

**THE EFFECT OF ORGANISATIONAL STRUCTURE ON
PROJECT PERFORMANCE: THE CASE OF AGA LTD.**

By

KNUST

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**A Thesis submitted to the Institute of Distance Learning,
Kwame Nkrumah University of Science and Technology in partial
fulfillment of the requirements for the degree of**

**COMMONWEALTH EXECUTIVE MASTERS IN BUSINESS
ADMINISTRATION**

JULY, 2011

DEDICATION

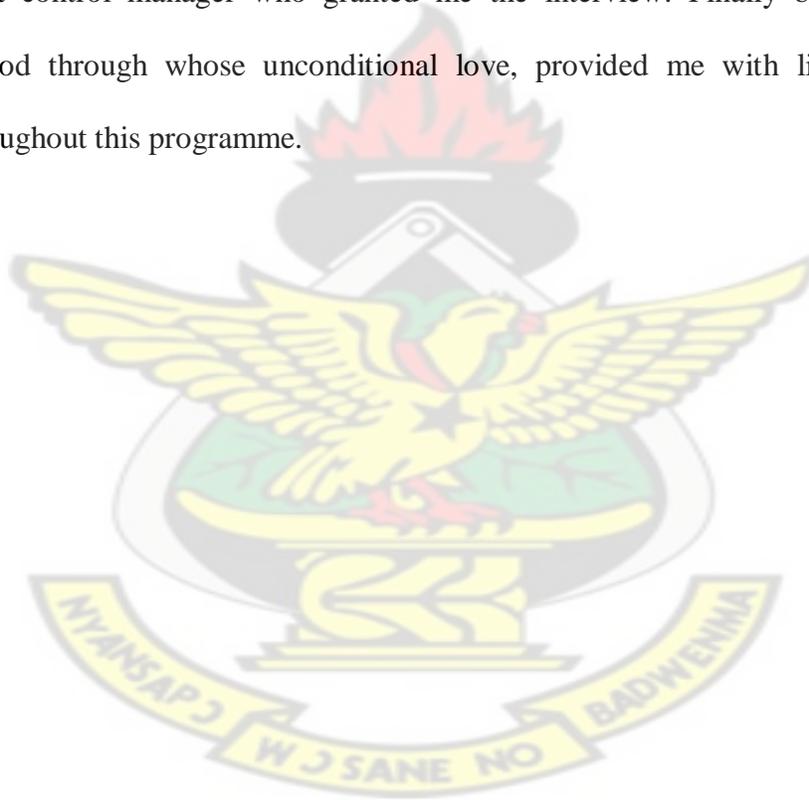
I dedicate this work to my loving family, Mrs. Doris Aniagyei, Lois and Jessica for their inspiration.

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ACKNOWLEDGEMENT

I would like to express my appreciation to all those who contributed in the process of writing this thesis. I am indebted to Mr. Ahmed Agyapong without whom guidance and supervision and patience I would not be able to accomplish this and also take this opportunity to thank all my Lecturers for the knowledge they assisted me to acquire. Without forgetting the respondent, Staff of AGA Ltd whose feedback enable me to get the data for the analysis especially Mr. E.O Bartels, engineering Projects manager and Mr. C. Fiifi Ekuban, Capital projects cost control manager who granted me the interview. Finally blessed be to the Almighty God through whose unconditional love, provided me with life, strength and intellect throughout this programme.



ABSTRACT

Gold production for AngloGold Ashanti Ltd- Obuasi Mine (AGA Ltd) has declined significantly in recent times. One of the strategies adopted to make the mine sustainable is by implementing capital projects in order to meet the medium and long term goals. However studies have shown that an appropriate organisational structure is contingent upon the type of work performed and the environment in which the organisation conducts its' Business. Hence the major objective of the study is to examine the relationship between the organisational structure and the performance of projects in AGA Ltd-Obuasi. The research adopts an inductive case study approach with both qualitative and quantitative research method for collecting and analysing the data. Sample of the various categories of workers was taken from the Company's total population using convenience and purposive sampling techniques. Interviews and questionnaires were employed as the main tool of data collection for the study. A Crosstab analysis was adopted for the analyses of the relationship. The study found out that the organisational structure in place of AGA Ltd-Obuasi is mechanistic which relates to projects in a very weak matrix structure due to the nature of its operations, the strategy adopted, the size of the company and the need to respond rapidly to the dynamic complexity of the external environment. However this structure is the source of major problems in implementation of projects as the study revealed and concluded that some of the organisational structure related factors significantly impact inversely to the categories of the key performance index namely time, cost and quality. Based on this, a 'projectised' structure i.e a project structure was recommended to be adopted among other recommendation made by the study.

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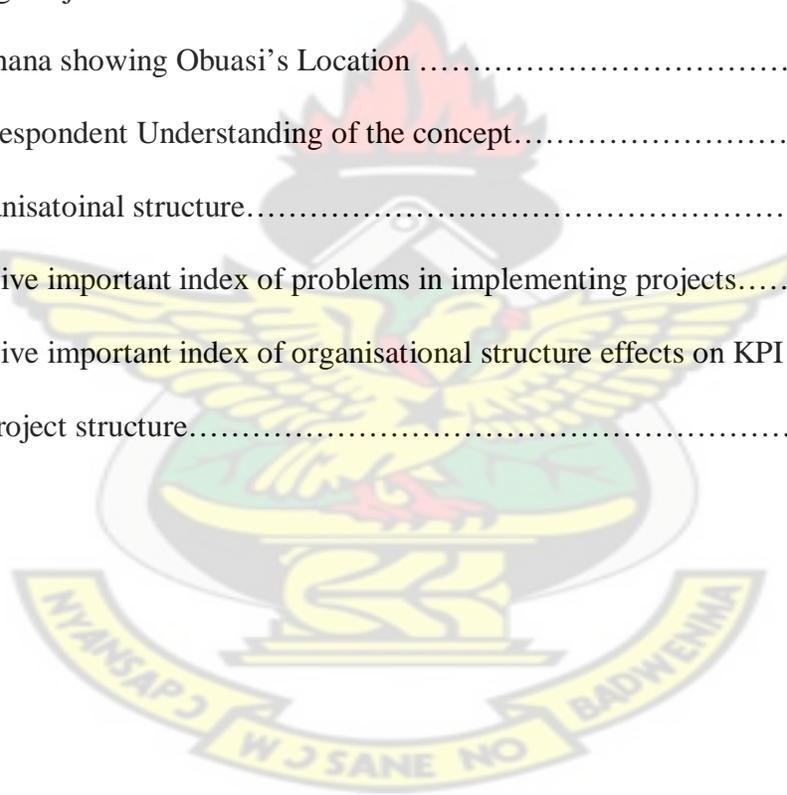


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CHAPTER ONE

INTRODUCTION

1.1. Background of Study

A suitable organisational structure may assist the project management team to achieve high performance in the project through gains in efficiency and effectiveness. Specific project objectives are set to be achieved at the end of each project. The objectives may vary from one project to the other. Time, cost and quality objectives are however basic and common to almost all projects; they are discussed in the success subject matter of most projects (Belassi and Tukel, 1996).

Anglogold Ashanti Ltd (AGA LTD) is a gold mining company with the main mine at Obuasi, Ashanti region. Currently the total work force is about 4000 and the average production is 316,615 oz of gold at a cost of \$945/oz and a total cash cost of \$744/oz (AGA LTD, 2010). In order to sustain its operation and maximised profit for its stakeholders the mine has to expand its business by improving upon its processes, exploring new areas, refurbishing existing facilities and introducing new technologies and these are done through projects. AGA is a large organisation with a complex structure. There are about 20 departments ranging from human resource, training, various mining sectors, processing, various engineering departments, projects etc. Even though there is a project department not all the projects are handled by them, some are by wholly contractors, others are handled through the corporate office, separate task forces are also set up to handle projects and the various departments do handle some of the projects internally. In addition to this the project department itself has a structure supporting it, which mostly depends upon other departments

resources like equipment and expertise to execute its projects hence there are scramble for resources, projects delay, overspending on projects budgets and poor quality of works prevails (Asare,2010). Couple with the above, millions of dollars is invested in projects yearly but only minimal returns are obtained. Last year alone about \$109 million dollars were invested in projects and the company annual gross profit yielded about \$45million (AGA LTD, 2010). Hence the study will investigate how the organisational structure of AGA Ltd impacts on the project performance, because an appropriate structure is contingent upon both the type of work to be performed as well as the environment in which the organisation conducts business (Bolman & Deal, 1997). The study sought to evaluate the effects of organisational structure of AGA Ltd on the project performance and come out with recommendation.

1.2 Statement of Problem

Project performance can be affected by a range of things; of these is the organisational structure of the business (Paul, 2010). As mentioned, it has been observed that the most successful way of exploiting a strategic opportunity or implementing a change in a company is through a temporary process or structure i.e. a project team focused on the project task and objectives in order to solve a problem or implement a new strategy (Partington, 2000).

AGA Ltd has challenges in its projects implementations. It is faced with complex organisational structure, weak project structure, scramble for resources, projects delay, overspending on projects budgets and poor quality of work prevails (Asare, 2010).

Due to the above named challenges the study intend to investigate the effect of AGA organisational structure on its project performance because, organisations which manages multiple projects at the same time requires to keep a good monitoring and controlling project performance, and to create the best project governance structure (Dinsmore and Cabanis-Brewin, 2006). Again many organisational flaws can be related to an inappropriate structure chosen in order to reach a desired goal. An appropriate structure is contingent upon both the type of work to be performed as well as the environment in which the organisation conducts business (Bolman & Deal, 1997).

Different structures provide different strengths and weaknesses to the work to be performed and it is therefore important to find a structure suitable for the desired outcome on stability and predictability (Mintzberg, 1983).

1.3 Objectives Of The Study

1. To determine the basis of the organisational structure put in place for projects in AGA-Obuasi.
2. To measure the performance of the project key performance indicators (KPI's) at AGA-Obuasi.
3. To identify the problems of implementing projects at AGA-Obuasi
4. To examine the relationship between organisational structure and the performance of a project in AGA-Obuasi.

1.4 Research Questions

1. What is the basis of the structure put in place for projects in AGA-Obuasi?
2. What is the measure of performance of the key project indicators at AG-Obuasi?
3. What are the problems of implementing projects at AG-Obuasi?
4. What is the relationship between organisational structure and performance of a project in AGA-Obuasi?

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1.5 Significance of the Study

This research will personally help me to broaden my knowledge on organisational structure and project performance. It will also give AGA Ltd management, the Government of Ghana and other stakeholders the relevant literature in reviewing the performance of projects in AGA Ltd. Since to the best of my knowledge, no known investigative work has been done and documented in this area, it will add knowledge and scholarly literature to academic institution such as KNUST, the mining sector and other institutions worldwide by serving as a source of reference.

1.6 Scope of Study

This thesis was a case study based on AGA-Obuasi mine. Numerous are the factors that affect project performance, although project performance is influenced by several factors as stated by Blismas *et al.*, (2004), the focus here is on the effect emanating from organisational structure. Project performance is considered in the context of achievement of a project's Time, Quality and Cost objectives; it does not include other emerging performance metrics used in the measurement of project performance.

1.7 Methodology

Sample of the various categories of workers were taken from the Company's total population using convenience and purposive sampling techniques. Interviews and questionnaires were employed as the main tool of data collection for the study. Both primary and secondary data were used to address objectives of the study. Statistical Package for social Sciences (SPSS) Software was adopted for the analyses.

1.8 Limitation of The Study

AGA LTD is a multinational company with several companies spread over several countries however AGA LTD-Obuasi mine was chosen for a case study due to convenient, time and lack of adequate resources. Again some selected respondent who could have contributed to the study may decline to be part.

1.9 Organisation of Study

The study was divided into five main chapters. Chapter one comprised of the introduction, while chapter two reviewed published literature related to the topic under discussion. Chapter three featured the methodology adopted in carrying out the research. Chapter four consisted of analysis of the collected data, findings and discussion. Chapter five contained the summary of findings, conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviewed the relevant literature on organisational structures, the concept of project management structures, and further discuss measurement of projects performances and the problems associated with them.

2.2 Organisational Structures

Organisational structure defines how individuals and groups are organised or how their tasks are divided and coordinated (Mintzberg, 1983). In this changing world, companies have had to learn how to formulate and implement their strategies through projects and organisational structures in order to successfully face threats and opportunities. However, the management of multiple projects is not easy due to its complexity.

Theories on organisational structures started with the identification of organising as a distinct managerial function. They took formal shapes upon results from studies on organisational structures which covered many widely different industries. They included studies on the manufacturing industry by Lawrence and Lorsch (1967), administrative organisation by Balu and Schoenherr (1980), investment banks by Eccles and Crane (1988) and multi-national organisation (Ghoshal and Nohoria, 1989). With the emergence of the systems and contingency theories, the importance of the organisational structure as a critical component of a formal organisation had finally gained position in research. Basic researches on organisational structures that are relevant to the objectives of this study are those of

Lawrence and Lorsch (1967), Drazin and Van de Ven (1985) and Mintzberg (1989). In a research on the organisation structures in six enterprises, Lawrence and Lorsch (1967) summarized the features of the organisation structure to be the span of control, number of levels to a shared superior, time span of review of departmental performance, specificity of review of departmental performance and importance of formal rules. Drazin and Van de Ven (1985) defined the organisational structure in terms of specification, standardisation, discretion and personnel expertise. They agreed with Lawrence and Lorsch on the feature of specialisation. Mintzberg (1989) studied seven types of organisations, namely, entrepreneurial, machine, professional, diversified, innovative, missionary and political. He found them to be based on key parts of the organisation, type of decentralization and their coordinating mechanism. Applied research on organisational structures in organisational companies, developed further when many researchers applied basic research results on organisational theory in other fields. Lansley (1994) indicated that strong linkage existed among different organisational models and advocated using them for the reconciliation of conflicts. Mukalula (1996) studied three aspects of a organisation firm's structure: namely, organisational complexity, formalisation, centralization and decentralisation of authority. Sunkuk (1997) adopted five among the seven types of organisations presented by Mintzberg (1989) to examine which managerial environment will best reflect that of the organisation. Applied research extended the study of organisations beyond organisational features to relationships with the operating environment.

Among the basic and applied research studies, there is agreement on the following:

- The structure of an organisation is important to the performance of the organisation. This would mean that the project management team's structure would certainly affect its performance.
- Two basic features of a structure of an organisation are its width as indicated by spans of control, and its height as indicated by the levels of decentralisation.

2.2.1 Models of structures

Mintzberg (1983) defines the organisational structure as; "...the sum of total in which its labour is divided into distinct tasks and then its coordination is achieved among these tasks." There is no such thing as a best organisational structure. One needs to carefully consider the reason for why the organisation is there and Mintzberg (1983) means that the structure should be selected to achieve an internal harmony, as well as alignment with the organisation's situation (Hatch, 2006; Mintzberg, 1983). After looking at the different aspects that constitute the organisational structure, the study will now look into two extreme organisational types. An organisation can however make use of a mix of the different structures, and the structures are not to be seen as one or the other (Lorsch & Lawrence, 1986).

2.2.2 Mechanic structures

The mechanic structure is characterised by authority and control, where decision-making is made at higher levels, indicating a centralised organisation. Written rules and regulations are common, as the formalisation in a mechanical organisation is stressed. There are also clear

role-descriptions including authority, responsibilities and prestige associated to each specific role. Each employee commonly answers to the person seated one level higher in the hierarchal pyramid (Hatch, 2006). The work processes are usually very standardised and the employees working in such structure knows exactly their individual well-delimited task, what they are expected to do and how it should be done (Hatch, 2006; Granström, 1999). Initiatives on how to improve work processes are not seen as beneficial since a new way of doing things requires policies to be rewritten and supervisors to be thoroughly introduced to the change. Thereby the mechanical approach limits and hinders innovation (Granström, 1999). A vertical communication where the superior gives instructions to the subordinate is used rather than a horizontal discussion (Hatch, 2006). This implies that the mechanical structure assumes that knowledge and competence is concentrated to the top management. This creates a heavy dependency upon the competence and leader ability of the decision makers and it is not always the case that the same person possesses both (Bakka et al., 2001; Granström, 1999). With a mechanical structure there is a risk that the goal for the employee is becomes to simply follow the rules. Additionally, there are less utilisation of the knowledge and competence of the employees, which can cause unmotivated and dissatisfied workers (Jacobsen & Thorsvik, 1999). However, the benefit of having a mechanical structure is the clear description and allocation of responsibilities. The structure also allows for a relatively exact forecast to be made in addition to that the work standardisation can boost effectiveness (Jacobsen & Thorsvik, 1999). To yield the most benefits a mechanical structure should preferably be used in a stable environment (Hatch, 2006). There are of course differences to the extent an organisation is mechanical, where the extreme mechanical structure can be said to have an obsession for control. Where the aim is to reduce all possible

uncertainty to create a smooth going machine where informal communication between employees at lower levels preferably is avoided (Mintzberg, 1983).

