

**AN INVESTIGATION INTO THE CAUSES OF DELAY
IN LARGE CONSTRUCTION PROJECTS IN KENYA**

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**An Investigation into the Causes of Delay in Large Construction
Projects in Kenya**

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Science in Construction Engineering and Management in the Jomo
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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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DEDICATION

This work is dedicated to my parents, Mr. M. Kwatsima and Mrs. J. Kwatsima, my children for giving me easy moment during my studies.

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ABBREVIATIONS

AAK:	Architectural Association of Kenya.
CEK:	Association of Civil Engineers of Kenya
BOQ:	Bills of Quantities.
ESP:	Economic Stimulus Projects.
GDP:	Gross Domestic Products.
NCA:	National Construction Authority.
IDT:	Isolated Delay Type.
ARC:	Australian Royal Commission
KNBS:	Kenya National Bureau of statistics

ABSTRACT

The construction sector is one of the important drivers of Kenya's economic growth. The sector is also an important pillar in the achievement of country's vision 2030 due to its ability to provide many job opportunities. The construction sector is characterized by time consuming and depletion of the material as a result of its volatility and complexity caused by delays. There is therefore a direct link between time and cost of completing a large construction project. This implies that as project completion delays, costs involved in the project increase. Project delays are a common and regular phenomenon in the Kenyan construction industry. Delays can lead to many negative effects such as lawsuits between owners and contractors, increased costs, loss of productivity and revenue, and contract termination. This study was aimed at empirically investigating factors that cause delays in the completion of large construction projects in Kenya.

The study adopted survey research method where structured questionnaire was administered on a sample of 213 players in the construction industry. The 213 respondents comprised of 46 project owners, 15 consulting firms and 152 contracting firms. The study results revealed that contract administration, finances, design variation and technology significantly influence delays in the completion of large construction projects in Kenya. Based on the study findings, the creation of effective and efficient construction management structures was necessary. The study suggests that when sourcing for a contractor to undertake a project, it is of paramount importance to vet them and confirm that they have capacity to undertake the project in question. The contractor should also show proof of competent and well educated staff who have handled such projects to completion in the past. The contractor should also show proof of appropriate equipment or ability to rent.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

In the construction industry, the term delay is used to describe the time overrun of a project beyond the officially agreed completion time due to causes by the parties in the contract, who are the, employer, contractor and the consultant (Msafiri, 2015). Project delays are a common problem not only with an immeasurable cost to society, but also with debilitating effects to the contracting parties (Ondari & Gakera, 2013). Project delays are a reoccurring problem and have negative impacts on project success in terms of time, cost, quality and safety (Knight, Hurst & Farahani, 2009).

Currently, construction accounts for a large percentage of the annual gross domestic product (GDP). However, the growth in the construction industry has influenced the country's economic development. As observed in developed countries, construction is considered unique in that it can stimulate the growth of other industrial sectors. Hence to consider growth of the construction industry in terms of its contribution to GDP in isolation is somewhat misleading in that, to do so understates the crucial role played by the construction industry .Therefore, improving construction efficiency by means of cost effectiveness and timeliness would certainly contribute to cost saving for the country as a whole. Efforts directed to cost and time effectiveness were associated with management issues. If delay is well mitigated and managed, it would act as capacity building in the growth of the small and medium contractors.

According to Abedi et al., (2011), eight hundred and forty five of Kick starter top projects in the USA missed their targeted delivery dates. Jonathan and Arditi(2001), studied 50 most funded projects around the USA and found that out of the studied projects; only 8 out of the 50 met their set deadlines. Successful execution of projects and keeping them on time and within budget depends on effective planning and scheduling right from the beginning. High levels of experience and accurate time and cost estimating are necessary to plan a project effectively (Keane & Caletka, 2008). Chan & Kumaraswamy (1998), studied projects delays in Hong Kong.

They observed that for projects to be deemed as having been successfully delivered, they should be on time, within budget and expected quality, otherwise lack of any of these is deemed a project delay. An investigation by Odeyinka & Yusif (2010) shows that seven out of ten projects surveyed suffered delays. There are many factors that contributed to causes of delays in construction projects. These range from factors inherent in the technology and its management, to those resulting from the physical, social, and financial environment. Delays can give rise to disruption of work and loss of productivity, late completion of project, increased time related costs and third party claims and abandonment or termination of contract. Delays are costly and often result in disputes and claims. Therefore, mitigation measures will minimize or avoid the adverse consequences of delays in construction projects (Abedi et al., 2011).

