest being 5 and 3 being the average. Roles identified were: preparation of charts and diagrams to convey needed information on a project (3.8, 4.1), directs the project from design stage (4.0, 3.9) give technical advice whether the area can accommodate the structure (4.2, 4.5); engage stakeholder of a project on discussion of report (4.1 ,4.3) and, directs and advice to workers on a project (3.4, 4.2) .

From the study, it was realized that engineers perform all their roles at all times under both traditional method and design and build method. See table 4.4 for details.

TABLE 4.4: ROLES OF ENGINEERS

Roles	**Traditional**			**Design & Build**		
	Mean	Std. Dev.	Rank	Mean	Std. Dev.	Rank
Preparation of charts and diagrams to convey needed information on a project	3.8	0.72	4	4.1	0.67	4
Directs the project from design stage	4.0	0.43	3	3.9	0.9	5

Give technical advice whether the area can accommodate the structure.	4.2	0.58	1	4.5	0.52	1
Engage stakeholder of a project on discussion of report	4.1	0.79	2	4.3	0.45	2
Directs and advice to workers on a project	3.6	0.49	5	4.17	0.39	3

Source: Field Data, 2013

4.3.4 CRITICAL COMMUNICATION ROLES OF LAND SURVEYORS

The level of surveyor's key roles being performed under Traditional and Design and Build procurement systems were indicated by (**Mean**) the highest being 5 and 3 being the average. Roles identified were: Preparation of charts, diagrams and survey to convey needed information on a project. (4.5, 4.0) conduct environmental impact analysis on project (3.5, 3.5) Give technical advice on building laws, codes and regulations (2.5, 4.0) Engage stakeholder of a project on discussion of survey report (3.5, 4.0) Advice to workers on a project (3.5, 4.0).

From **Table 4.5**, Surveyors performed their role all the time under traditional method with exception of giving of technical advice on building laws, codes and regulations but under design and build method, they perform such roles all the time.

The extent of the performance of their roles under the two methods is summarized in Table 4.5

TABLE 4.5: ROLES OF SURVEYOR

Roles	Traditional			Design & Build		
	Mean	Std. Dev.	Rank	Mean	Std. Dev.	Rank
Preparation of charts, diagrams and survey to convey needed information on a project	4.5	0.71	1	3.5	0.71	4
Conduct environmental impact analysis on project	3.5	0.71	2	3.5	0.71	5
Give technical advice on building laws, codes and regulations	2.5	0.71	5	4.0	0.00	1
Engage stakeholder of a project on discussion of survey report	3.5	0.71	3	4.0	0.00	2
Advice to workers on a project	3.5	0.71	4	4.0	0.00	3

Source: Field Data, 2013

4.4 CHALLENGES TO THE PERFORMANCE OF THE CRITICAL ROLES

This section of the chapter presents the data and discussion on the challenges to the performance of the communication roles of the various selected project team members for this study.

4.4.1 CHALLENGES TO THE PERFORMANCE OF THE CRITICAL COMMUNICATION ROLES OF ARCHITECTS

From the table 4.6 below, challenges to the performance of the critical communication roles under Traditional and Design & Build procurement systems were indicated by **Mean** (the highest occurrences being 5 and the least being below the average 3). Challenges identified were, Lack of commitment towards project success (4.7, 2.3); Misunderstanding among team members (3.0, 3.0);

misinterpretation of drawings (3.3, 2.3); programme of work not well described (4.0,

2.3); no interpersonal communication such as face to face meetings among the team (3.7, 2.0); communication channels not well defined (2.3, 3.3)

From the analysis in **Table 4.6**, Architects had challenges in the entire critical communication roles with exception of communication channels being well defined in the Traditional system. With the Design and Build the Architect had challenges with misunderstanding among and communication channels not well defined, the reason given was that, is mostly happen when their normal team leader role is played by other team members who gets the job and engaged the team members

TABLE 4.6: CHALLENGES OF COMMUNICATION TO THE PERFORMANCE OF ARCHITECTS ROLES

Communication Challenges	Traditional			Design & Build		
	Mean	Std. Dev.	Rank	Mean	Std. Dev.	Rank
Lack of commitment towards project success	4.7	0.58	1	2.3	0.58	3
Misunderstanding among team members	3.0	1.00	5	3.0	1.00	2
Misinterpretation of drawings	3.3	1.00	4	2.3	0.58	4
Programme of work not well described	4.0	0.00	2	2.3	0.58	5
No interpersonal communication such as face to face meetings among the team	3.7	0.58	3	2.0	0.00	6
Communication channels not well defined	2.3	0.58	6	3.3	0.58	1