2.2.3 Organic structures

An organic structure has the same decision-making process as a decentralised organisation where the ones possessing the right knowledge and experience regarding the decision at hand make the decisions. Expertise is how prestige is acquired as authority is based on knowledge and competences rather than level in the hierarchy (Hatch, 2006). In an organic structure problem solving and interaction allow for redefinition of tasks and work methods. The responsibilities and roles are redefined over time depending on situation, it thereby enables for the use of personal expertise and creativity. An organic structure uses formalisation to a smaller extent than a more mechanic structure, and uses horizontal communication and consulting between departments rather than vertical instructions. In an organic structure employees rather seek advice from each other than give instructions. The organic structure allows for innovation and is thus more suitable and beneficial when used in a changing environment with high requirement on adapting to the surroundings (Hatch, 2006).

As the characteristics of an organic structure are that it is flexible with the authority and responsibility placed on the individual rather than on a position there can be many different combinations of how employees are put together to reach the wished outcome (Jacobsen & Thorsvik, 1999). Taking the organic structure to the edge is when there is no form of either standardisation or formalisation of behaviour and job specialisation are present in the organisation, in an attempt to enable for maximal flexibility to be maintained. No supervision should be exercised rather managers should have coordinating responsibilities, acting more

as peers than supervisors with their influence coming from their expertise and skills rather than from their formal position. Such an extremely organic structure is not efficient but can still be found even though rarely (Mintzberg, 1983). A less extreme variation of the organic structure is where teams are put together to solve a problem where the selection of the members should be based on competence rather than according to their level in the hierarchical system. This should lead to an increase in initiatives by the employees at “lower” level. The focus for these teams should be on the end result rather than milestones along the way. This means that the team has the freedom to decide on how to reach the end as long as they do, with a given set of resources. This freedom under responsibility allows for better utilization of the different capabilities and knowledge of the employees. These teams should be created as a response to the occurrence of problems needing a solution rather than as a response to instructions and orders to carry out the work (Adestam & Gunnmo 2008). Management should focus on integration of the teams but not telling what and how to do, as it is the responsibility of the team. Therefore a high responsibility is put on the individuals as a group where the work requires a great deal of cooperation. The drawback of this kind of organic structure is that there is a risk that the teams become too autonomous and creates their own goals deviating from the ones of the larger organisation (Granström, 1999).

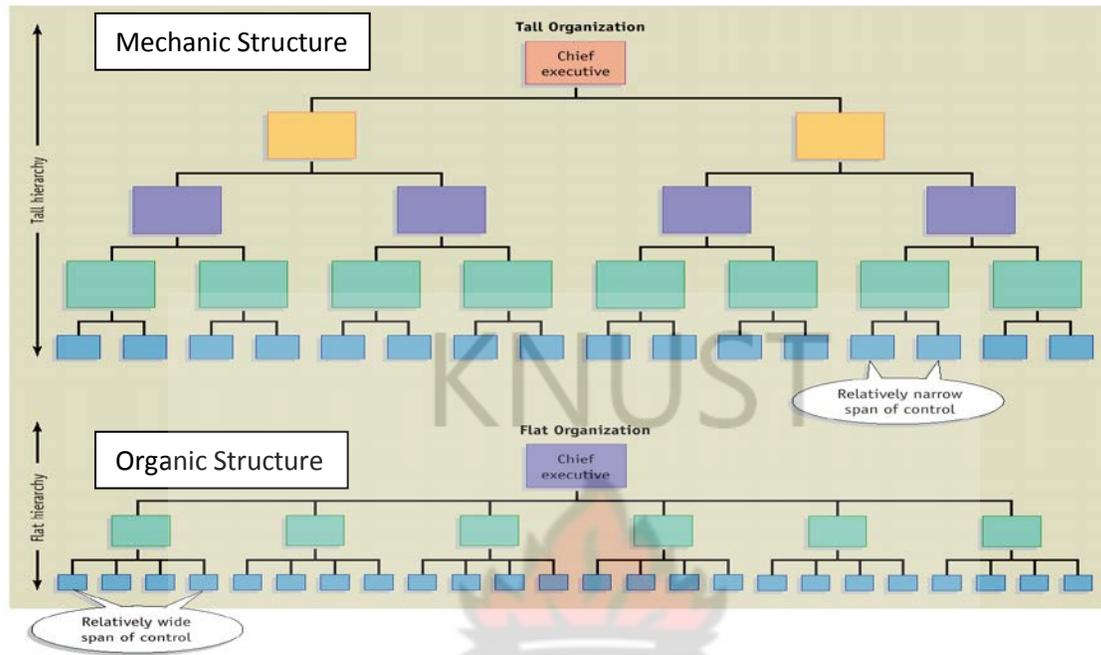
Tab.2.1 Summary of the two structures and their characteristics

Mechanic Structure	Organic Structure
High degree of Formalisation	Low degree of Formalisation
Centralised decision-making	Decentralised decision-making
Standardisation according to work Process	Standardisation according to work knowledge and end result
Vertical differentiation rather than horizontal differentiation	Horizontal differentiation rather than vertical differentiation
Integration in the form of vertical instructions and regulation	Integration in the form direct informal communication

Source : Adestam & Gunnmo (2008)

From the above observations, researchers theorised that the change in the organisational structure, through its shape in terms of width and height, would affect organisational performance, and even vice versa. Theoretically, researchers and theorists presented two extremes for possible models of structures. They are the organic structure and mechanistic structure. The model of an organic structure would be a flat and cross-functional team, with low formalisation, possessing comprehensive information and relying on participative decision making. The model of mechanistic structure would be the opposite and would be characterized by extensive departmentalisation, high formalisation, limited information and centralisation (Robbins, 1996). Thus the organic model of structure would have the maximum width (span) but the minimum height (level), while the mechanistic model or structure would have the reverse, minimum width and maximum height. These are illustrated in Figure 2.1.

Figure 2.1: Models of Structures



Source: Stephen, (2003) Prentice Hall

2.3 Projects and Organisations

Project is a temporary endeavour undertaken to create a unique product, service or result (PMI, 2004). In all projects, the teamwork is crucial for the success. As explain by Smith and Dodds (1997), as a result of the teamwork, projects provide a way to find new insights; each member of the group has its own perspective which can be shared with the whole team in order to find the best way to execute the project. Other success factor in projects is the need to manage efficiently their life cycle; indeed, a good management it is a real challenge for those organisations executing multiple projects at the same time with different life cycle and needs (Dooley et al, 2005). In fact, due to the amount of demands and factors surrounding multiple projects, companies tend to compensate rather than reconcile conflicting demands (Gerald, 2009). Turner (1999) mentioned that those classic organisations that wish to

manage successful different project, need to make huge changes in order to adopt the right culture for projects. However, this author also explains that these companies can adopt project's culture creating a hybrid environment or a project environment. In a hybrid environment, projects and operations work together, meanwhile in a project environment the management of the whole organisation is through projects. Dooley et al (2005) clarify that the sum of the problems associated with individual projects are considerable, however, the number of problems associated with the management of multiple projects were higher. For that reason, the main issues in the success of projects are: the control of the cost of management, and the identification of the influential factors with positive or negative relation over productivity (Dooley et al, 2005). In order to manage more effective their projects, organisations has needed to adopt more flexible structures that allow them to react to the recently changing environment (Turner, 1999). About this, Turner and Müller (2003) explain that if a company wants to achieve the goals of the projects in which is working on, as well as the objectives from the organisation, it is necessary that the company aligns its operational process with the needs of the projects in order to save costs using the resources available in the best way. Organisations are based on projects in different levels, also, each organisation chooses different ways of working with them; this is called by, Müller (2009) as "levels of projectisation". Due to their own characteristics, governance and needs, the organisations working on projects has been classified in two categories: those who are project oriented and those who are project based.

2.3.1 Project Management Structures

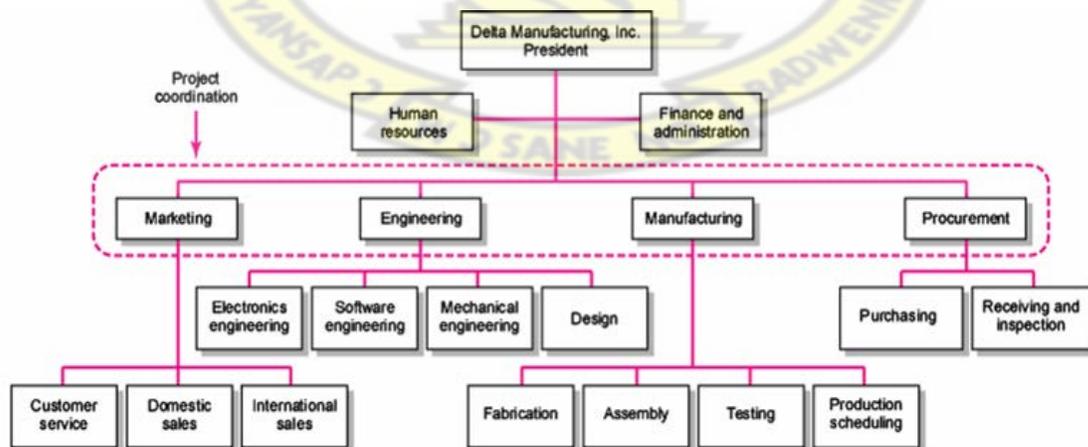
2.3.1.1 Project Considerations

In choosing projects management system the following can be taken into consideration:

Size of project, Strategic importance, Novelty and need for innovation, Need for integration (number of departments involved), Environmental complexity (number of external interfaces) Budget and time constraints, Stability of resource requirements Challenges to Organising Projects, the uniqueness and short duration of projects relative to ongoing longer-term organisational activities the multi-disciplinary and cross-functional nature of projects creates authority and responsibility dilemmas. Choosing an appropriate Project Management Structure, the best system balances the needs of the project with the needs of the organisation. Other considerations are how important is the project to the firm's success? What percentage of core work involves projects? What levels of resources (human and physical) are available?

2.3.2 Organising Projects: Functional organisation

Fig.2.2 Functional organisation



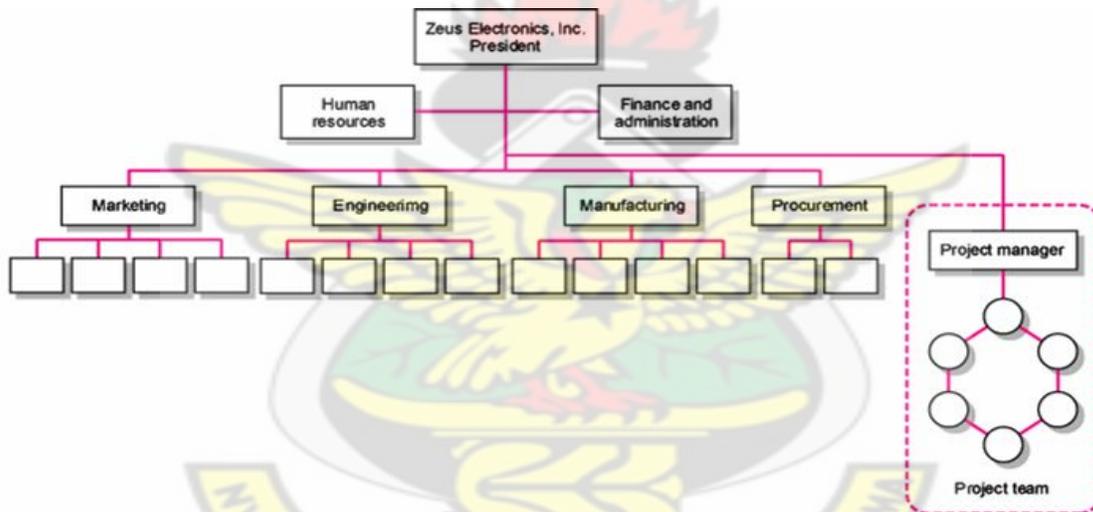
Source: Clifford and Erik (2008)

Different segments of the project are delegated to respective functional units. Coordination is maintained through normal management channels. Used when the interest of one functional area dominates the project or one functional area has a dominant interest in the project's success. Advantages are: No structural change, Flexibility, In-depth expertise and Easy post-project transition. Disadvantages are: Lack of focus, Poor integration, Slow, and Lack of ownership

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2.3.3 Organising Projects: Project Structure (Dedicated Teams)

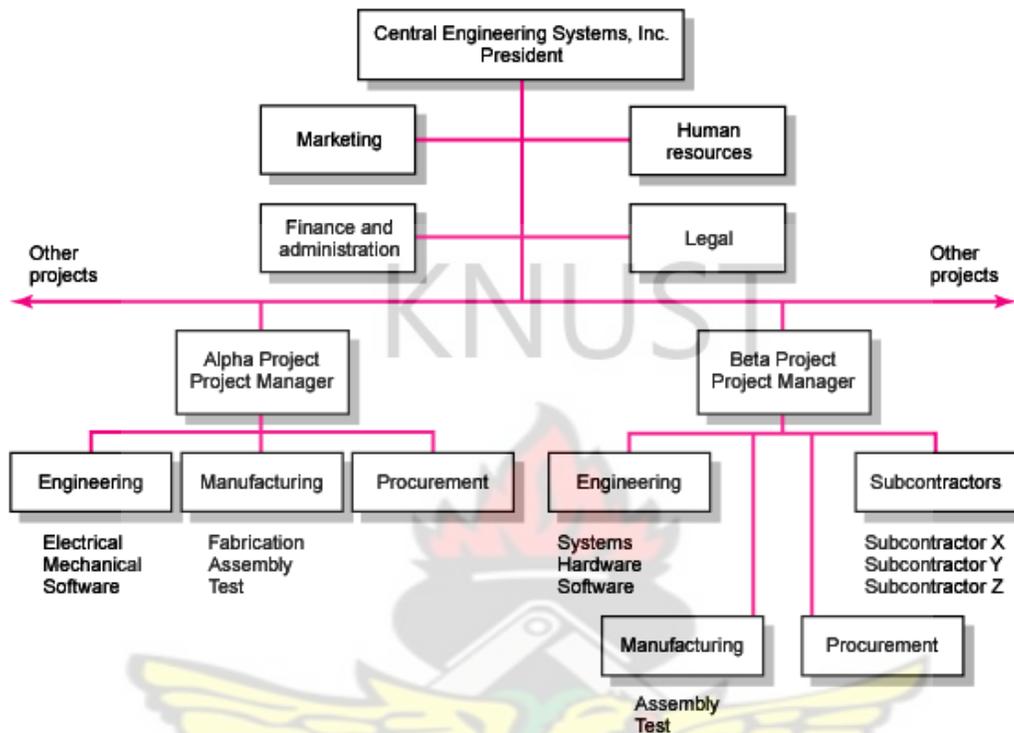
Fig 2.3 Project Structure Dedicated Teams



Source: Clifford and Erik (2008)

2.3.3.1 Organising Projects: Project Structure

Fig. 2.4 Project Structure

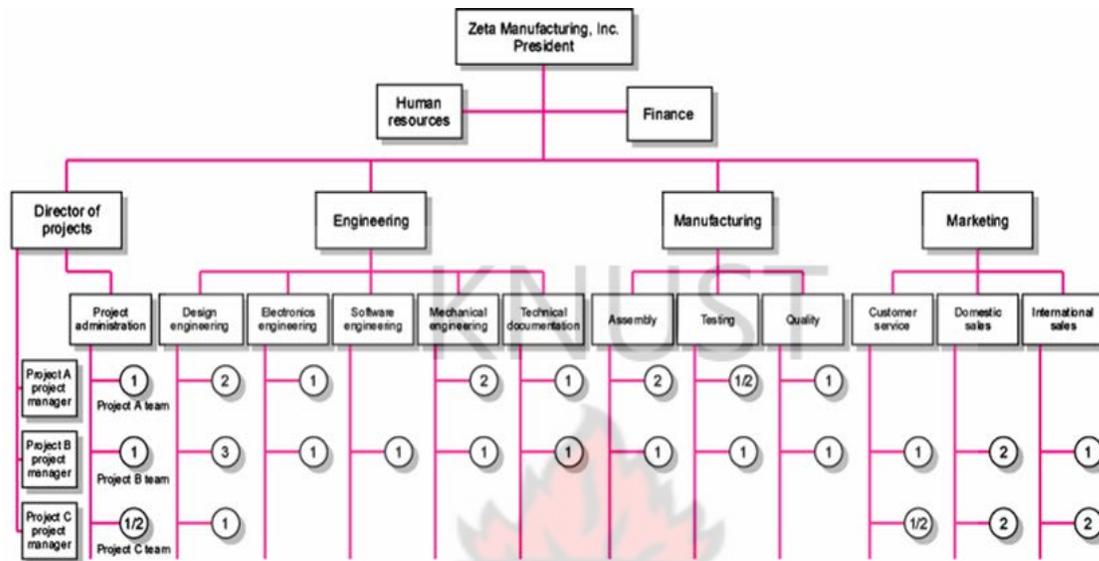


Source: Clifford and Erik (2008)

From fig. 2.3 and fig. 2.4 teams operate as separate units under the leadership of a full-time project manager. In a project organisation where projects are the dominant form of business, functional departments are responsible for providing support for its teams. Advantages are: Simple, Fast, Cohesive and Cross-functional integration. Disadvantages are: Expensive, Internal strife, Limited technological expertise, and Difficult post-project transition.