According to Ahmed et al. (2002), delays can be grouped in the following four broad categories according to how they operate. The four categories include: excusable or non-excusable delays, excusable compensable delays or non-compensable delays, concurrent delays or non-concurrent delays and critical or non-critical delays. Each of these categories of delay is defined by how they operate contractually.

According to studies on projects in Ghana by Fugar & Agyakwah (2010), indicate that project financing, economic and natural material supply are the major causes of project delays. Akinsiku & Akinsurile (2012) while studying projects in Nigeria indicate that some of the factors that influence project delays include poor contractual management, slow or delayed project approval processes by project stakeholders change in laws and regulations, poor communications and contractual problems among others.

Kikwasi (2012), studied causes of project delays in Tanzania. He classified the causes of project delays according to material related delays, design related delays, equipment related delays, project related delays, contractor related delays, and consultant related delays and external related delays as the most common and highly rated factors influencing delays in projects. Assaf et al. (1995) summarized main causes of delay in large building and construction projects in Saudi Arabia and classified causes of project delays into contractual factors, organizational factors,

client factors, external related factors and project factors. With each of this they identified approval of shop drawings, delays in payment to contractors, slow decision making and executive bureaucracy in owner's organizations among others as the most important causes of delay. According to Ayudhya (2011) delays in construction may be caused by the client, the contractor, the consultants, acts of God, or a third party and they may occur early or late in the job.

When projects experience delays, timelines are extended and rate of work is increased to try and beat the deadlines. This then results in poor quality of projects, increased costs incurred, little or no return on investment, inability to meet project need, legal issues arising between parties or total abandonment of the project. This brings about distrust between parties, dissatisfaction and sometimes broken work relationships.

1.1.1 Project Delays in Kenya

In Kenya, construction projects are referred to as part of the main pillars contributing to economic growth. Delays in Kenyan construction projects are said to be a common and re-occurring phenomenon and are experienced in any-sector that delivers services through project constructions (Msafiri, 2015). The government of Kenya and its developing partners continue to allocate huge financial resources to finance development. However the benefits intended for the developments are partly or never realized due to un-successful project implementations. Specific, research undertaken to investigate what ails construction projects in Kenya especially in the public sector provides insights to what is said to be the major causes of project delays including poor planning, poor quality and risk measures, poor communication and poor stakeholder involvement (Kagiri & Wainaina, 2008).

According to KNBS (2012), the construction industry contributed 3.8%, 4.1%, 4.3% and 4.1% towards Gross Domestic Product (GDP) for the years 2008, 2009, 2010 and 2011 respectively. This is an average of 4.1% as compared to the 10% for the developed economies. KNBS (2012) attributes delay of Kenyan projects to various factors including financial constraints and political influence, poor bidding and awarding processes among others.

In Kenya, construction projects continue to experience delays hence never taking off (Mbaluka & Bwisa, 2013). Project management procedures are said to guide managers on how to manage project resources efficiently ensuring delivery. Pre project activities comprising of planning, designing, estimating, negotiating, purchasing, scheduling, controlling and accounting should be done carefully before embarking on any project development activities to ensure elimination of project delays. According to a report done for African Development Bank to its board of directors on its projects portfolio, the biggest delay facing its projects is the approval process delay (Gohou & Soumare, 2010).

Talukhaba (1999), in his study of Kenyan high-rise projects observed that factors that cause project delays are associated with the project participants, the process and the environment of project implementation. He further described the effects of each of these factors on the projects and their implications on the same. Some of the described effects include cost overruns, time overruns and the legal issues arising due to delay. In summary, one can conclude that the main problem with Kenyan construction industry is related to client erratic payment, architects instructions, improper planning, clients' instruction, climatic related factors such rock, underground water and rain, design changes, slow decision making and executive bureaucracy.