Source: Field Data, 2013

4.4.2 CHALLENGES TO THE PERFORMANCE OF THE CRITICAL COMMUNICATION ROLES OF QS

From the **Table 4.6**, present challenges to the performance of the critical communication roles under Traditional and Design & Build procurement systems, indicated by **Mean** (the highest occurrences being 5 and the least being below the average 3). Challenges identified were, Lack of commitment towards project success (3.8, 2.2); Misunderstanding among team members (3.0, 3.0); misinterpretation of drawings (3.2, 1.8); programme of work not well described (3.2, 1.8); no interpersonal communication such as face to face meetings among the team (4.2, 1.4); communication channels not well defined (2.2, 2.2) and discrepancies in the bill of quantities (4.0, 1.2)

The study in table 4.7 reviewed that, Quantity Surveyor had challenges in the entire critical communication roles with exception of communication channels being well defined in the Traditional system.

TABLE 4.7: CHALLENGES OF COMMUNICATION TO THE PERFORMANCE OF QS ROLES

Communication Challenges	Traditional			Design & Build		
	Mean	Std. Dev.	Rank	Mean	Std. Dev.	Rank
Lack of commitment towards project success	3.8	0.84	3	2.2	0.84	2
Misunderstanding among team members	3.0	0.84	7	3.0	1.23	1
Misinterpretation of drawings	3.2	1.30	4	1.8	0.84	4
Programme of work not well described	3.2	1.30	5	1.8	0.45	5

No interpersonal communication such as face to face meetings among the team	4.2	0.45	1	1.4	0.55	6
Communication channels not well defined	2.2	0.84	6	2.2	0.84	3
Discrepancies in the bill of quantities	4.0	1.23	2	1.2	0.45	7

Source: Field Data, 2013

4.4.3 CHALLENGES TO THE PERFORMANCE OF THE CRITICAL COMMUNICATION ROLES OF ENGINEERS

The table 4.6 below shows challenges to the performance of the critical communication roles under Traditional and Design & Build procurement systems. The challenges were indicated by **Mean** (the highest occurrences being 5 and the least being below the average 3). Challenges identified were, Lack of commitment towards project success (4.0, 2.2.5); Misunderstanding among team members (2.7, 2.3); misinterpretation of drawings (3.7, 2.17); programme of work not well described (3.4, 2.25); no interpersonal communication such as face to face meetings among the team (4.1, 1.08); communication channels not well defined (2.8, 2.8)

From the study, the Engineers had challenges in all the critical communication roles with exception of misunderstanding among team members and communication channels being well defined in the Traditional system, see Table 4.8.

TABLE 4.8: CHALLENGES OF COMMUNICATION TO THE PERFORMANCE OF ENGINEER ROLES

Communication Challenges	Traditional			Design & Build		
	Mean	Std. Dev.	Rank	Mean	Std. Dev.	Rank
Lack of commitment towards project success	4.0	0.43	2	2.25	0.62	3

Misunderstanding among team members	2.7	0.78	3	2.3	0.65	2
Misinterpretation of drawings	3.7	0.65	4	2.17	0.72	5
Programme of work not well described	3.4	0.90	5	2.25	0.75	4
No interpersonal communication such as face to face meetings among the team	4.1	0.52	1	1.08	0.29	6
Communication channels not well defined	2.8	0.45	6	2.8	0.45	1

Source: Field Data, 2013

4.4.4 CHALLENGES TO THE PERFORMANCE OF THE CRITICAL COMMUNICATION ROLES OF LAND SURVEYORS

Challenges to the performance of the critical communication roles of Land Surveyors in Traditional and Design & Build procurement systems presented in Table 4.9 were indicated by **Mean** (the highest occurrences being 5 and the least being below the average 3). Challenges identified were, Lack of commitment towards project success (4.0, 2.5); Misunderstanding among team members (4.0, 3.0); misinterpretation of drawings (3.5, 2.5); programme of work not well described (3.3, 3.0); no interpersonal communication such as face to face meetings among the team (4.5, 1.0); and communication channels not well defined (3.0, 3.0).

The study revealed that, Land Surveyors had challenges in all the critical communication roles with exception of programme of work not well described and communication channels being well defined in the Traditional system.