2.3.4 Organising Projects: Matrix Structure

Fig.2.5 Matrix Structure



Source: Clifford and Erik (2008)

Hybrid organisational structure (matrix) is overlaid on the normal functional structure.

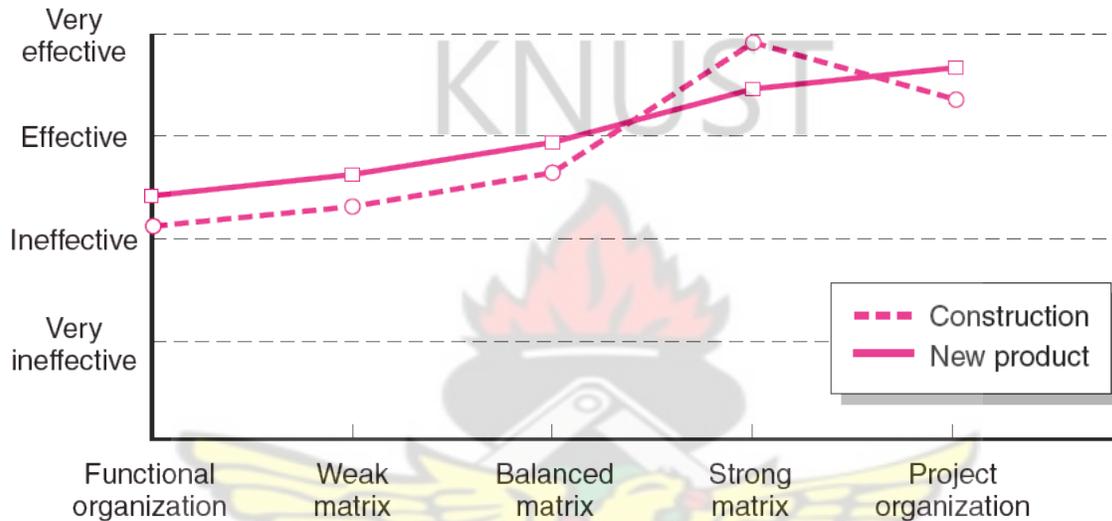
Two chains of command (functional and project) Project participants report simultaneously to both functional and project managers. Matrix structure optimises the use of resources. Allow for participation on multiple projects while performing normal functional duties, achieves a greater integration of expertise and project requirements. Matrix structure can be weak, balance or strong. Functional Weak form: Matrices in which the authority of the functional manager predominates and the project manager has indirect authority. Balance form: The traditional matrix form in which the project manager sets the overall plan and the functional manager determines how work to be done.

Strong Form: Resembles a project team in which the project manager has broader control and functional departments act as subcontractors to the project.

Advantages are: Efficient, Strong project focus, Easier post-project transition and Flexible.
 Disadvantages are: Dysfunctional conflict, Infighting, Stressful and Slow.

2.3.5 Organising Projects: Structural effectiveness

Fig 2.6 Structural effectiveness



Source: Larson, and Gobeli (1987)

From Fig. 2.6 strong matrix structure and project organisation are the best structural effectiveness in both construction and new product development companies, as indicated by Larson and Gobeli (1987) in a comparative researched work to determine the best organisational structure for construction and new product development organizations.

2.4 Projects and Performance

Harisha et al., (2010) defined performance as the success in meeting pre-defined objectives, targets and goals. In simple terms refers to getting the job done or producing the result that you aim at. According to Neely et al. (1995), performance measurement can be defined as the process of quantifying the efficiency and effectiveness of action. Literally it is the process of quantifying action, where measurement is the process of quantification and action leads to performance. Project performance is a measure of the extent to which a substantially completed project achieved its pre-defined objectives, targets and goals as a whole.

2.4.1 Organisational structures for project performance

The establishment of management structures for the management of a project is one of the important activities required for accomplishing goals. Shaker (2003) in a publication reviewing Peter Drucker books, who argues that management is the function, which involves getting things done through other people. Basically this involves the following, which are all aspects of setting organisation matters for performance: Getting Managers with leadership capabilities, Getting staff with competence and appropriate skills, Placing responsibilities on people for successful completion of the project, Establishing clear delegated authorities Defining proper communication lines. Since these outlined duties relate to the matters concerned with internal organisational running, it may be argued that they are solely for the purpose of improving only organisational performance. Kotnour (2000) asserts that some of the internal organisational matters such as organisational learning practices increase project success too. The tendency to have the project success increased therefore lies in the ability of the manager to develop certain strategies within the organisation. The activity of setting a

project organisational structure is, for instance, one of the major organisational matters whose influence on project performance may be significant.

2.5 Dimensions of Project Performance

Project performance has been considered to be tied to project success and this is also tied to project objectives (Chan & Chan, 2004). Project success has been measured based on different dimensions. Sadeh *et al.* (2000) measured project success based on the following five dimensions: Meeting design goals, Benefit to end users, Benefit to the developing organisation, Benefit to the defense and national infrastructure, Overall success (a combined measure for project success), Shenhar *et al.* (1997) also proposed that project success is divided into four dimensions: Project efficiency, Impact on customer, Business success and preparing for the future. Chan & Chan (2004) developed a consolidated framework for measuring project success. The framework is comprised of the following eight project success dimensions: Cost, Environmental performance, Quality, User expectation/satisfaction, Time, Commercial/Profitable Value, Health and Safety and Participants' Satisfaction.

There are three basic objectives of measurement of organisation projects of the key performance indicators; time, cost and quality. These objectives are the adopted dimensions for measurement of project performance in this study. Measuring the success based on these objectives is considered to yield effective results since project participants are more familiar with the three basic project objectives. Researchers like Walker (1999), have discussed project success around these objectives. The overall performance of any project is invariably

an aggregation of the performances of its individual objectives. Based on the widely-known and widely-understood nature of these objectives project performance is measured in terms of time performance, cost performance and quality performance. Nonetheless, organisation project success has also been discussed, in few cases, around other project objectives; health, safety and environmental friendliness and scope (Kumaraswamy & Thorpe, 1996; Best & Valence, 1999). An overriding factor for measuring project performance based on the three basic objectives emanates from the qualitative finding by Phua & Rowlinson (2004) out of their research into how important cooperation is to organisational project success. They identified three factors; adherence to project budget, time and quality requirements as being consistently indicated by interviewees to be the overarching criteria of assessing organisational project success. Hence it is highly useful to adopt these objectives to form the basis for the measurement of the projects performance in subsequent analysis.

2.6 Project Management Structure and Project Performance

In a research work by Sarfo (2007) and citing others the study reported that the organisational structure adopted for management of building projects is an important area to consider for the success of projects. Weaknesses in this area of project management lead to poor project performance regardless of organisational facilitators such as senior management commitment and leadership style (Cooper, 1998). Loo (2003), also grouped project management activities that facilitate project success under two main areas, which require the establishment of organisations structure for their effectiveness. The areas cover technical (e.g. planning, controlling, and procedures) and people (e.g. leadership, communication, and conflict management). Sidwell (1982) in his investigation into the

impact of client decision-making upon organisation process and project success concluded that project organisational structure has influence on the project performance from inception to completion. Getting an organisation structure alone is not enough. As much as having an organization structure is important for the achievement of project success as emphasized by Loo (2003), Cooper (1998) and Sidwell (1982), the effect of the size of the management structure adopted for management of a project needs to be also given special thought.

2.7 Project Performance Measurement

In this study, overall project performance is determined based on the performance of the individual basic project objectives: Time performance, Cost performance and Quality performance. Two main research works that have developed formulae for the measurement of project performance have been identified. Chan & Chan (2000) made use of Key Performance Indicators (KPIs) in his study into the use of key performance indicators for measurement of project success. Four major areas, among others, determined the formulae that were adopted for the measurement of project performance. The areas chosen represent the dimensions that were adopted for the measurement. The major dimensions for which formulae were required for their calculation are indicated in table 2.2 below. One or more indicators were required to measure the performance of each of the dimensions.

Table 2.2 Project Performance Measurement Formulae adopted by Chan & Chan (2004)

Dimension	KPIs	Definition
Time	1) Construction Time =	Project completion date –Project commencement Date
	2) Speed of construction =	Gross Floor area /construction time
	3) Time variation =	((Construction time-Revised contract period) X 100%) / Revised contract period
Cost	1) Unit Cost =	Final Contract Sum / Gross Floor Area
	2)Percent Net Variation =	((Net value of variations) X100 %) / Final Contract Sum

Source: Chan & Chan (2004)

Table 2.3 Project Performance Measurement Formulae adopted by Ling *et al.*, (2002).

Dimension	Performance metrics	Definition
Time	1) Construction Speed =	Area/(as-built construction end date – as-built construction start date
	2) Delivery Speed =	Area / total time
	3) Schedule growth =	[(Total Time – total as planned time) / total as planned time] X 100%
Cost	1) Unit Cost =	(Final Project cost/area) /index
	2) Cost Growth =	[(Final project cost –contract project cost)/contract project cost] X 100%)
	3) Intensity	Unit cost / total time
Quality	Turn over quality =	Ease of starting up and extent of call backs, Measured by ranking [5=exceed owner's expectation; 1=not satisfactory]
	System quality =	Performance of building elements, interior space and environment Measured by ranking [5=exceed owner's expectation; 1=not satisfactory]
	System quality =	Performance of equipment [5=exceed owner's expectation; 1=not satisfactory]

Source: Ling *et al.*, (2002)

Secondly, Ling *et al.* (2002), in developing models for predicting the performance of Design-Build and Design-Bid-Build projects, made use of the performance metrics for

measurement of project performance as indicated in table 2.3. Also from the Earned Value Management, a project measurement technique that integrates time, cost and scope data and comparing it with the baseline as indicated by Kathy (2009), given the baseline the formula below in table 2.4 can be used to measure the performance.

Table 2.4 Project Performance Measurement Formulae adopted (Kathy, 2009).

Dimension	Performance metrics	Definition
Time	SV =	EV-PV
	SPI =	EV/PV
	SPI=	Planned Time Estimated / ETC
Cost	CPI =	BAC / EAC
	CPI=	EV/AC
	CV=	EV-AC
	EV=	PV to date x RP
	RP=	AWC / % WPTC

Source: Kathy (2009)

EV: Earned Value

PV: Planned Value

SPI/CPI: Cost or schedule Performance Index

EAC: Estimated at Completion, ETC: Estimate Time to Complete

BAC: Budget at completion

AC: Actual Cost

CV/SV: Cost or Schedule Variance

RP: Rate of Performance

AWC: Actual work Complete, WPTC: Percentage of work planned to have been completed.

The formulae adopted for measurement of project performance include the KPI's: Time variation (for measurement of time performance) and Percent Net Variation (for measurement of cost performance) as employed by Chan & Chan (2004) and originally used

by Naoum (1994). The Time Variation indicator has the ability to take care of percentage increase or decrease in the estimated project days/weeks while discounting the effect of extension of time. The Percent Net Variation indicator also has the ability to give indication of cost overrun or under run. Moreover, the purpose of these Key Performance Indicators (KPIs), as described by The KPI Working Group (2000), is to enable the measurement of project and organisational performance throughout the organisation. The choosing of KPI's is based on certain guidelines as advocated by Collin (2002);

- Only a limited, manageable number of KPI's is maintainable for regular use.
Having too many (and too complex) KPIs can be time and resource-consuming.
- Data Collection must be made as simple as possible.
- For performance measurement to be effective, the measurement or indicators must be accepted, understood and owned across the organisation.

Contrary to the objective ways of measuring cost and time indicated above quality performance measurement has mostly been subjective. For instance a 5-point ranking of owner's satisfaction with the project's quality was employed by Chan & Chan (2004) for measurement of quality performance. In an investigation into organisation time performance, Walker (1995) developed a organisation time index for measuring the time performance of 33 projects out of which a regression model was developed for predicting organisation duration. The time performance index formula, which is able to tell whether a project is performing below or above trend, appears as:

- $\text{Planned Organisation Period} / \text{Actual Organisation Period}$

Similarly, in a study into the influence of Information Technology (IT) utilization on

Firm performance in the organisation, El-Mashaleh *et al.* (2006) also developed an IT index. The index facilitated developing a regression model indicating how IT utilization affects schedule, cost and customer satisfaction of an organisation firm. The performance indices exhibit the advantage of portraying under runs and overruns whilst enhancing development of regression model to depict relationships.

2.7.1 Project Time

Time here, refers to the duration for completing implementation of project. Projects often experience delays. In an RICS research paper Morledge *et al.*(1996) in which data was collected in relation to 215 completed projects of commercial and industrial nature, it was found out that 136 (63%) were delivered late. It was contended that the lateness was mainly due to unrealistic expectation of clients about the project duration during the implementation stage. One major client in the implementation industry is the government. The government usually takes decisions under economic and political considerations. Such considerations may come with directives specifying time periods within which completion of projects are expected. In their bid to comply, members of the project team may be trying to accomplish an unrealistic task. Such situations reflect what Kumaraswamy and Chan (1995) found out in their investigations into determinants of implementation duration. They concluded that the overall timescales of many projects appear to be established as a consequence of commercial and/or political considerations. They argued that subsequent planning and programming methodologies are then designed to meet these time targets, rather than any objective assessment of durations. Project teams are therefore made to face increased pressure. Ward *et al.* (1991) also identified that client time expectations are frequently based upon either their

own experience of similar works or on advice from 'specialist advisors'. This behaviour of clients may be an indication of the adherence to or rejection of advice of project consultants, who have been formally employed to lead 'Specialist advisors' refer to certain people having no technical know-how but may advise a client due to certain social or political relationship between them and the management of projects. With the use of a web-based instrument prepared to gather data related to the effects of certain variables on time overrun in commercial projects, which was sent to the CEO's of 100 randomly selected implementation companies, delayed progress payments was identified as a major cause of implementation time overrun (Choudhury & Phatak, 2004). In an investigation into implementation time performance of implementing projects in Australia, Walker (1995) identified the following as broad factors affecting implementation time performance: effectiveness of client's representative team, effectiveness of implementation management team, the scope of works. This gives rise to the need to highlight on certain characteristics of the project management team members too i.e. the type of structure in place to influence decision making and how the team performs.