1.2 Statement of the problem

The success of a construction project is critically affected by the capacity of the implementing firms, design variations, nature of the contract and stability of the economic environment. However there seems to be no agreement among scholars and practitioners as to the nature of the causes of delays in construction projects. There also seems to be lack of consensus as to the principal causes of delays in public construction projects. For instance, Aibinu et al (2002) argue that the main cause of delay is poor planning. According to Frimpong (2003), poor risk management is to blame while Karimi (1998) argues that lack of experience and intellectual ability among contractors as the main reason. Other causes that have been highlighted include; poor organizational culture (Kagiri, and Wainaina 2008)

poor government policy guidance (Karimi, 1998). In Kenya, more than 40% of all project failures leading to litigation arise from delays in project completion (Kagiri, and Wainaina, 2008).

The increase in project delays in the construction industry is hurting the economy because it results in wastage of resources, enhanced costs of projects and frustration among customers, yet construction is one of the principal sectors that can revitalize economic growth in Kenya. Investment in construction projects and related infrastructure and services has multiple direct and indirect effects. It triggers forward and backward linkages through additional investment in manufacturing of building material, transport and government (GOK, 2001). Unfortunately, delays in large construction projects particularly buildings, will continue to plague the construction industry in the foreseeable future unless strategic measures are taken by the industry. The government may lack sufficient mitigating measures to address the problem. Although much has been done in identifying the factors that influence projects delay in large construction projects in Kenya, the industry still experiences delays (Alaghbari & Salim 2007). This is attributed to the fact that there is still lack of information for the effective mitigation of delay. This study therefore seeks to contribute to these attempts by others in identifying further the causes of delay in large construction projects in Kenya and then come up with strategies to mitigate such delays.

1.3 Aim of the Study

The rationale of this evaluation is: (a) to appraise the major causes of delay in large construction projects in terms of the impact on the parties involved. (b) to minimize the delays by improving the functionality of management of projects within the construction industry.

1.4 Objectives of the Study

1.4.1 General Objective

The overall objective of this study is to determine the causes of delays in the completion of large construction projects in Kenya and find solutions to this problem.

1.4.2 Specific Objectives

The specific objective is of the study are:-

- i. To identify the causes of delays in the completion of large construction projects in Kenya.
- ii. To analyze how finance causes delays on the completion of large construction projects in Kenya.
- iii. To analyze the influence of design variation on delays in the completion of large construction projects in Kenya, and
- iv. To develop a strategy to mitigate delays in the completion of large construction projects in Kenya.

1.5 Research Questions

The study sought to answer the following research questions:

- i. What are the causes of delays in the completion of large construction projects in Kenya?
- ii. What is the effect of finance on delays in the completion of large construction projects in Kenya?
- iii. What is the influence of design variation on delays in the completion of large construction projects in Kenya? and
- iv. What strategy can be developed to mitigate delays in the completion of large construction projects in Kenya?

1.6 Justification of the Study

This study will provide insights that reveal the factors influencing project delays in Kenya with an aim of enabling project delivering organizations become more knowledgeable of the factors hence looking into ways that can minimize project delay. With this, project delivering organizations shall maintain productivity and sustainability by identifying, acquiring and adequately implementing measures that prevent delays in projects hence leading to improved delivery.

The study sought to highlight the important factors accounting for the delays in large construction projects. In this way, the study findings will contribute to the universe of knowledge regarding the initiation, planning, execution and termination of construction. This knowledge is important especially to the construction industry which is constantly looking for better ways to complete projects on time, within costs and agreed- upon performance parameters. An understanding of the key causes of delays will play an important role in the ways large projects are conceptualized, planned and executed.

This study will also be important to the government in formulation of construction industry policies and the way these policies are implemented. An informed policy provides useful guidelines to the industry which minimizes project failures, reduces risks and severally enables order in the construction industry. This study will also benefit other stakeholders such as;

Contractors: The results of this study will be of great importance to any individual involved in project construction and implementation since it will give them an insight on the factors that influence project delays in Kenya.

Developers: The results of this study will be of great importance to the owners of the project since it will give them an insight on how effectively projects can be implemented and delivered without experiencing delays caused by the identified factors.

Scholars: The results of this study will be of great importance to scholars since it shall provide insight on the factors influencing project delays in Kenya hence enable them attain informed information on the same.

This study also intends to spawn practical and theoretical further research questions that can become useful study basis for future researchers. Study findings should be considered as a contribution in the debate about how to improve the efficiency and effectiveness in the construction industry particularly with regard to scheduling and cost management.