TABLE 4.9: CHALLENGES OF COMMUNICATION TO THE

PERFORMANCE OF LAND SURVEYOR ROLES

Communication Challenges	Traditional			Design & Build		
	Mean	Std. Dev.	Rank	Mean	Std. Dev.	Rank
Lack of commitment towards project success	4.0	0.00	2	2.5	0.71	4
Misunderstanding among team members	4.0	0.00	3	3.0	0.00	1
Misinterpretation of drawings	3.5	0.71	4	2.5	0.71	5
Programme of work not well described	3.0	0.00	5	3.0	0.00	2
No interpersonal communication such as face to face meetings among the team	4.5	0.71	1	1.0	0.00	6
Communication channels not well defined	3.0	0.00	6	3.0	0.00	3

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This concluding chapter summarizes the major finding of the study and key recommendations are provided and also outline recommendation for further research. The scope of the study is also discussed in the chapter.

5.2 SUMMARY OF FINDINGS

The summary of the findings from the study are presented in this section in the order of the objectives set in the beginning of the study.

5.2.1 ROLES PERFORMED BY THE PROJECT TEAM UNDER THE TWO PROCUREMENT SYSTEMS

Architects – Critical roles performed by the Architects under both the Traditional and Design & Build systems were, developing and interpreting client brief, preparation of design, advice on material/ furniture/ equipment selection, and leader of a project team.

Quantity Surveyor – Under the Traditional system, the QS performed the following critical roles, advice on preparation on tender document, monitoring advice on evaluation of variation in contract, preparing valuation report on work done for payment, and regular report on project to client. Under the Design and Build system, the Quantity Surveyor prepares the tender and contract documents, monitoring construction expenses, advice on evaluation of variation in contract, preparing valuation report on work done for payment, and regular report on project to client.

Engineer – Engineers under both system performed their critical roles which constitutes the preparation of charts and diagrams to convey needed information on a project, directs the project from design stage, give technical advice whether the area can accommodate the structure, engage stakeholder of a project on discussion of report and, directs and advice to workers on a project.

Land Surveyor – The study revealed that in Traditional system, Surveyors performed their roles through the preparation of charts, diagrams and survey to convey needed information on a project, conduct environmental impact analysis on project, and advice to workers on a project. In the Design and Build system the critical roles identified were the same as that of the Traditional system with the exception of giving technical advice on building laws, codes and regulations, engage stakeholder of a project on discussion of survey report.

5.2.2 CHALLENGES TO THE PERFORMANCE OF THE CRITICAL ROLES IDENTIFIED

Architect – From the study, Architect in the Traditional system identified the following challenges whiles performing their critical communication roles. The challenges lack of commitment towards project success, misinterpretation of drawings, programme of work not well described, and no weekly meetings among the team to enhance interpersonal communication such as face to face. With the Design and Build system, the Architect had challenges with misunderstanding among team members and communication channels not well defined, the reason given was that, is mostly happened when their normal team leader role is played by other team members who gets the job and engaged the team members.

Quantity Surveyor – The challenges on the part of the QS in Traditional system were lack of commitment towards project success, misinterpretation of drawing, programme of work not well described, no interpersonal communication such as face to face meetings among the team, and discrepancies in the bill of quantities. There were challenges under the Design and Build.

Engineer – From the study, Engineers in the Traditional system identified the following challenges whiles performing their critical communication roles, lack of commitment towards project success, misinterpretation of drawings, programme of work not well described, and no interpersonal communication such as face to face meetings among the team.

Land Surveyor – Challenges identified were, lack of commitment towards project success, misunderstanding among team members, misinterpretation of drawings, no interpersonal communication such as face to face meetings among the team.

5.3 CONCLUSION

Base on the literature review and the analysis of the survey result it could be concluded that the entire research objective has been met and some of the limitations of the study were as follows;

 Architects have challenges when it came to the Design and Build system. The reason given was that;

i. Critical communication roles are perform by project team in both Traditional and Design & Build procurement systems.

ii. Lack of commitment towards project success, misinterpretation of drawings, programme of work not well described, discrepancies in the bill of quantities, and interpersonal communication such as face to face meetings among the team, are challenges team members face when performing their Critical communication roles in the Traditional system **iii.** For Design and Build, the major challenge is communication channels not well defined.

iv. Architects also have problem of misunderstanding when their normal team leader role is played by other team members in the Design and Build.

With the above findings it can be concluded that the procurement systems have impact on project team communication and Design & Build being the most effective.

5.4 RECOMMENDATIONS FROM THE STUDY

Base on the study the following recommendations were made:

- Projects which are in urgent need should be procured under Design & Build
- Communication channels must be well defined when using Design & Build system

- There should be more face to face meetings at least once a week for the project team to address the challenges.