2.7.2 Project Cost

Cost has been defined as the degree to which the general conditions promote the completion of a project within the estimated budget (Bubashit and Almohawis, 1994). It covers overall costs incurred from project inception to completion. This highlights the importance that has to be attached to every project management activity carried out through every stage of the project development up to completion. Chan and Chan (2004) also argues that cost is not only confined to the tender sum and that it is the overall cost that a project incurs from

inception to completion, which includes any cost arising from variations, modifications during implementation period. These cost variables give indication of certain additional practices that when engaged in during the project management process would have both direct and indirect implications for the project cost performance. The number and manner in which variation orders are issued by consultants during implementation is an important practice to look at. Clients who often engage in the habit of agitating for numerous design changes before practical completion also play great role in the influences on project cost.

In a research work by Sarfo (2007) and citing a research by Ling et al. (2002) identified certain variables that affect cost performance. These include: the number of repetitive elements contained in a project, the extent of design completion when bids are invited, and the level of paid up capital of contractors engaged. These variables bring to bear certain related practices that may affect the performance of project cost. For instance the kind of procurement method usually adopted by clients; traditional procurement or design and build will determine the extent of cost.

2.7.3 Project Quality

Quality is defined as “the totality of the features required to satisfy a given need; fitness for purpose” (Parfit and Sanvido, 1993; CIRIA, 1985). The extent to which projects are monitored, the experience of project consultants, quality and past performance record of contractors and the number of variation orders issued all have effect on quality (Kashiwagi & Parmar, 2004). How all these factors can be competently coordinated would be relevant to achieving satisfactory quality performance. The project team leader has the responsibility to

ensure that these factors combine well to yield good quality performance. Quality performance has been considered as a function of the procedures adopted during the implementation process (Serpell and Alarcon, 1998). Those procedures comprise the concept of procurement form and the method of tendering. The emphasis here is on organisational structure having influence on quality of a project. Quality performance measurement has mostly been subjective. For instance a 5-point ranking of owner's satisfaction with the project's quality was employed by Chan & Chan (2004) for measurement of quality performance. In a research work into the factors that influence quality performance projects, Chan and Tam (2000), using factor analysis and stepwise regression analysis, identified project management action by the project team as the most powerful predictor of client's satisfaction with quality. An emphasis therefore needs to be given to the significant practices that are usually adopted by members of the project management team for the quality management of projects, i.e. structure put in place to support the management team must not inhibit project performance in the delivery process.

2.8 Problems Associated With Projects

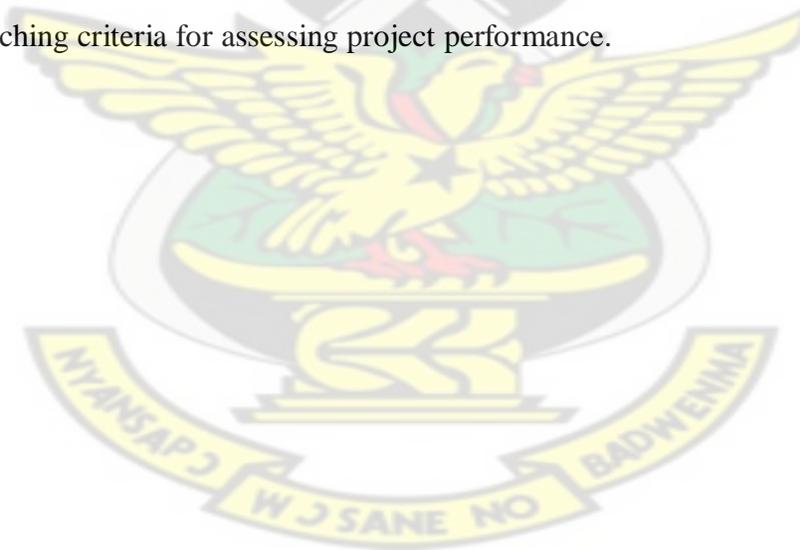
In a publication by Tom Carlos (2008), the study said there are many reasons why projects (both simple and complex) fail; the number of reasons can be infinite. However, if we apply the 80/20 rule the most common reasons for failure can be found in the following list: Poorly managed, Undefined objectives and goals, Lack of management commitment, Lack of a solid project plan, Lack of user input, Lack of organisational support, Centralised proactive management initiatives to combat project risk, Enterprise management of budget resources, Provided universal templates and documentation, Poorly defined roles and responsibilities,

Inadequate or vague requirements, Stakeholder conflict, Team weaknesses, Unrealistic timeframes and tasks, Competing priorities, Poor communication, Insufficient resources (funding and personnel), Business politics, Overruns of schedule and cost, Estimates for cost and schedule are erroneous, Lack of prioritisation and project portfolio management, Scope creep, No change control process, Meeting end user expectations, Inadequate testing processes and Bad decisions. Even with the best of intentions or solid plans, project can go awry if they are not managed properly. Éliane Lecompte-Marmo, (2008) in a researched to determine the causes of failure in the implementation of project management the study interview 5 experience senior managers in Montreal and identify the following as the main causes project failure: no ownership of the project, responsibility transferred to operating personnel, reluctance to transparency, lack of change management planning, lack of change agent, lack of employee commitment, needs not clearly communicated, lack of concrete support and commitment from upper management and unrealistic expectations from upper management. However, Responsibility transferred to operating personnel, Reluctance to transparency, Ease of evaluating performance, Human resources management structure not adapted to project management which was all as a result of impact of organizational structure and rank impact of organizational structure among others as the highest predominant level of importance.

2.9 Summary

Main findings from the literature include the fact mechanic and organic structure were the two major structures of organization. However the structure put in place in an organisation depend upon its suitability to meet its objectives. Hence an organization which is project

oriented or based have to re-align its structure in other to achieved the optimized project performance. The project performance may vary from organisation to organisation depending upon the structure in place. Optimum practices depend on the level of performance of the outcomes realized. This necessitates finding out of the relationship between organisational structure and project performance. Project performance is considered to be tied to project success and this also is associated with project objectives. Project performance is therefore measured using certain criteria developed based on the project objectives. Project performance has been measured with several dimensions such as: Cost, time, quality, benefit to end users, benefit to national infrastructure, Environmental impact, health and safety requirements etc. Three basic project objectives, time, cost and quality, have been selected as the criteria for measuring project performance. These are considered to be the overarching criteria for assessing project performance.



CHAPTER THREE

RESEARCH METHOD

3.1 Introduction

This chapter covers the design or approach used by the researcher to answer the research questions and explains why the approach or design was chosen. This section provides a detailed explanation of the procedure the researcher used to arrive at various conclusions in the study. This chapter includes: the research design, methodology approach, method of data collection, data collection instrument and method of data analysis.

3.2 Research Design

According to Ghauri and Grønhaug (2005), a research design is the overall plan for relating the conceptual research problem to relevant and practicable empirical research. In other words, the research design provides a plan or framework for data collection and its analysis. The aim for a researcher is to give an, as correct picture of reality as possible by combining and analysing empirical data in relation to theory. Different approaches exist and the approach most suitable for the research depends on the desired starting point of the researcher in relation to present theories.

For this thesis, an inductive approach was adopted, which according to Saunders et al (2007) the order that should be followed is: data collection, data analysis and finally, development of theory. It was considered an Inductive approach because the objective of the research is to see how an organisational structure affects the performance of projects in AGA Ltd, as well as the problems that face and how to solve them. So, even in the literature review were

analysed different aspects about this subject, it will be during the analysis of data when a conclusion theory or recommendation will be built. Based on the research questions and objectives of this study, the research purpose selected is the exploratory design. With exploratory research you may have initially been uncertain about some major aspects and therefore needed to investigate these issues. This research is exploratory, aimed at investigating or evaluating the case on effect of organisational structure of project performance based on the research questions. The research aims at answering the research questions developed in the earlier section. Although the choice of research methodology is a difficult step in the research process, the particular approach adopted in any particular research is preceded by critical thought process (Walker, 1996). The two main methodologies, qualitative and quantitative, were combined in this study. The effect of organisational structure on measured performance of cases of completed projects, were thus determined through quantitative analytical methods; cross tabulation analysis.

3.3 Area of Study

This study was done in Ghana, Ashanti region, Obuasi district where AGA Ltd is located.

3.4 Population

The population of this study comprise of AGA workers, about a total population of 3630 with the breakdown of its composition as shown in table 3.1.

3.5 Sample Size

Sample size of 83 was taken from the total list of workers made up of Executive managers/managers, Senior Staff, Junior Staff as shown in table 3.1 and conforms to the advice for statistical analyses, stating that the number 30 is useful rule of thumb when deciding on a suitable sample size (Stutely, 2003). Also this sample size was chosen due the sampling technique chosen which was mainly purposive and by convenient and targeted workers who were directly or indirectly involved in projects and have knowledge and expertise in the area of the study.

Tab. 3.1 Distribution of population and sample size for the study

Sample Frame	population size	Sample size
Executive managers/managers	30	3
Senior Staff	600	68
Junior Staff	3000	12
Total	3630	83

Source: Author's Field Work.

3.6 Sample and Sampling Procedure

A sample is the representative part of the total population chosen for analysis during a research (Bryman and Bell, 2007). The importance of the sampling process is crucial. The characteristic of the interest sample of the population are AGA workers. Hence the sample size was purposively and conveniently distributed among the sample frame as shown in table 3.1, based upon those who are directly or directly involved in projects and have expertise in that field.

The sampling approach chosen to answer the question “What were the bases of using certain organisation structures in projects execution?” was Purposive sampling where 3 executives manager were sample, because the interest was to get resource personnel who have in-depth knowledge in the subject area. Convenient sampling was used for the rest of the sample population (80), because of ease of obtaining them and the fact that they could best provide the needed information on the study.

3.7 Instruments for data collection

The Instruments for data collection can involve different techniques as observation, structured or semi-structured interview schedule, questionnaire, and secondary sources, among others (Bryman and Bell, 2007). Semi-structured interview was used for the Executive managers/ Managers and the questionnaire for the Senior and Junior staffs. For this thesis, to answer the question “What were the bases of using certain organisation structures in projects execution?” the instrument used was semi-structured interviews. In this research method, the researcher has an interview guide, which is a list of questions about the specific topics that should be covered, but, during the interview those questions do not follow the specific sequence due to more interesting questions can arise as a result of the interviewee’s answers, however, the main topics should be covered at the end of the interview (Bryman and Bell, 2007). Indeed, interviews for case studies should be more as conversation instead of structured questionnaire (Yin, 2003). The outline with corresponding questions for the interviewee’s can be found in appendix I and II. The main data collection instrument employed in this study for the rest of the research questions were structured questionnaire as can be found in appendix III & IV. The questionnaire was both open and

close ended items. The secondary sources were obtained by the use of the company's and other website, official empirical data, journals and dissertations and reports.

3.8 Method of Data Collection and Analysis

In this research, the primary data was collected through an interview and by utilizing a self administered questionnaire. The questionnaire items were clearly simplified and structured in a manner void of any ambiguity, but there were still some technical performance measurement terms and details. Secondary sources, in addition to the interview and questionnaire were obtained through the company's website and empirical data from the projects department between the years 2006 - 2010. The first step towards measurement of the performance of the projects (KPI) involved the determination of measurement criteria. Three criteria: time, cost and quality objectives have been adopted for the project performance measurement. For the performance measurement to be effective, the indicators must be accepted and understood across the organisation. Atkinson (1999) confirms wide use and understanding of the three chosen criteria in the assertion that though other definitions on project performance have been developed, the three basic criteria, referred to as the 'iron triangle', are always included. Analysing qualitative data is about examining, categorising, tabulating and recombining the empirical evidence to address the initial propositions of the study (Yin 2003). The purpose of analysing qualitative material is to make the material more clear and distinct, making sure not to lose the extent of information that the material includes. The information gathered from the interviews was evaluated after its relevance towards the purpose of the thesis, where the information found needed and beneficial was included in the empirical finding chapter., the empirical findings were made more clear and distinct and then

compared to the recommendations of the recent literature or with theoretical propositions, It was then possible to conclude if the company abides by the theoretical propositions and recommendation then made.

The method developed involved the use of an 11-point scale, 0.5 – 1.5, indicating the index achieved by a project. Thus each respondent was required to indicate the time, cost and quality performance achieved by a selected project on the respective scale of indices. The indices were developed based on the project time performance index (schedule planed index ratio of planned construction period to actual construction period) developed in a study into construction time performance by Walker (1995).

Here the Likert scaling was used to help analyses the problems which influence the implementation of the projects and representing them graphically using bar charts. In order to achieve the aim of determining the significant organisational structure affecting project performance, a relationship had to be established. Cross tabulation analysis was therefore performed to determine the relationship between factors relating to organisational structure affecting project performance and the categories effects of the projects performance within the organisation.

3.9. Profile of AGA Ltd-Obuasi

Anglogold Ashanti (AGA) Ltd formally (Ashanti Goldfields Company) is a gold mining company with the main mine at Obuasi, Ashanti region. The Obuasi Township has been in existence for over 100 years and is sub-urban in outlook with a population estimated at 300,000 migrating from all comers of Ghana and the rest of the world (Business, 2008). The

original license in 1897 was to mine 100 square miles or 258sq kms, the current license is to mine 474 square kms, and the new license is valid until 2054, as per the stability agreement (AGA LTD, 2010). Currently the total work force is about 4000 and the production as at 2010 was 316,615 ozs of gold at a cost of \$945/oz and a total cash cost of \$744/oz (AGA LTD, 2010).

Fig 3.1 A Map of Ghana showing Obuasi's Location



Source: Microsoft Encarta, Microsoft Corporation.

Vision

The vision of the organisation is to be the leading mining company.

Mission

The mission statement is as follows: We create value for our shareholders, our employees and our business and social partners through safely and responsibly exploring, mining and marketing our products. Our primary focus is gold and we will pursue value creating

opportunities in other minerals where we can leverage our existing assets, skills and experience to enhance the delivery of value.

Values Statement:

Safety is our first value, we treat each other with respect, the communities and societies in which we operate will be better off for AngloGold Ashanti having been there, we also respect the environment, we value diversity and we are accountable for our actions and undertake to deliver on our commitments.

Past Performances

Tab. 3.2 Past Performance at Glance (obuasi)

	2005	2006	2007	2008	2009	2010
Gold Production(000 oz)	391	387	360	357	381	317
Production cost \$/oz	481	600	698	834	796	945
Cash cost\$/oz	345	395	459	633	630	744
employees	5850	5630	4670	4260	4400	4000
Productivity/employee (00)	0.668	0.687	0.771	0.838	0.866	0.793
Gold price for the year\$/oz	443.4	605	695.3	871.1	925	1250
Annual turnover(\$ 000,000,000)	0.173	0.234	0.250	0.311	0.352	0.396

Source: AGA LTD, (2010)

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter is devoted to an analysis of and discussion of data gathered from the field. The issues concern included the bases of the organisational structures put in place, measurement of the performance of the project key indicators, identifying the problems of implementing projects and examining the relationship between organisational structure and the performance of a project.

4.2 Response to Data Collection.

In all 3 executives/managers were interviewed as planned, 80 questionnaires were send out of which 68 were given to the senior staff and 12 questionnaires to the junior staff. Out of the 68 senior staff 35 of them were given questionnaire on measurement of the performance of the project key indicators and examining the relationship between organisational structure and the performance of a project, out of which 30 respondents were obtained. The non-response could be partly attributed to respondents' complaints about the nature of data being requested; data on completed projects. Such data had to be retrieved from archives and this yielded considerable unwillingness. About 45 questionnaires were sent to respondents on, identify the problems of implementing projects out of which 33 were given to the senior staff and 12 to the junior staff. In all 3 junior staff and 8 senior staff fail to respond. Hence the overall response rate is about 87%, it is however acceptable and was used for the analysis. Also, the number of projects obtained meets the requirement of the statistical method used for the analysis. Most of the respondents belonged to the senior staff level, regarded as the

middle management level, in the company. No respondent also indicated lack of understanding of the concepts under study as in fig. 4.1 below.