1.7 Scope of the Study

The scope of the research includes an assessment of contractors registered/categorized as class NCA 3 and above. These are the contractors allowed by law (NCA) to execute projects ranging from Kenya shilling Five hundred million to thirty five billion which is within the scope of this study. Consideration was also made to contractors with an average yearly turn-over of Kenya shilling one billion.

1.8 Limitation of the Study

The study will cover large construction project undertaken within a period of (10) years with an average contract period of (5) five years. The study area was the whole nation (Kenya) involving selected projects in Nairobi, Eastern and North eastern parts of Kenya. Due to logistic problems (time)some of the stakeholders with the necessary information about projects delay under the civil engineering bodies i.e. IEK and EBK did not return their questionnaires both at local and national level.

1.9 Definition of Terms

Delay: Akinsiku & Akinsulire (2012), define delay as a pervasive phenomenon in construction project delivery. According to Aibinu & Jagboro (2002), delay can be defined as a situation in which a project contractor and project owner jointly or separately fail to meet their end of the bargain in project completion.

Construction Delays: Assaf et al. (2008) defined delay as the time overrun compared to completion date as specified in a contract, or beyond the date that the parties agreed upon for delivery of a project. Majid & McCraft (2009) defined delays as the time overrun beyond the contract date or the date that the critical activities have been delayed.

Contract Delays: Akinsiku & Akinsulire (2012) define contract delays as delays that are caused by inability of a contractor to proceed with the project diligently or efficiently due to lack of or as a result of inadequate resources needed to perform work on a project.

Finance: Finance, related delays are said to be delays that are concerned with financial characteristics. Some of these characteristics include cash flow problems, financial constraints among others (Ibironke, Oladinrin, Adeniyi & Eboreime, 2013).

Organization: Organizational factors that contribute to project delays are said to be factors that are as a result of organizational activities, processes and guidelines. Organizational related delay factors are said to be influenced mainly by the organization's operations hence the influence of factors coming from this on projects (Frimpong, Oluwoye & Crawford, 2003).

Concurrent delays: Delays caused by both parties in the contract.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of literature on causes and project delays. The chapter begins by discussing the empirical data dealing with requirements for successful project implementation, the factors causing delay in construction projects and finally some policy briefs regarding management and implementation of construction project.

2.2 Construction Process

In the construction industry and the traditional arrangement of procurement for work, contractors obtain work from clients, directly or through the consultants. The contract is made directly between the client and the works contractors. However, unlike the other systems of procurement of construction works a construction manager is appointed at a fee to act as the client's advisor to provide planning, management and the co-ordination of construction itself. The project manager, both acting on behalf of and representing the client, has the duty of providing a cost effective and independent service correlating, integrating and managing different disciplines and expertise, to satisfy the objectives and the provisions of the project brief from inception to completion. The service he provides must be to the client's satisfaction, safeguard his interests at all the times and, where possible, give consideration to the needs of the eventual user of the facility. In dealing with this project team i.e. the architect, quantity surveyor, engineers etc. the project manager has an obligation to recognize the respective professional codes of other disciplines and in particular, the responsibilities of each disciplines to society, the environment and each other.

Construction management services are delivered through two methods:

- i. The agency construction management
- ii. At-risk construction management

The agency construction management method is where the construction manager only acts as an agent of the client in the construction processes and does not do the

execution of the works .The manager is then paid fee for the services. In the agency management system the construction manager does not have any risks responsibility in the construction processes.

In the design and construction process, the At-risk management entails a commitment to a guaranteed maximum price. In this process construction manager works through the design but acts as general contractor during the construction phase, now the construction manager who is also carrying out the construction process has a risk that comes with the construction works but at the same time has an economic interest in the profitability of the construction phase. The areas of risk exposure to delay include project programming, contract system, design development, contract tendering, construction development, financial burden, and environmental factors. Once the variables are firmly identified, effective plans can be developed and applied which organize the project resources, establish clear lines of authorities and communications, set limits and lead the project

2.3 Delay in the Construction

Ogunlana et al., (1996) studied the delays in both building and civil projects in Thailand, as an example of developing economies. Ogunlana (1996) deduced that the difficulties facing the construction industry in developing countries could be categorized into three groups:

- i. issue of insufficient supply of resources among other deficits in industry infrastructure;
- ii. issues brought about by clients and consultants; and
- iii. Issues arising due to ineptitude of contractors.