5.5 RECOMMENDATION FOR FURTHER RESEARCH

This section gives a brief overview for in carrying out future research to add knowledge to procurement systems in works. It is recommended that further research could be done in the following areas;

- Effect of communication management among the project team on, cost, time and quality in procurement systems
- The factors affecting communication among the team in the procurement systems **REFERENCES**

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APPENDIX 1

QUESTIONNAIRE FOR RECOGNISED CONSTRUCTION TEAM MEMBERS

Sir/ Madam

I am a research student from the Department of Building Technology, KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI. I am pursuing MSC. PROCUREMENT MANAGEMENT and I am writing a thesis on the topic **The Influence of Procurement systems on Communication among Project Team members.** Your opinions are highly essential as they will help to determine the influence of procurement on construction project team communication. Whatever you say will be treated confidential, so feel at ease to express your candid opinion. Be assured that your responses will not in any way be linked to your identity. You are kindly requested to answer the questions below by indicating a tick or writing the appropriate answer when needed.

THANK YOU.

PERSONAL DATA

1. Gender: Male [ ] Female [ ]
2. Age: 18-24 [ ] 25-34 [ ] 35-44 [ ] 45-54 [ ] 55 and above [ ]
3. Which company do you work with?
   ……
4. What it the class of your company? D3K3 [ ] D2K2 [ ] D1K1 [ ]
5. How long have you worked with this institution?
   1= below 1 year [ ] 2= 1-3 years [ ] 3= 4-6 years [ ] 4= 7 – 9 [ ] 5=10 years and above [ ]
6. How long have you engaged in construction industry?
   1= below one year [ ] 2= 1- 5 years [ ] 3= 6 – 10 years [ ] 4= 11 -15 years [ ] 5= 16 years and above [ ]
7. What is your highest educational level?

1= HND/CTC [ ] 2=Bsc. [ ] 3= Msc./Mphil[ ] 4= above Msc./Mphil[ ]

8. Which of the following professional bodies do you belong? Please tick as many as are applicable

   1= Ghana Institution of Engineers [ ] 2= Institution of Incorporated Engineers [ ]

   3=Ghana Institution of Surveyors [ ] 4= Ghana Institution of Architect

   5=Chartered Institute of Builders [ ] 6= None [ ] 7= Other specify……

ROLES/ AUTHORITY/ POWERS OF CONSTRUCTION TEAM

1. Are the roles clearly defined? 1= Yes 2= No

Traditional method	
Design and build	

If No give reason (Traditional method)……..

If No give reason (Design and build)…….

2. How often do you exercise your roles under each procurement system as an team member? Please indicate with **Not at all = 1, Not often = 2, Quite often=3, Often = 4, Very often = 5**

Architects

Roles	Traditional method					Design and build				
	1	2	3	4	5	1	2	3	4	5
Developing and interpreting client brief										
Preparation of design										
Advice on material/ furniture/ equipment selection										
Manage health and safety issues										
Leader of design team										

Quantity Surveyors

Roles	Traditional method					Design and build				
	1	2	3	4	5	1	2	3	4	5
Advice on preparation on tender document										
Monitoring construction expenses										
Advice on evaluation of variation in contract										
Checking evaluation report before payment										
Regular report on project to client										

Engineers

Roles	Traditional method					Design and build				
	1	2	3	4	5	1	2	3	4	5
Preparation of charts and diagrams to convey needed information on a project										
Directs the project from design stage										
Give technical advice weather the area can accommodate the structure.										
Engage stakeholder of a project on discussion of report										
Directs and advice to workers on a project										

Land Suveyor

Roles	Traditional method					Design and build				
	1	2	3	4	5	1	2	3	4	5
Preparation of charts, diagrams and survey to convey needed information on a project										
Conduct environmental impact analysis on project										
Give technical advice on building laws, codes and regulations										
Engage stakeholder of a project on discussion of survey report										
Advice to workers on a project										

COMMUNICATION CHALLENGES

Rate the following factors as per your experience in construction team under each procurement

Strongly disagree=1, disagree=2, less agree=3, agree=4, strongly agree=5

Communication indicators	Traditional method					Design and build method				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Lack of commitment towards project success										
Misunderstanding among team members										
Misinterpretation of drawings and pictures										
Programme of work is not described suitably										
No interpersonal communication such as face to face meetings among team members										
Communication channels not well defined										
Discrepancies in bill of quantities										