Status of Respondents

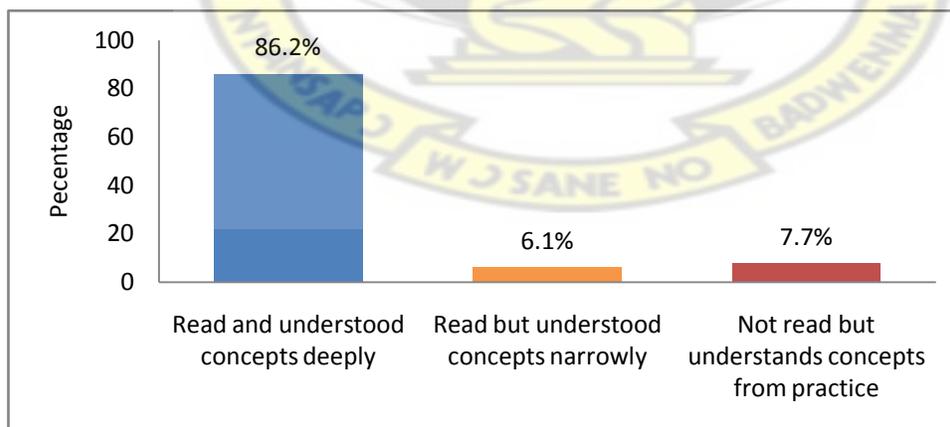
Tab. 4.1 Rank of Respondents

		Frequency	Percent	Valid Percent
Valid	Exe./Managers	3	4.2	4.2
	Senior Staff	60	83.3	83.3
	Junior Staff	9	12.5	12.5
	Total	72	100.0	100.0

Source: Author's Field Work.

Respondent Understanding of the concept

Fig.4.1 Rank of Respondent Understanding of the concept



Source: Author's Field Work

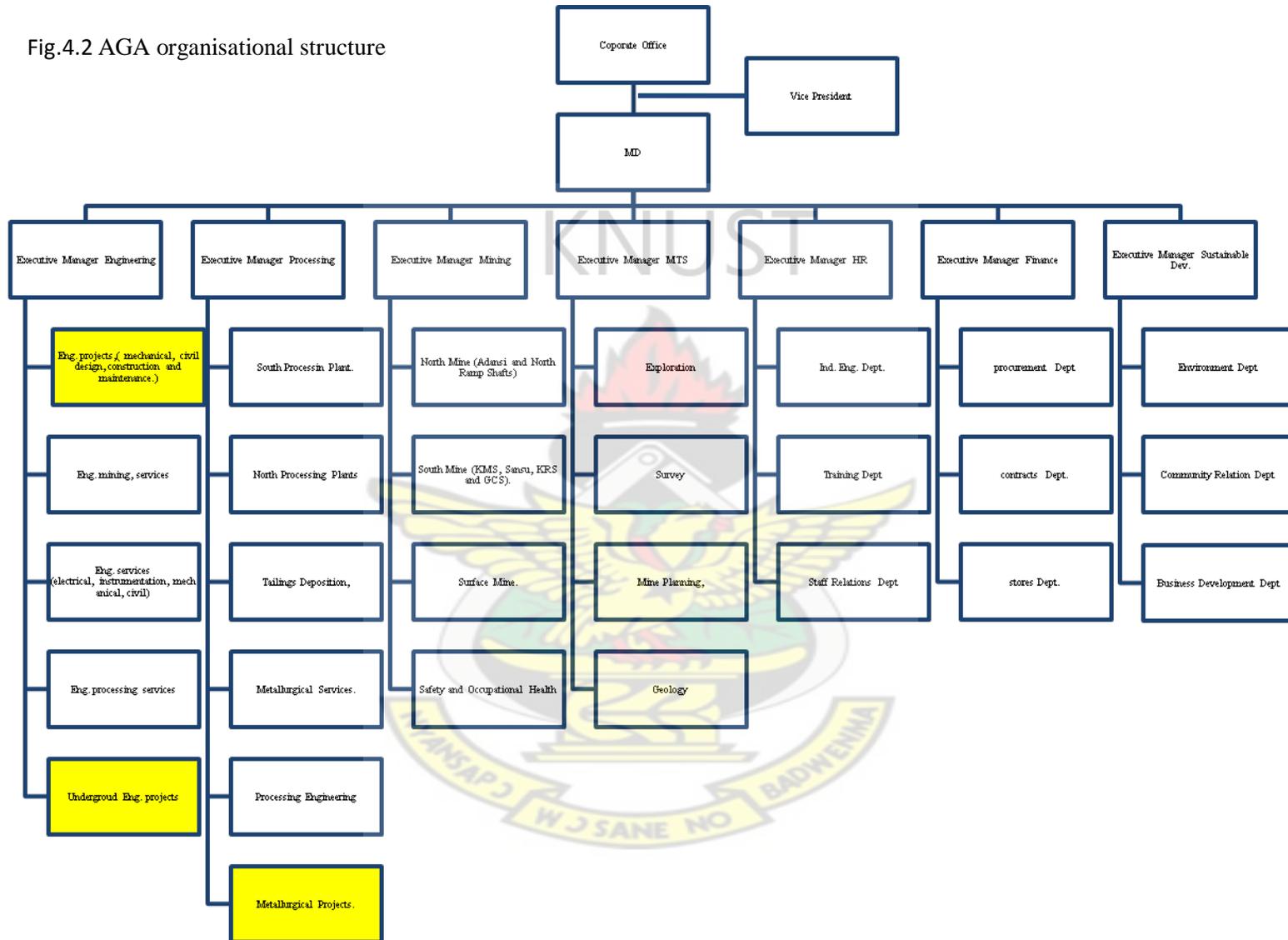
4.3 Interview Conducted with Executive/Managers on the Bases of the Organisational Structures in AGA LTd.

Interviewees generally agreed that for innovation strategy of the company, an organic structure (loose structure, low specialization, low formalisation, decentralization, low hierarchy and large span of control) may be suitable with the reason that at that level one had to rely on their own expertise to carry out his functions. Most innovative strategy of companies are pursued through Projects which may suggest that an organic structure for such projects may be suitable. It came to light that AGA strategy is pursuing cost minimization and a mechanistic structure (Tight structure, extensive specialization, high formalisation, high centralisation, high hierarchy and narrow span of control) is normally used for such strategy. They noted that controlling a large work force is quite difficult hence needed to put structures in place such as narrow span of control high hierarchy chain of command, strict rules and procedures which turns to be mechanistic in nature. It was reveal that unstable environment like highly uncertain and complex environment required an organic structure however the case of AGA Ltd is not necessary so because e.g if the environmental Protection Agency (EPA) required immediate change on the ground, it takes a higher centralised decision making body to respond since they could close down their operations, and highly centralised decision making are mechanistic in nature. The technology used are mostly labour intensive and and semi-automated which are quite routine and repetitive in nature and thus call for high specialisation, standadisation and formalisation and are characteristics of a mechanic structure. All the respondents confirmed that the organisational structure in at AGA Ltd obuasi as shown in fig.4.3 is mechanistic in nature due to the nature of its operations, the cost minimization strategy adopted, the large size of the workforce, the

routine and repetitive technology being used and the need to respond rapidly to the dynamic complexity of the external environment. This is to say that the initial structure put in place was to address production and the environment.

The interviewees suggested the use of mix mechanistic and organic structure for the operations and the projects respectively i.e. the operations are routine in nature and mechanistic structure in place best suits it. Projects are temporary task and unique in nature hence would recommend an organic structure for it. Even though the company have to undertake projects in order to meet its medium to long term strategic goals for the sustainability of the mine its main focus is on operations where daily production target have to be met and also satisfy its stakeholders, hence they relate to projects in a very weak matrix where authority mostly reside in the functional managers. These kind of arrange comes with its own problems like scramble for resources, conflicts, prioritisation etc. which affects projects delivery. Hence they recommended project structure or a strong matrix relation with the projects structure where a strong level of authority reside in projects and bypassing most of the existing company mechanistic structure to implements projects and handing it over to the end users. Typical advantage is avoiding unnecessary delays in going through long approval process for projects approval, procurements and contracts due to the hierarchy of decision making. Difficulty may arouse if one uses the structure for operations for projects because their structural approaches differ as explain by the respondents and subsequent study following this shows that the structure inhibit project performance.

Fig.4.2 AGA organisational structure



Source: AGA HR Dept.,

From fig.4.3 is AGA ltd organizational structure existing as at 2010, the supervisors report to senior supervisors and senior supervisors report to superintendents. The superintendents also report to the frontline managers who in turn report to their senior managers then the senior managers to the executive managers. These reporting lines are functional based however there exist some inter-functional reporting lines.

4.4 The performance of the project key Performance Indicators.

Project key performance indicators, as already indicated is measured in 3 criteria; time cost and quality. The time, cost and quality performance of each project were measured by means of time, cost and quality performance indices respectively on an 11-point scale ranging from 0.5 to 1.5. The time and cost performance indices were obtained by computing from formula whilst the quality performance was subjectively measured by each respondent indicating, in his or her own estimation, the extent to which the quality of the project deviated from what was expected; The formula and indices are as indicated below in appendix iv.

4.4.1 Overview of performance of the project key indicators.

A computed index of less than 1.0 indicates under performance or below schedule whilst 1.0 or above is according to schedule or above schedule respectively. In order to know the trend of performance of all projects obtained tables 4.2 below gives a descriptive summary of the performance indices obtained project by project.

Table 4.2 Time performance trend of projects

	Time Performance index	Frequency	Overall Trend Performance			
				No.	%	Valid Percent
Valid	0.5	5	Completed behind schedule	19	63.33	67.9
	0.6					
	0.7	3				
	0.8	2				
	0.9	9				
	1	5	Completed on schedule	5	35.71	17.9
	1.1	2	Completed Ahead of schedule	4	13.33	14.3
	1.2	2				
	1.3					
	1.4					
	1.5					
	Total	28		28	93.33	100
Missing		2		2	6.67	
Total		30		30	100.00	

Source: Author's Field Work

Table 4.3 Time performance Index Statistics

N	Valid	28
	Missing	2
Mean		0.771
Median		0.800
Mode		0.8
Std. Deviation		0.2203

Source: Author's Field Work

From table 4.2 19 out of 28 valid respondents have their project completed behind schedule representing 67.9% and at least 9 out of 28 representing 32.2% indicate either they completed the project on schedule or ahead of schedule. Moreover from table 4.3 the mean of 0.77 confirmed that on the average most of the time performances were below the expected mean of 1.0, an indication of poor performance.

Table 4.4 Cost performance trend of projects

	Time Performance index	Frequency	Overall Trend Performance			
				No.	%	Valid Percent
Valid	0.5	5	Completed above initial budget	15	50.00	53.5
	0.6					
	0.7	1				
	0.8	1				
	0.9	8				
	1	5	Completed as budget	5	16.67	17.9
	1.1	3	Completed below initial budget	8	26.67	28.6
	1.2	3				
	1.3	2				
	1.4					
	1.5					
	Total	28		28	93.33	100
Missing		2		2	6.67	
Total		30		30	100.00	

Source: Author's Field Work

Table 4.5 Cost performance Index Statistics

N	Valid	28
	Missing	2
Mean		0.880
Median		0.953
Mode		1.0
Std. Deviation		0.2594

Source: Author's Field Work

From table 4.4 15 out of 28 valid respondents have their project completed above initial cost representing 53.5% and at least 13 out of 28 representing 46.5% indicate either they completed the project as budgeted or complete below initial budget. Moreover from table 4.5

the mean of 0.88 confirmed that on the average most of the cost performances were below the expected mean of 1.0, an indication of poor performance.

Table 4.6 Quality performance trend of projects

	Time Performance index	Frequency	Overall Trend Performance			
				No.	%	Valid Percent
Valid	0.5		Below expectation	11	36.67	39.3
	0.6					
	0.7	1				
	0.8	3				
	0.9	7				
	1	16	As Expected	16	53.33	57.1
	1.1	1	Above expectation	1	3.33	3.6
	1.2					
	1.3					
	1.4					
	1.5					
	Total	28		28	93.33	100
Missing		2	2	6.67		
Total		30				
			30	100.00		

Source: Author's Field Work

Table 4.7 Project quality status achieve Statistics

N	Valid	28
	Missing	2
Mean		0.950
Median		1.000
Mode		1.0
Std. Deviation		0.0962

Source: Author's Field Work

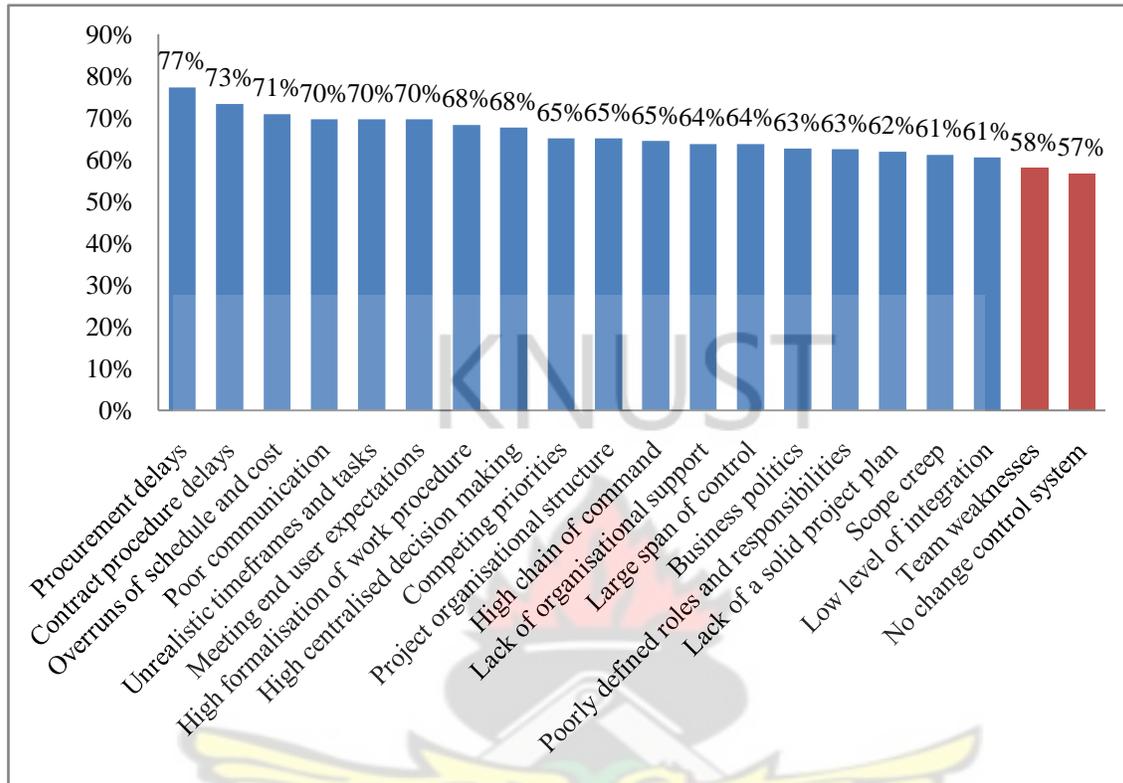
From table 4.6, 11 out of 28 valid respondents have their project completed below expectation representing 39.3% and at least 17 out of 28 representing 60.7% indicate either the project is as expected or above expectation. Moreover from table 4.7 the quality mean of 0.95 indicate that most of the projects were close to the expectation with the mean of 1.0.

The trend percentages and means obtained indicate that project performance of time and cost falling below trend is prevalent amongst the projects. However, the trend of quality performance of all the projects is better than cost and time performance. This may be due to the inclination of clients towards attaining projects of satisfactory quality rather than projects completed on or ahead of schedule and as budgeted or below budget. There is an indication that whilst time and cost objective can be compromised on, quality is difficult to sacrifice.

4.5 Problems of Implementing Projects

The total score of the various problems in projects implementation as indicated in the categories of the significant level was rank as shown in fig. 4.3 using questionnaire in appendix III. A score above 60% ($3 \text{ (moderately significant)} \times 20 \text{ (listed problems)} / 5 \times 20$) indicates that the problem is at least significant.