Chan & Kumaraswamy (1998) examined the causes of construction delays in Hong Kong as seen by clients, contractors and consultants, and studied the factors affecting productivity. The review revealed differences in perceptions of the relative significance of factors causing delays in construction projects between the three groups, suggestive of their experiences, likely bias and lack of effective communication in outlining causes of the delays.

Mansfield et al., (1994) studied the causes of delay and cost overrun in construction projects in Nigeria. The results revealed that the most important factors were financing and payment for completed works, poor contract management, changes in site conditions, shortage of material, and poor planning. Mezher and Tawil (1998) conducted a survey of the causes of delays in the construction industry in Lebanon from the perception of owners, contractors and architectural/engineering firms. The survey concluded that owners had more concerns with regard to financial issues, contractors regarded contractual relationships the most important, while consultants considered project management issues to be the most important causes of delays. Shon (2013) evaluated the progress reports of 164 building and 28 highway projects constructed during the period 1996- 1999 in Jordan. The results indicate that delays were extensive e.g. the average ratio of actual completion time to the planned contract duration was 160.5% for road projects and 120.3% for building projects.

Al-Momani (2000) conducted a quantitative analysis of construction delays by examining the records of 130 public building projects constructed in Jordan during the period of 1990- 1997. The researcher presented regression models of the relationship between actual and planned project duration for different types of building facilities. The analysis also included the reported frequencies of time extensions for the different causes of delays. The researcher concluded that the main causes of delay in construction projects related to designers, user changes, weather, site conditions, late deliveries, economic conditions, and increase in quantities. Talukhaba (1988) investigated on time and cost performance of construction projects and observed that construction claims in construction are caused by delays in completing projects on time. Mwandali (1996) did an analysis of major factors that affect project management in Kenya Railway projects. Similar observations have been made in developing countries like Indonesia Kothari (2006), India Morris (1990), Nepal and Nigeria Aibinu & Jagboro (2002) and in Ghana (Frimpong, 2003).

Factors ranging from inflation, project complexity, inaccurate material estimation, financing, change orders, design changes, late submission of drawing, poor specification, incorrect site information, poor contract management among many others were found to be main sources of overruns.

Assaf et al., (1995) studied the causes of delay in large building construction projects in Saudi Arabia. The most important causes of delay included approval of shop drawings, delays in payments to contractors and the resulting cash-flow problems during construction, design changes, conflicts in work schedules of subcontractors, slow decision making and executive bureaucracy in the owners' organizations, design errors, scarce and incompetent labor.

Musa (2010) conducted a study on factors influencing delays in water projects in Kenya funded by the Government. Lack of capacity for contractors to execute projects diligently was found to be the cause of delay in his study. A similar study by Karimi (1998) focused on factors contributing to cost overruns in projects under the Ministry of Water and the observations in the study were that most projects experience delays due to the fact that the clients delayed in honoring progress payments towards contractors.

Jonathan et al., (2001) presented a paper on method for calculating activity delays and appraising their contributions to project delay. The method consisted of a set of equations, which could be easily coded into a computer program that would provide fast access to project delay information. The observations were that delays are mostly caused by the non-payment by the client to the contractor and lack of coordination of project activity by the consulting team. Alkass, Mazerolle & Harris (1996) presented a paper which discusses delays analysis techniques that was issued by practitioners in the construction industry and this technique is called the Isolated Delay Type (IDT). The techniques was tested against a case example and its strengths and weaknesses underscored. It was found to give fair results in the determination of causes of delay.

A detailed study by the New South Wales (NSW)- Australia Royal Commission into Productivity in the Building Industry (1992) of 20 commercial high-rise buildings with a total design and construct value of over \$2.0 billion found 22 specific causes of time overrun. Weather, industrial disputation, client scope changes and variations, and consultant problems were some of the ones occurring with the highest frequency.

Kagiri & Wainaina (2008) identified the important factors that influenced the overruns in the power projects as: contractor inabilities, improper project preparation, resource planning, and interpretation of requirements, works definitions, timeliness, government bureaucracy, and risk assessment. Fugar and Agyankwah (2010), on a similar study for overruns on high-rise projects in Ghana established that, plant usage, resource estimates and human resource shortage influenced delays while environment, cost data, and inflation were significant in determining the cost overrun.