Fig 4.3 Rank relative important index of problems in implementing projects



Source: Author's Field Work

This shows that the following in descending order are significant problems in implementing projects: Procurement delays, Contract procedure delays, Overruns of schedule and cost, Poor communication, Unrealistic timeframes and tasks, Meeting end user expectations, High formalisation of work procedure, High centralised decision making, Competing priorities, Project organisational structure, High chain of command, Lack of organisational support, large span of control, Business politics, poorly define roles and responsibilities, Lack of solid project plan, Scope creep and low level of integration.

All these problems are characteristic nature of a mixture of extensively mechanistic and organic structure which is bureaucratic in nature in addition to the listed, and this confirmed the structure in place of AGA Ltd-Obuasi is complex, extensively mechanistic in nature and related to projects structure in a very weak matrix. For instance the procurements delays and contract procedure delays which were among the highest ranks of problems could be traced to the responsibility residing in functional managers in a mechanistic structure who are pre-occupied with operational duties priorities than projects.

4.6 The Relationship between Organisational Structure and the Performance of Project.

In order to analysed the study thoroughly an attempt was made to see how time cost and quality index relate to each other. Correlation analysis was used since both were continuous variables and anyone could be the dependent or the independent variables. The correlation was conducted using 2-tailed at a significance (2-tailed) level of 0.05. Hence, a computed significant value less than 0.05 implied that there is significant relationship between the performances of the two grouping variables.

Table 4.8 correlations of KPI'S

		Time performance Index	Cost performance Index	Project quality status achieve
Time performance Index	Pearson Correlation	1	0.248	0.103
	Sig. (2-tailed)		0.242	0.633
	N	24	24	24
Cost performance Index	Pearson Correlation	0.248	1	0.094
	Sig. (2-tailed)	0.242		0.661
	N	24	24	24
Project quality status achieve	Pearson Correlation	0.103	0.094	1
	Sig. (2-tailed)	0.633	0.661	
	N	24	24	28

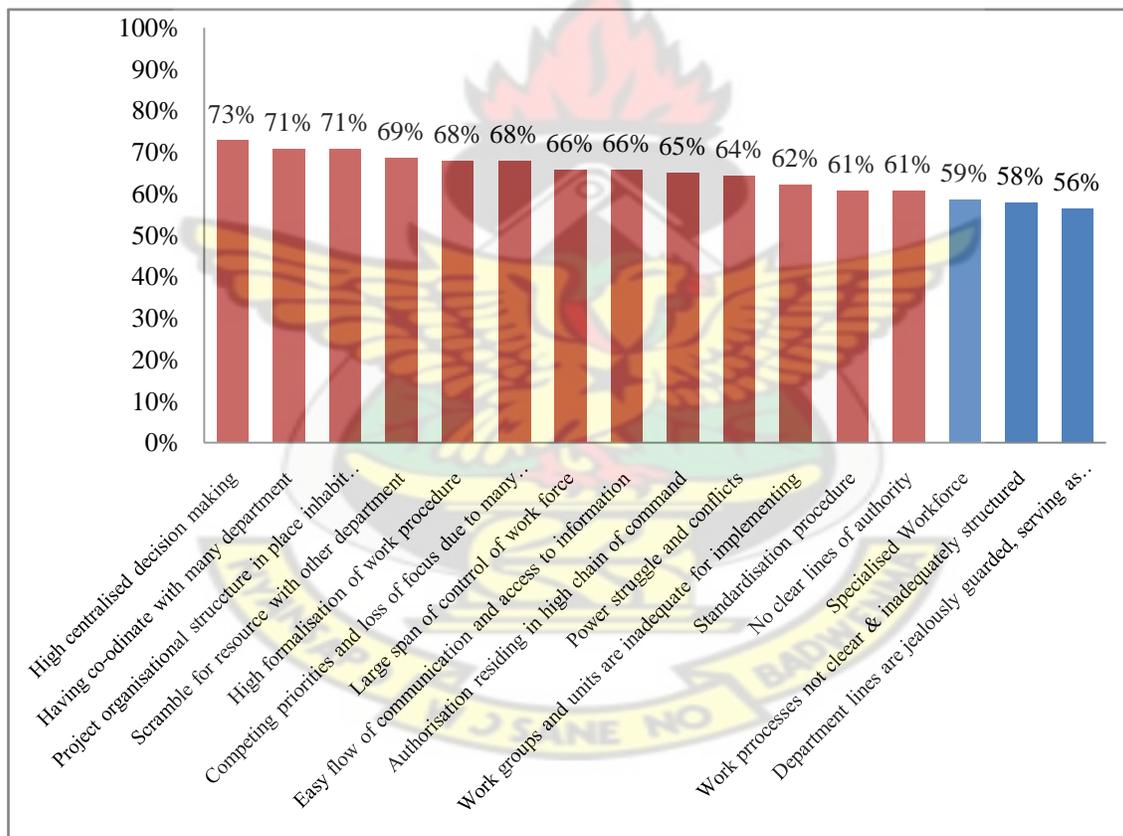
Source: Author's Field Work

For the relationship between time and cost performance index, the Pearson correlation of 0.248 is not strong on a scale of 0 to 1 and the sig. (2-tailed) of 0.242 \gg 0.05 indicates that there is no significant correlation between time and cost. For the relationship between time and quality performance index, the Pearson correlation of 0.103 is not strong on a scale of 0 to 1 and the sig. (2-tailed) of 0.633 \gg 0.05 indicates that the correlation is not significant. Finally for the relationship between cost and quality performance index, the Pearson correlation of 0.094 is not strong on a scale of 0 to 1 and the sig. (2-tailed) of 0.661 \gg 0.05 indicates that there is no significant correlation. This means that the time, cost and quality performance index are independent and each do not influence the outcome of the other, e.g. if the project is to delay it does not necessary implied the budget will be over spent or under spent and the vice versa. Hence the KPI's was use separately as the dependent variables against the categorised organisational structure significant levels as the independent variables.

Rank relative important index of organisational structure effects on KPI.

The rank relative important index organisational structure effects on KPI's of project was determine as shown in the fig.4.4 below, this helped to reduce the study to the significant effects. The total score of the various organisational structure related factors as indicated in the categories of the significant level was rank as shown in fig. 4.4 using questionnaire in appendix IV. A score above 60% (3 (moderately significant) x 16 (listed problems) / 5 x16) indicates that the problem is at least significant.

Fig 4.4 Rank relative important index of organisational structure effects on KPI.



Source: Author's Field Work

From fig 4.4 High centralised decision making, Having to co-ordinate within many departments, project organisational structure in place inhibiting efficient delivery were

among the highest rank as important to the respondent that affects significantly projects performance.

Cross tabulation analysis was used to determine the relationship between the organisational structures (independent) on project performance (dependent) since both variables were categories making them discrete variables. It is therefore suitable to use crosstab ordinal to ordinal analyses, with the significant level of 0.05. The Kendall's tau-c value is the measure of association that calculates the strength of the relationship between two ordinal variables and the direction as well depending upon how the statement was coded.

Effect of organisational structure on Time performance index

From table 4.9 High centralised decision making (approx. Sig.= 0.014), Scramble for resource with other department (approx. Sig. = 0.034) and Power struggle and conflicts (approx. Sig.= 0.006) with their respective Kendall's tau-c values of -0.337, -0.295, -0.366 indicates strong association, the negative values indicates the directional is inversely related i.e. the higher the significant of the organisational structure factors mention above the more the projects were complete behind schedule. The above mention factors are often problem that exist in weak matrix structure as mention in the literature review. Typical explanation using the test results of Power struggle and conflict is as below:

Table 4.9 Results of Crosstab and ranking

RELATIVE IMPORTANT INDEX		Time Performance Index		Cost Performance Index		Quality Performance Index	
ORGANISATIONAL STRUCTURE RELATED FACTORS	RANK	Kendall's tau-c	Approx . Sig	Kendall's tau-c	Approx . Sig	Kendall's tau-c	Approx . Sig
High centralised decision making	73%	-0.337	0.014	-0.333	0.006	-0.126	0.434
Having to co-ordinate with many department	71%	-0.256	0.143	-0.379	0.006	-0.210	0.212
Project organisational structure in place inhabit efficient delivery	71%	-0.107	0.421	-0.149	0.325	-0.195	0.160
Scramble for resource with other department	69%	-0.295	0.034	-0.287	0.057	-0.169	0.364
High formalisation of work procedure	68%	-0.031	0.833	-0.153	0.348	-0.107	0.493
Competing priorities and loss of focus due to many project being handle	68%	-0.268	0.058	-0.168	0.246	-0.245	0.920
Large span of control of work force	66%	-0.218	0.143	-0.314	0.025	-0.432	0.003
Easy flow of communication and access to information	66%	0.038	0.803	0.168	0.294	-0.126	0.414
Authorisation residing in high chain of command	65%	-0.191	0.187	-0.107	0.482	-0.288	0.197
Power struggle and conflicts	64%	-0.366	0.006	-0.375	0.018	-0.383	0.006
Work groups and units are inadequate for implementing	62%	-0.096	0.565	-0.333	0.032	-0.130	0.360
Standardisation procedure	61%	-0.218	0.14	-0.180	0.15	-0.145	0.328
No clear lines of authority	61%	-0.218	0.166	-0.463	0.003	-0.126	0.366
Specialised Workforce	59%	-0.153	0.349	-0.092	0.583	0.000	1.000
Work processes not clear & inadequately structured	58%	-0.295	0.054	-0.318	0.031	-0.265	0.050
Department lines are jealously guarded, serving as impediments to collaboration	56%	-0.134	0.337	-0.191	0.256	-0.145	0.319

Source: Author's Field Work

Table 4.10a crosstab of Project completion status achieve -Power struggle and conflict

	Power struggle and conflicts					Total
	Not significant	Slightly Significant	Moderately Significant	Significant	Very Significant	
Project completion status achieve						
Completed behind schedule	3	1	2	8	5	19
Completed on schedule	1	1	1	2	0	5
Completed ahead of schedule	2	0	2	0	0	4
Total	6	2	5	10	5	28

Source: Author's Field Work

The cross tabulation reveals a pattern indicating that project time status has something to do with Power Struggle and Conflict. From the table, respondents who indicated that they completed the project behind schedule also indicated significantly that Power struggle and conflicts was a major contributing factor. Thus 13 out of 19 of the respondents in that category said that Power struggle and conflicts is at least significant as far as project completion is concerned. They saw that project time status achieved has something to do with power struggle and conflicts as far as organisational structure is concerned. Respondents who indicated that they completed project on schedule does not give a clear picture of the pattern of response on power struggle and conflict which was seen as moderately significant, with out of the 5 responses, at least 3 said moderately significant and significant. Those completed ahead of schedule, 2 out of 4 saw power struggle and conflict as moderately significant. Thus, those who said they completed their projects at or ahead of schedule seem to be saying that power struggle and conflicts is not a major factor. Hence from table 4.10b the test reveals that power struggle and conflict is significantly related to project time status.

Symmetric Measures Table 4.10b

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Ordinal by Ordinal	Kendall's tau-b	-0.390	0.127	-2.776	0.006
	Kendall's tau-c	-0.356	0.128	-2.776	0.006
	Gamma	-0.600	0.170	-2.776	0.006
N of Valid Cases		28			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Source: Author's Field Work

From table 4.10b the measures of ordinal association show that project time status achieved and power struggle and conflicts are significantly associated since Power struggle and conflicts has approx. Sig. = 0.006 with respective kendall's tau-c value of -0.356. The negative kendall's tau-c value indicates the negative values indicates the directional is inversely related i.e. the higher the significant of the categories of the organisational structure factors mention above the more the projects complete behind schedule.

Effect of organisational structure on cost performance index

From table 4.9 High centralised decision making (approx. Sig.= 0.006), Having to co-ordinate with many department (approx. Sig.= 0.006), Large span of control of work force (approx. Sig.= 0.025), Power struggle and conflicts (approx. Sig. = 0.018), Work groups and units are inadequate for implementing (approx. Sig. = 0.032), No clear lines of authority (approx. Sig.= 0.003), Work processes not clear & inadequately structured (approx. Sig.=

0.031), are those organisational structures which have the strong relationship with the cost performance index since their approx. sig < 0.05 with their Kendall's tau-c values in the table 4.9 greater than 0.2 with the negative values indicating that the organisational structure significant categories are inversely related to the cost performance index categories. No clear lines of authority have the strongest association with the cost performance index, this may be due to parallel lines of authority which may exist but they may be virtually or people assuming power to influence which contribute greatly to projects cost completed above estimate. These factors are also mixture of characteristics of mechanistic and organic structures in place and relating to projects structure in a very weak matrix as mention in the literature review. Even though the following factors, No clear lines of authority, Work groups and units are inadequate for implementing, Work processes not clear & inadequately structured, were rank relatively low they have strong association with the cost performance index, this could be that the respondent may not be aware of their inversely strong effect on cost or might have underestimate them. Typical explanation using the test results of, No clear lines of authority is as below:

Table 4.11a Crosstab of Project cost status achieve - No clear lines of authority

	No clear lines of authority					Total
	Not significant	Slightly Significant	Moderately Significant	Significant	Very Significant	
Project cost status Completed above initial estimated cost	0	3	2	5	5	15
Completed as estimated	2	1	2	0	0	5
Completed below initial estimated cost	5	0	0	2	1	8
Total	7	4	4	7	6	28

Source: Author's Field Work

The cross tabulation reveals a pattern indicating that project cost status has something to do with No clear lines of authority. From the table 4.11a, respondents who indicated that they completed the project above initial estimated cost also indicated significantly that No clear lines of authority was a major contributing factor. Thus 10 out of 15 of the respondents in that category said that No clear lines of authority is at least significant as far as project cost is concerned. They saw that project cost status achieved has something to do with No clear lines of authority as far as organisational structure is concerned. Respondents who indicated that they completed project at estimated cost does not give a clear picture of the pattern of response on No clear lines of authority was seen as moderately significant with out of the 5 responses, 2 said moderately significant. Those completed below initial estimated cost, 5 out of 8 saw No clear lines of authority as slightly significant. Thus, those who said they completed their projects at or below estimated cost seem to be saying that No clear lines of authority is not a major factor. Hence from table 4.11b the test reveals that No clear lines of authority is significantly related to initial project estimated cost. From the table Symmetric measures of ordinal association shows that project cost status achieved and No clear lines of authority are significantly associated.

Symmetric Measures Table 4.11b

		Value	Asymp. Error ^a	Std. Approx. T ^b	Approx. Sig.
Ordinal by Ordinal	Kendall's tau-b	-0.449	0.151	-2.991	0.003
	Kendall's tau-c	-0.463	0.155	-2.991	0.003
	Gamma	-0.596	0.190	-2.991	0.003
N of Valid Cases		28			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Source: Author's Field Work

The measures of ordinal association from table 4.11b shows that project time status achieved and No clear lines of authority are significantly associated since No clear lines of authority has approx. Sig.= 0.003 with respective kendall's tau-c value of -0.463. The negative kendall's tau-c value indicates the negative values indicates the directional is inversely related i.e the higher the significant of the categories of the organisational structure factors mention above the more the projects were complete above initial estimated cost.

Effect of organisational structure on quality performance index

From table 4.9, Having a large span of control of work force (approx. Sig. = 0.003) and Power struggle and conflicts (approx. Sig.= 0.006) are those organisational structure related factors which have the strong relationship with the quality performance index since their approx. sig < 0.05 with their kendall's tau-c values in the table 4.9 greater than 0.2 with the negative values indicating that the organisational structure significant categories are inversely related to the quality performance index categories. The fact that only two organisational

related factors affects quality strongly goes to indicate that achieving the desire quality may be quiet independent of the organisational structure existing.