Focused study by scholars as seen in the reviewed literature on large construction projects in Kenya and other developing countries reveals the following: There has been considerable and continued interest on the effects of construction delays. The information available is varied and widespread. Despite the necessity for such research, little work has been carried out to describe the delays in the public construction projects. These factors were among others: - (a) late or none payment to contractors by the clients (b) delay in issuing of technical information for use by contractor from the consultants (c) lack of management capacity by the contractors to execute work. The actual frequency and magnitude of these factors causing delays is not known, which has proven to be a serious and very expensive problem for the construction industry.

Developing countries like Kenya and others, maybe lacking resources, managerial skills and have low human capital productivity. Another factor identified in review for delays is incompetent designers/contractors, poor estimation and cost management, social and technological issues, site related issues, and improper techniques and tools as in the case study of the (Economic Stimulus Projects) ESP-

projects in Kenya. Therefore, project design standards, specifications and construction methods must be carefully selected so that they will be appropriate to local financial, human, and material resources required during both the implementation and its subsequent operation. It is important to appreciate that, for a country like Kenya, projects are sometimes implemented on “fast track” basis and some issues are easily overlooked during project preparation and often lead to projects implementation issues that result in delays.

2.4 Influences and Causes of Delay

Delay of projects often generates conflict and contract dispute in the delivery of building and civil engineering projects Aibinu & Odeyinka (2002). If construction delay claims conflict can be avoided or mitigated, there could be substantial financial savings on projects. The data were analyzed using structural modeling with partial least squares estimation approach. The results indicate that when the contractors received an unfavorable outcome from the contract administrator’s decision on their claims for delay, the intensity of conflict was lower when there was pre-contract negotiation and pre-contract agreement regarding the rules for quantifying and assessing the impact of anticipated delays than when there was none.

It was also discovered that the higher the level of pre-contract negotiation and pre-contract agreement on the rules for quantifying and assessing delays, the higher the contractors perceived the quality of the decision-making process for delay claims during the construction phase. Further, the higher the contractors perceived the quality of the decision-making process for delay claims, the lower the intensity of conflict. At the time of entering into contracts, owners and their project management team need to pay more attention to pre-contract negotiation and agreement with their contractor to clarify and agree on the rules for quantifying and assessing the impact of anticipated delay and disruption.

Aspects that require pre-contract negotiation, agreement, and clarification include: the rules of evidence for claims, the record requirements for claims and the procedure for keeping the records, form of construction program including the software for the preparation of the program and the procedure updating the program,

the methodology for analyzing delay claims, formula for quantifying unabsorbed head office overhead component of prolongation cost, the method for quantifying disruption cost, the handling of concurrent delays, profit—whether claimable and the rate of profit to be paid, acceleration—circumstances under which it will be compensated and basis of compensation, and the question of who owns the float. These are, typically, not adequately covered by most standard forms of contracts. The agreements on these matters may be incorporated as part of partnering agreement or as a supplement to the contract agreement. Pre-contract negotiation, clarity, and agreements could produce instrumental and no instrumental (social psychological) effects, which could facilitate delay and disruption claims assessment and their resolution. It could mitigate conflict even when the outcomes are unfavorable to a party.

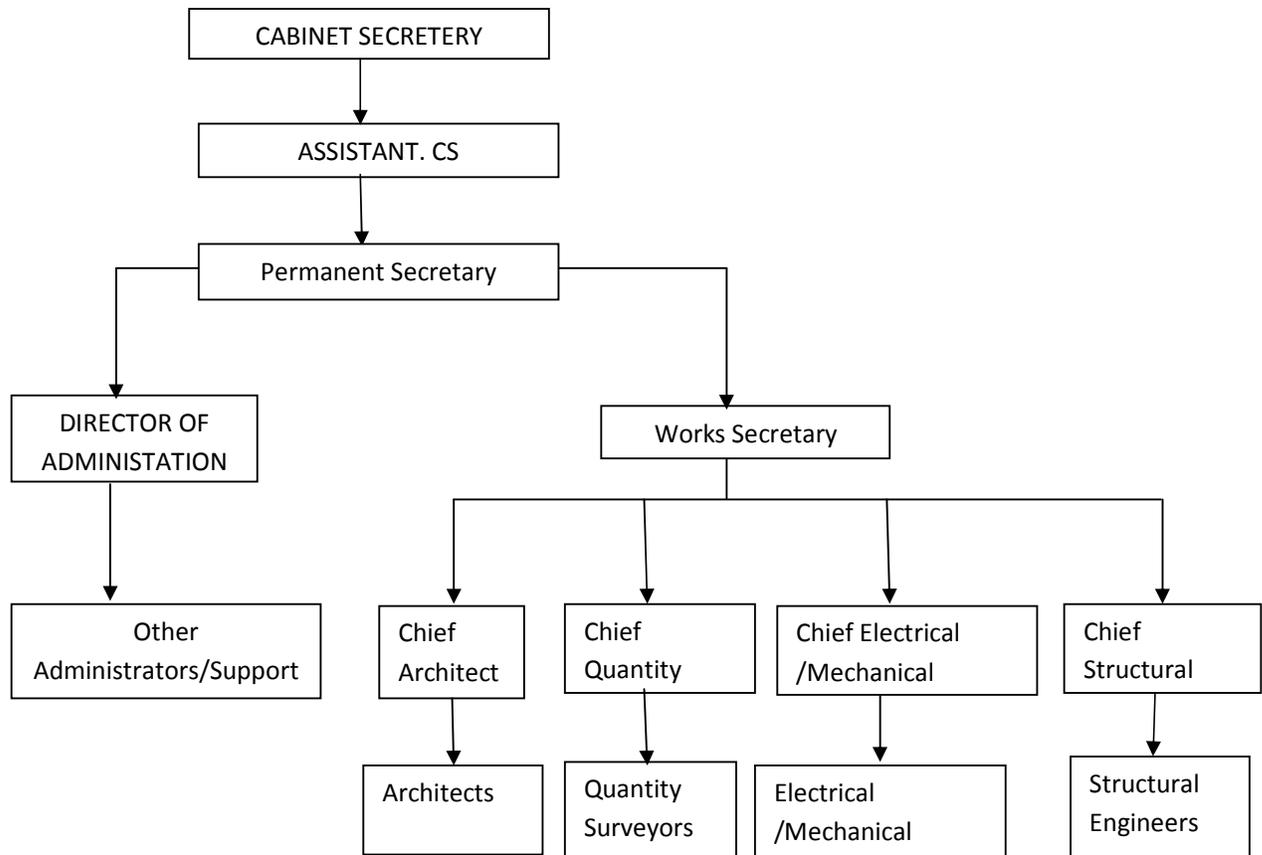
2.5 Organization

Construction projects success focuses on completion of within budget, time and having met the required specifications and requirements (scope). These three project constraints time, budget and scope are the main sought after for management in any project (Schwalbe, 2008). However the three most referred to project constraints are not enough to measure a projects success with constraints such as customer satisfaction, laws and regulations governing projects delivery, stakeholders' expectations also need to be put into consideration when determining projects success (Ibironke et al., 2013).

Reviewed literature (Ibironke et al., 2013) also views project abandonment (partially or fully) as an impact on delayed projects. Project abandonment slaps organizations with huge debts to pay yet no returns are attained from the project. In addition, the research showed that projects with good developed and maintained management processes, enhances performance and eventually delivery.

Figure 2.1 Management

Project delivery of the Ministry of Roads and Public works.



Source: Ministry of Roads and Public works

The Ministry of Roads and Public Works has a mission to facilitate provision, construction and maintenance of quality buildings and other public works for sustainable socio-economic development of Kenya. The Ministry has a vision to be a leading institution in the construction and maintenance of construction works and guide the ministry in execution of its responsibility of planning, environment and infrastructure development.

Assets in built environment include hospitals, schools, colleges, technical institutes, prisons and courts while assets in infrastructure development include foot bridges, seawalls, breakwaters and jetties. Among the core values of the Ministry are customers focused and results oriented, efficiency and effective service delivery.

The Ministry is headed by the cabinet secretary who is the political head of the Ministry. He represents the Ministry at the cabinet and is responsible for pursuing Ministerial agenda at that level. Operations of the Ministry are overseen by principal secretary who is responsible for ensuring that the Ministry performs its mandate as per the presidential circular. The Pprincipal Secretary is assisted by a Works Secretary who is in charge of the technical departments and a Director of Administration who is in charge of administrative issues of the Ministry. Below are the Chief Architect, Chief Quantity Surveyor, Chief Electrical/Mechanical Engineer and the technical heads of departments. There are also the technical officers of various ranks who assist them in managing public building construction projects. In spite of the above arrangement that is meant to oversee and reduce projects delay for public projects, there is need still for the development and adaptation of an organization structure or management system to enhance project delivery and performance especially for large construction projects.