Power struggle and conflicts is the common organisational structure related factor that inversely affect the time, cost and quality performance index. This could be trace to the mechanistic nature of the organisational structure relating to projects in a weak matrix arrangement where many Executive/Snr. Managers and managers whom authority reside wanting to influence the time, cost and the quality of the projects being implemented. Typical explanation using the test results of large span of control of workforce is as below:

Table 4.12a Project quality status achieve - Large span of control of work force

	Large span of control of work force					Total
	Not significant	Slightly Significant	Moderately Significant	Significant	Very Significant	
Project quality status Below expected	0	2	1	3	5	11
As expected	1	6	3	5	1	16
Above expected	1	0	0	0	0	1
Total	2	8	4	8	6	28

Source: Author's Field Work

The cross tab reveals a pattern indicating that project quality status has something to do with Large span of control of work force. From the table4.12a, respondents who indicated that they completed the project below expectation also indicated significantly that Large span of control of work force was a major contributing factor. Thus 8 out of 11 of the respondents in that category said that Large span of control of work force is at least significant as far as project cost is concerned. They saw that project quality status achieved

has something to do with; Large span of control of work force as far as organisational structure is concerned. Respondents who indicated that they completed project as expected does not give a clear picture of the pattern of response on Large span of control of work force, with 16 responses, 3 said moderately significant, at least 6 said slightly significant and at least 7 said significant. Only one completed above expectation saw Large span of control of work force as not significant. Thus, those who said they completed their projects at or above expected seem to be saying that Large span of control of work force is not a major factor. However from table 4.12b the test reveals that, Large span of control of work force is significantly related to project quality status. From table 4.12b Symmetric and directional measures of ordinal association shows that project quality status achieved and Large span of control of work force are significantly associated.

Symmetric Measures Table 4.12b

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Ordinal by Ordinal	Kendall's tau-b	-0.458	0.145	-2.945	0.003
	Kendall's tau-c	-0.432	0.147	-2.945	0.003
	Gamma	-0.677	0.180	-2.945	0.003
N of Valid Cases		28			

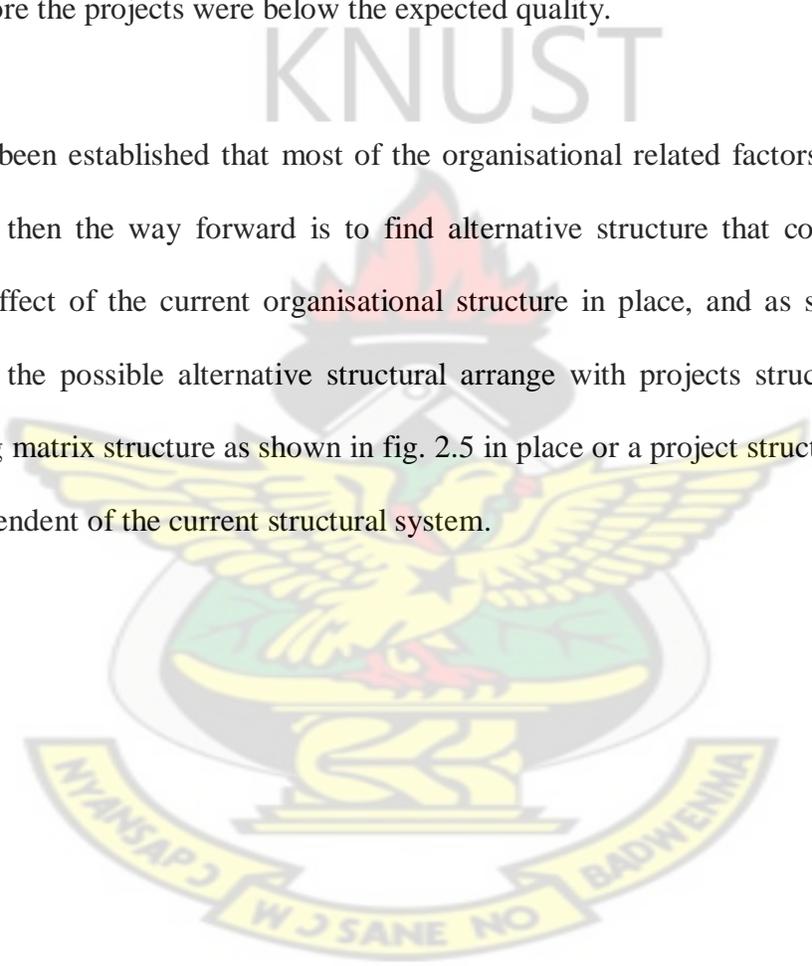
a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Source: Author's Field Work

The measures of ordinal association from table 4.13b shows that project quality status achieved and Large span of control of work force are significantly associated since Large span of control of work force has approx. Sig. = 0.003 with respective kendall's tau-c value of -0.432. The negative kendall's tau-c value indicates directional is inversely related i.e the higher the significant of the categories of the organisational structure related factors mention above the more the projects were below the expected quality.

Since it has been established that most of the organisational related factors affects projects performance then the way forward is to find alternative structure that could minimise or bypass the effect of the current organisational structure in place, and as suggested by the interviewees the possible alternative structural arrange with projects structure is either to have a strong matrix structure as shown in fig. 2.5 in place or a project structure as shown in fig.2.3 independent of the current structural system.



CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter attempts to summaries the findings resulting from the study upon which recommendations and conclusions were made.

5.2 Summary of Findings.

The principal aim of this research is to find out the effects of organisational structure on project performance in AGA ltd –Obuasi, hence the study was conducted with the following objectives in mind:

1. To determine the bases of the organisational structure put in place for projects execution in AGA-Obuasi.
2. To measure the performance of the project key Performance indicators at AG-Obuasi.
3. To identify the problems of implementing projects at AG-Obuasi.
4. To examine the relationship between organisational structure and the performance of a project in AGA-Obuasi.

The bases of the organisational structure put in place for projects execution.

The study revealed that the organisational structure in place of AGA-Obuasi is extensively mechanistic in nature due to the nature of its operations, the strategy adopted and the need to respond rapidly to the dynamic complexity of the external environment. Even though the company have to undertake projects in order to meet its medium to long term strategic goals

for the sustainability of the mine its main focus is on operations where daily production target have to be met and also satisfy its stakeholders, hence they relate to projects in a very weak matrix where most authority reside in the functional managers.

The performances of the project key indicators.

The KPI's of time performance, cost performance and quality performance of the projects, 67.9%, 53.5% and 39.3% performed below trend respectively. Moreover the mean of 0.77 and 0.88 and 0.95 respectively indicates project performance of time and cost performance below trend is prevalent amongst the projects. However, trend of quality performance is an indication that whilst time and cost objective can be compromised on, quality is difficult to sacrifice.

Implementation Problems in Projects

The following are significant problems in implementing projects: Procurement delays, Contract procedure delays, Overruns of schedule and cost, Poor communication, Unrealistic timeframes and tasks, Meeting end user expectations, High formalisation of work procedure, High centralised decision making, Competing priorities, Project organisational structure, High chain of command, lack of organisational support and large span of control with average ranking above 60%, indicates the problems are prevalent. All these problems are extensively characteristic nature of mechanistic structure which is bureaucratic in nature in addition to the listed, and this confirmed the structure in place of AGA-Obuasi which is extensively mechanistic in nature and related to projects structure in a very weak matrix.

Relationship between Organisational Structure and the Performance of a Project

High centralised decision making, Scramble for resource with other departments and Power struggle and conflicts are the higher significant categories of the organisational structure factors that cause more projects to be completed behind schedule. High centralised decision making, Having co-ordinate with many department, Large span of control of work force, Power struggle and conflicts, Work groups and units are inadequate for implementing, No clear lines of authority, Work processes not clear & inadequately structured are those organisational structure which have the strong relationship with the cost performance index indicating that the more the organisational structure significant categories the more are the projects completed above initial estimated cost. No clear lines of authority have the strongest association with the cost performance index, this may be due to parallel lines of authority which may exist but they may be virtually or people assuming power to influence due to its projects matrix structure, which contribute greatly to projects cost completed above estimate. Having a large span of control of work force and Power struggle and conflicts are those organisational structure significant categories which inversely related to the quality performance index categories. The fact that only two organisational related factors affects quality strongly goes to indicate that achieving the desire quality may be quiet independent of the organisational structure existing. Power struggle and conflicts is the common organisational structure related factor that inversely affect the time, cost and quality performance index. This could be trace to the mechanistic nature of the organisational structure relating to projects in a weak matrix arrangement where many functional Executive / Snr. Managers and managers whom authority reside wanting to influence the time cost and the quality of the projects being implemented.

5.3 Conclusion

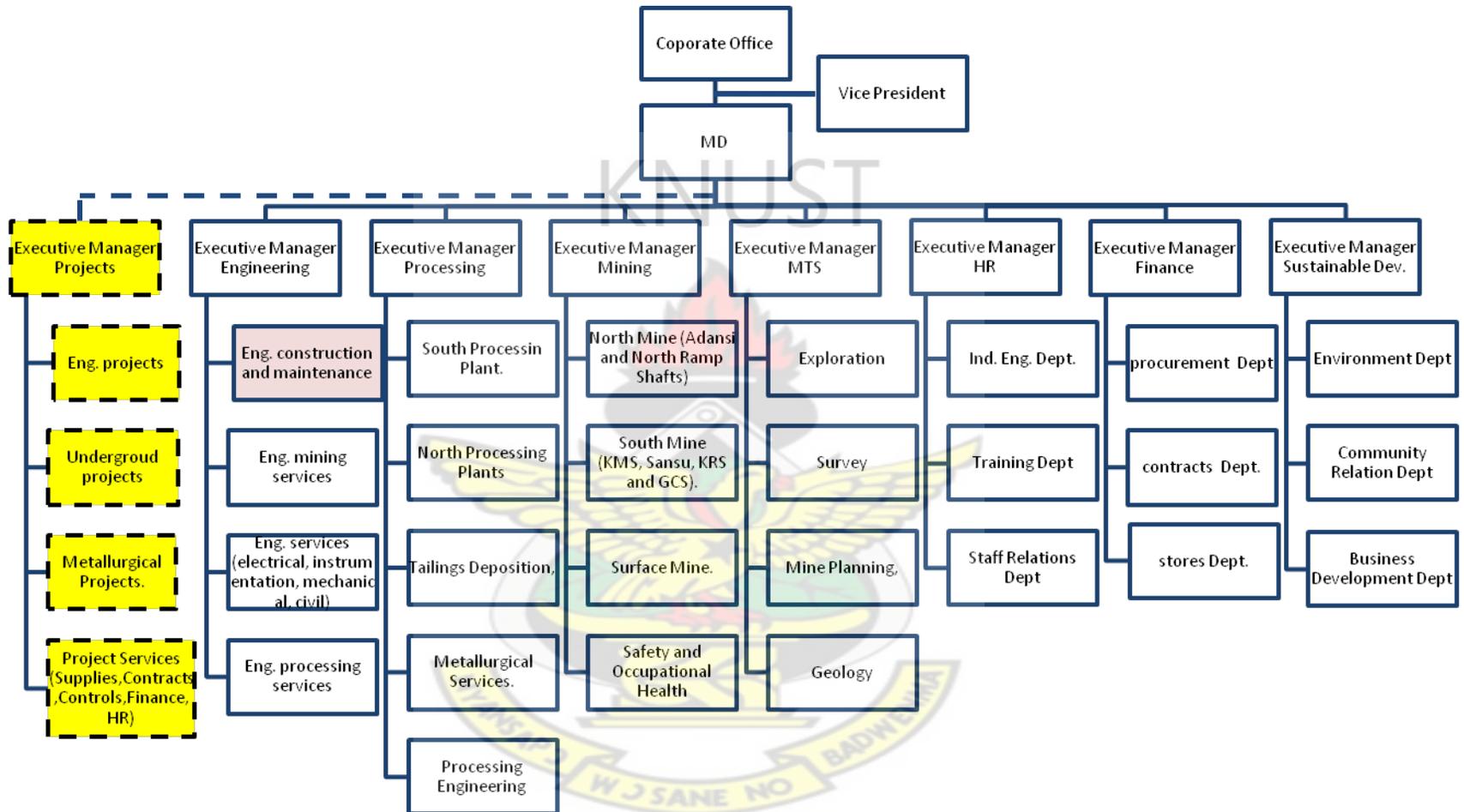
This study has been able to show that the structure in place in AGA-Obuasi has inverse effect on the key performance indicators of projects due to the mechanistic structure in place and relating to projects in a very weak matrix structure. It also reveals that 59% and 67% of the project does not meet expectation in terms of cost and time respectively due to the effect of the organisational structure in place however at least 63% of the project meets quality expectation irrespective of the organisational structure in place. The study also shows that even though the bases of the organisational structure in place was due to the strategy employed, the environment in which it operates, the size of the work force and the technology used in order to optimised production and maximised profit and ensure the sustainability of the mine this objective is not being achieved due to the project organisational structural problems impacting negatively on the time, cost and the quality performance of the capital project which are medium and long term strategic investment for the company to meet its target.

5.4 Recommendation

- In an effort to reduce the effect of the organisational structure on project performance a project structure which is organic in nature must be put in place with its own Executive manager reporting to the Managing Director as proposed in fig. 5.1. Here the project structure must have its own procurement, contract, finance, human resources and control system in place independent of the main functional lines. Projects must be well resource and efforts must be made to reduce drastically its reliability on the functional lines. Again with this structure the functions of construction and maintenance services are separated from Projects to enable it focus on the numerous projects it is handling.



Fig 5.1 Propose project structure



Source: Author's Field Work

- The project approval process must be limited to the executive manager Projects, and ensuring clear lines of authority in order to expedite the process and reduce its effect on project delays as the tall hierarchy of decision making and approval have its tolling effect on the project delays.
- Budgeting for capital projects have to be given a second look with the view of avoiding underestimating and overestimating by bringing in qualified personnel to handle this rather than it being done by the functional Lines who may not be focus in capturing all the cost elements in the project.
- Further efforts must be made to reduce the effect of power struggle by investigating all sources of it and putting other measures in place apart from addressing the organisational structure since this impacts on all the three key performance index namely time, cost and quality.
- **Recommendation for further studies.**
Since the study has clearly shown that it will be beneficial to institute project structure it is recommended that further research could be done to ascertain the impact of implementing project structure in AGA-Obuasi.

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APPENDICES

APPENDIX I

The Research is being carried out as partial fulfillment of the requirements for award of Commonwealth Executive Masters in Business Administration. The questionnaire is to enable the study understand the organisational structure in place in AGA Ltd, its effect on project performance and investigate some of the problems and the key projects performance. Please be assured that, all the information provided will be confidentially treated

1. To which of the following status in your firm do you belong?

(a) Senior staff []

(b) Junior Staff []

(Please read the notes on the following key concepts, as are applied in the context of this study, before proceeding to the questionnaire herein)

- **Organisational structure:**-Defines how individuals and groups are organised or how their tasks are divided and coordinated.
- **Formalisation** :- The degree to which workers are provided with rules and procedures that deprive versus encourage creative, autonomous work and learning
- **Standardisation:**-The level of variety or range of actions in a job or job series
- **Hierarchy or chain of command:** - The degree to which an organisation has many versus few levels of management
- **Span of control:**-The number and functional diversity of employees reporting to a manger.

- **Specialisation vs integration:** - The degree to which departments and workers are functionally specialized versus integrated in their works, skills, and training
- **Centralisation vs decentralization:-** The degree to which decisions are made high versus low in the organisational hierarchy
- **Departmentation:-** The groupings of jobs in a way that most effectively serves the needs of the organisation
- **Level of communication:** -The degree to which vertical and horizontal communications are slow, difficult, and limited versus fast, easy, and abundant
- **Project Performance:-** is a measure of the extent to which a substantially completed project achieved its Time, Cost and Quality targets as a whole.

Before answering this questionnaire, to what extent had you understood the concepts, Organisational Structure and Project Performance

- (a) Had read and understood concepts deeply []
- (b) Had read but understood concepts narrowly []
- (c) Had not read but understands concepts from practice []

APPENDIX II

Interview questions for top Executive Managers/manager on the researched question

“What were the bases of using certain organisation structures in projects execution?”

Our focus in this thesis is questions related to organisational structure, researched has shown that there are four forces that act as the causes or determinant of organisation structure namely strategy, size, technology and the environment (Pennings,1992). Here we will talk about issues such as communication, hierarchy, authority, formalisation, specialization, span of control, decentralisation and integration.

1. How far do you agree that for innovation strategy of the company the structure should be organic structure?(loose structure, low specialization, low formalisation, decentralization, low hierarchy and small span of control)
2. AGA strategy may be cost minimisation, do you agree with the statement that mechanistic structure are normally used for such strategy? (Tight structure, extensive specialization, high formalisation, high centralisation, high hierarchy and wide span of control)
3. What is your view on some studies suggesting that the use of mix mechanistic and organic structure like the use of mechanistic structure for its current operation in the production line and organic structure for new undertakings like projects?
4. Do you share the view that large organisation turn to be mechanistic?
5. The use of routine technology (standadisation of Automation), often call for mechanistic structure (Tall functional and departmentalized structure). What is your opinion?
6. Do you share the view that a stable environment like highly uncertain and complex environment will required an organic structure?

7. What structure do you think is in place at AGA and what was it based on i.e strategy, size, technology or the environment?
8. What structure do you suggest from the list below the company's projects should work with and what will be the advantage and the disadvantage?

Mechanistic structure

- Functional
- Weak matrix
- Balance matrix

Organic Structure

- Strong matrix
- 'Projectize' structure (Project base)



APPENDIX III

Questionnaire used for to help in the researched question ‘What are the problems of implementing projects at AG-Obuasi?’

PROBLEMS IMPLEMENTING PROJECTS	OF	SIGNIFICANT LEVEL OF INFLUENCE				
		1	2	3	4	5
		NOT SIGNIFICANT	SLIGHTLY SIGNIFICANT	MODERATELY SIGNIFICANT	SIGNIFICANT	VERY SIGNIFICANT
Lack of a solid project plan						
Poorly defined roles and responsibilities						
Team weaknesses						
Poor communication						
Overruns of schedule and cost						
Unrealistic timeframes and tasks						
Lack of organisational support						
Business politics						
Competing priorities						
Meeting end user expectations						
Scope creep						
Contractors delays						
Contract procedure delays						
procurement delays						
No Change Control System						
Project organisational structure						
High centralised decision making						
High chain of command						
large span of control						
high formalisation of work procedure						

APPENDIX IV

Questionnaire used for to help in the researched question “What is the relationship between organisational structure and performance of a project?” “What are the performances of the project key indicators at AG-Obuasi?”

TIME PERFORMANCE OF PROJECT

In the table below, please indicate the time performance of a selected project by ticking its corresponding time performance index obtained. (Alternatively you may provide the figures in the formula below)

Time Performance Index = $\frac{\text{Planned Contract Period}}{\text{Actual Construction Period}}$ =

Project Completion Status Achieved	Completed behind schedule					Completed on schedule	Completed ahead of schedule				
	0.5 and below	0.6	0.7	0.8	0.9		1	1.1	1.2	1.3	1.4
Index	0.5 and below	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4	1.5 and above
Please Tick											

COST PERFORMANCE OF PROJECT

In the table below, please indicate the cost performance of the selected project by ticking its corresponding cost performance index obtained. (Alternatively you may provide the figures in the formula below)

Cost Performance Index = $\frac{\text{Initial Project Cost}}{\text{Final Project Cost}}$ =

Project Cost Status Achieved	Completed above initial estimated cost					Completed as Estimated	Completed below initial estimated cost				
	0.5 and below	0.6	0.7	0.8	0.9		1	1.1	1.2	1.3	1.4
Index	0.5 and below	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4	1.5 and above
Please Tick											

QUALITY PERFORMANCE OF PROJECT

In the table below, please indicate the quality performance of the selected project by ticking its corresponding quality performance margin obtained.

Please note that quality performance margin is, in your own estimation, the extent to which the quality of the project deviated from what was expected.

Project Quality Status Achieved	Below expectation by about:					As expected	Above expectation by about:					
	0.5 and below	0.6	0.7	0.8	0.9		1	1.1	1.2	1.3	1.4	1.5 and above
Index												
Please Tick												

With reference to the project you have given performance information on, please rank to indicate the significance of the effect that each of the following listed organisational structure related factors had on the performance of the project.

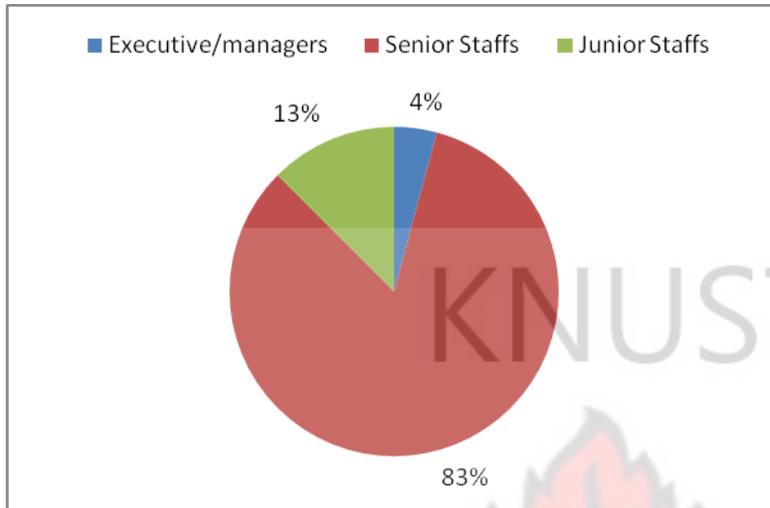
Please note the following before ranking:

The organisational structure related factors that had significant effect on the performance of the project are those that contributed to the kind of performance achieved at the end of the project either satisfactory or poor. (In other words if project performed poor, what the significant practices that contributed and if project performed satisfactorily, what are the significant organisational structure related factors that contributed to such performance)

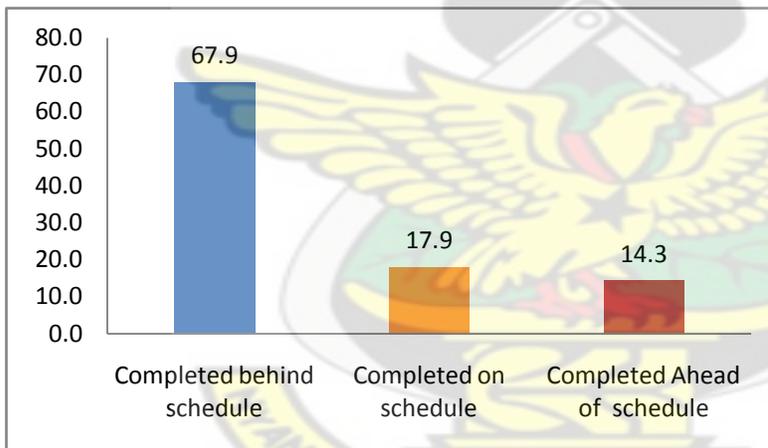
ORGANISATIONAL STRUCTURE RELATED FACTORS	RANK EFFECT ON PROJECT PERFORMANCE				
	1	2	3	4	5
	NOT SIGNIFICANT	SLIGHTLY SIGNIFICANT	MODERATELY SIGNIFICANT	SIGNIFICANT	VERY SIGNIFICANT
Use Of Specialised Workforce					
Tall Standardisation Procedure					
Work Processes Not Clear And Inadequately Structured					
Authorisation Residing In High Chain Of Command Or Heirachy Of Authority					
No Clear Lines Of Authority And Accountability					
Large Span Of Control Of Work Force Working With					
Work Groups And Units Are Inadequate For Implementing					
Having To Co-Ordinate With Many Departments					
Departmental Lines Are Jealously Guarded, Serving As Impediments To Collaboration					
High Centralised Decision Making					
High Formalisation Of Work Procedure					
Project Organisational Structure In Place Inhibit Efficient Delivery					
Competing Priorities And Loss Of Focus Due To Many Project Being Handle					
Scramble For Resource With Other Department					
Easy Flow Of Communication And Access To Information					
Power Struggle And Conflicts					

APPENDIX VI

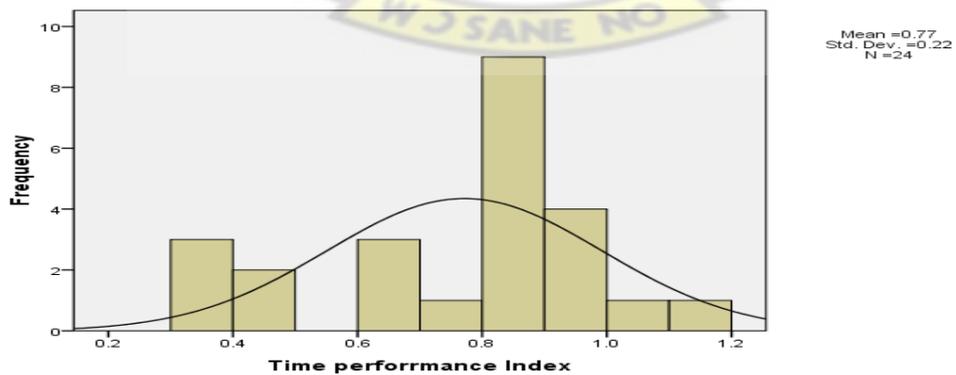
Rank of Respondents



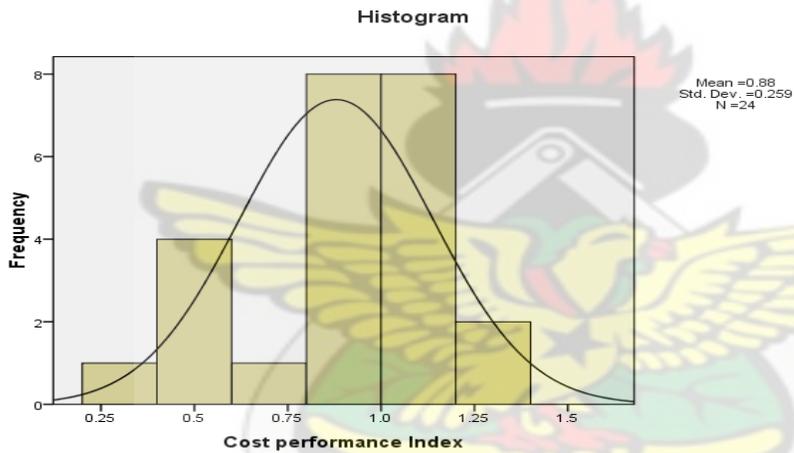
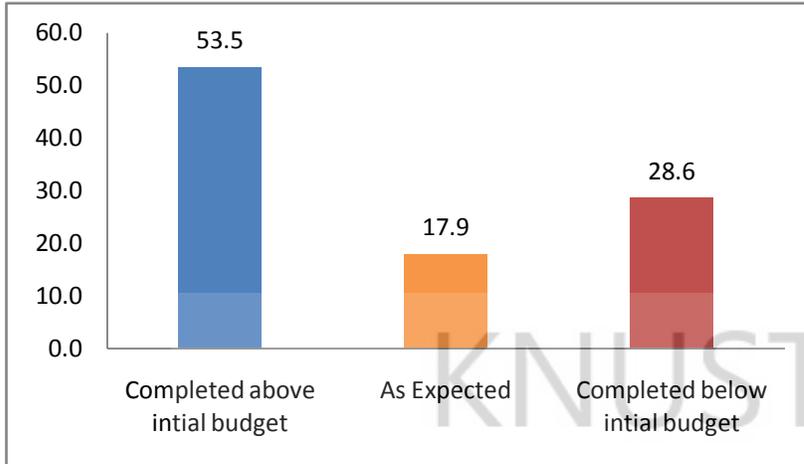
Time performance trend of projects



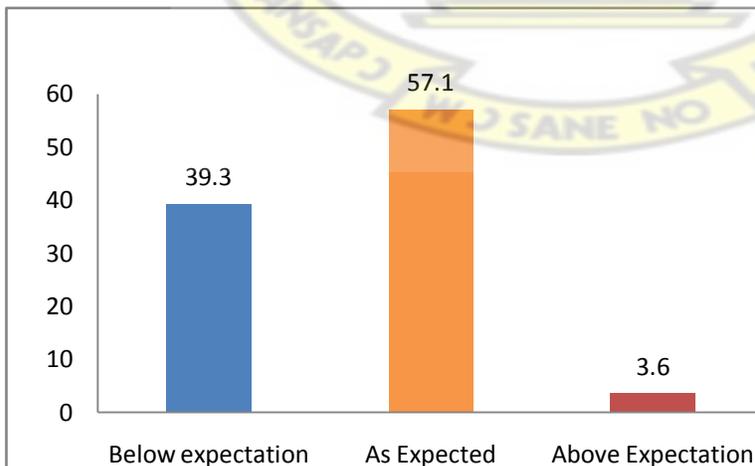
Histogram

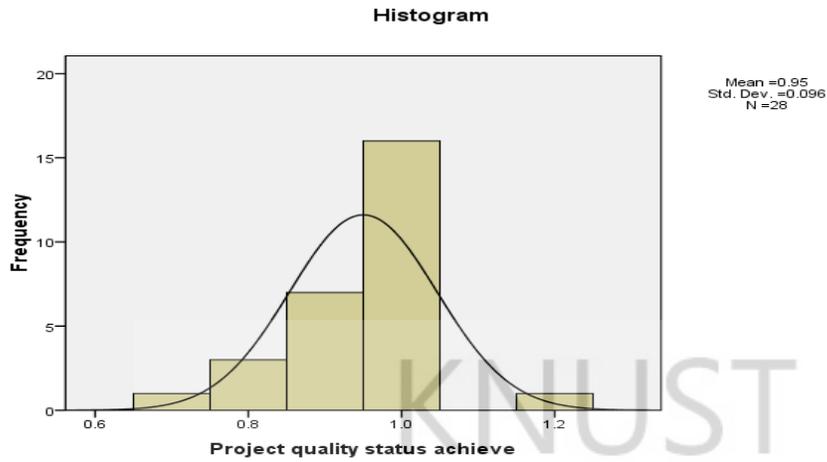


Cost performance trend of projects

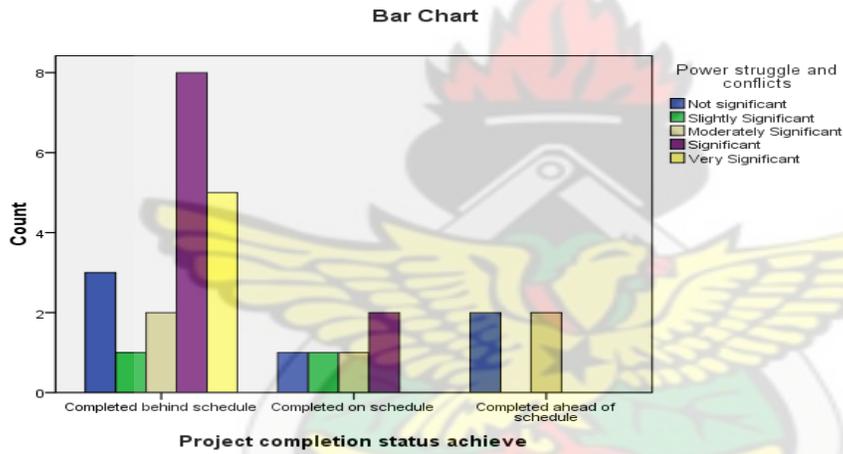


Quality performance trend of projects

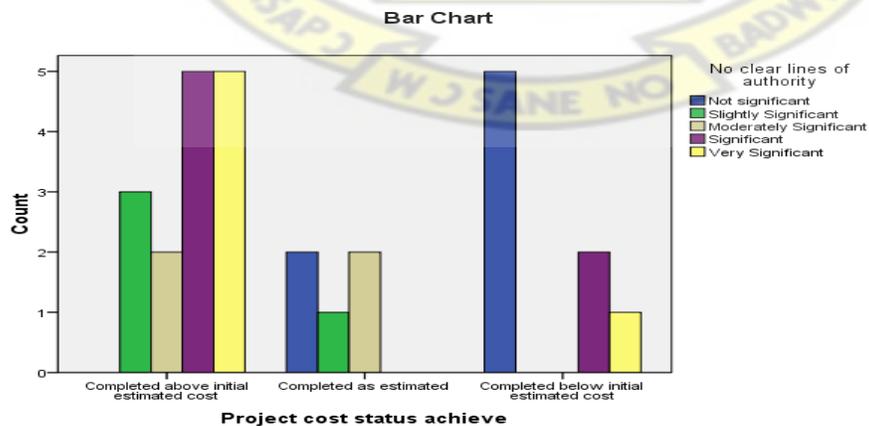




Project time status achieve – Power struggle and conflicts



Project cost status achieve - No clear lines of authority



Project quality status achieve -Large span of control of work force