2.6 Finance

Project delay finance factors are factors influenced by the financial capabilities and flows of a project. Some of the finance related factors affecting project delays include cash flow problems in organizations, lack of funding and late release of project fund (Naizai et al, 2012). Assaf et al., (1995), identified finance and payments for work, poor project cost estimations, difficult in accessing finances from credit facilities and material price fluctuations as the common finance factors influencing project delays.

According to Fugar & Agyakwah (2010), adequate cash flow is the hub around which everything else revolves. Lack of cash flow affects adversely affect projects by not only delaying it but also reduces work morale due to delay or non-payment of wages of workers, sub-contractors, suppliers among others. The challenge with lack of finances to projects is the identification of ways to eliminate or at least reduce the occurrence of the same. Alhomidan (2013) observes payment delays, contractor financial status, owner financial status, fluctuation in exchange rates, banks loan policies, inflation and monopoly as the main factors contributing to financial distress in projects.

Project delays can be observed by several indicating factors. One significant factor is owners' performance in making payments to creditors. Prolonged time taken or required in procurement and making payments is a strong indicator that a company is facing financial difficulties (Ayudhya, 2011). He further observed that due to the high lending rates on investment borrowing, contractors are not able to attain the required financial support they require to enable them manage projects they are undertaking. This then leads to financial constraints hence delaying projects.

2.7 Management

Managers play a key leadership role in maximizing and delivering individual and organizational performance. Management capability is therefore a concern of all those organizations and countries that want to remain competitive. According to (Tamkin & Hillage (1997) an organization can underperform in relation to key competition indicators if the managers are under qualified, have inadequate levels of training and development or otherwise perceived to be less competent. In many organizations, indicators of management capabilities therefore include management knowledge, skills and aptitudes. Integrating the managerial knowledge of individuals, an organization achieves its managerial capabilities. Integrating individual managerial knowledge for example, a constellation of people such as a team can provide additional services as the ones rendered by individual managers, because working with each other enables them to provide services that are uniquely valuable for the operations of the particular group with which they are associated (Van Den Busch and Van Wijk, 2000). Consequently they become individually and collectively more valuable to the firm that is the services they can render are enhanced by their knowledge of their fellow workers of the methods of the organization, and the best way of doing things in the measurement capability particular set of circumstances in which they are working. In a collective setting, managers are able to complement and leverage each other's individual knowledge, both at the level of the knowledge components and at the level of the knowledge domains.

When the collective responsibility is more or less permanent one, managers are able to specialize and to build upon the competences available in the firm (Van Den Bosch et al 2000, Sanchez and Heene 1996). Since knowledge and mental models are heterogeneous (Mahoney, 1995), temporal constellations of different managers may also provide enormous benefits in that reconfiguring and reintegrating their managerial knowledge gives rise to new combinations and therefore new managerial capabilities at the firm level. In this case, Van Den Bosch and Van Wijk (2000) suggest that for managerial capabilities, the duo assets that both composition and durability of a managerial collectivity (e.g. a management team) determine the nature of the managerial capabilities created and success of any managerial action. This theory guides in the understanding of the research questions ii- and v- in chapter 1- on how financial management and labour management capability influence project delays. Very few firms have investment capabilities and even fewer have innovation and linkage capabilities clearly straining their competitive ability.

2.8 Agency

Contract laws were influenced by the ancient Greek as a form of devotion to agreements as well as a basic category for cancelling agreements (Elliot & Quinn, 2007). Agency theory was first developed by Jensen & Meckling (1976). Its framework is concerned with the contractual relationships of stakeholders, managers, employees in an organization.

Agency theory addresses incentive and information problems inside and outside the firm (Shalhoub, 2002). Agency theory deals with problems caused by contractual conflicts. Occasionally, different subjective interests give rise to conflicts of interest between contracting partners. These conflicts may result in either of the contracting parties or both contracting parties to undertake action that maybe against the interest of the other contracting party. Agency theory deals with how these agency problems can be minimized (Padilla, 2002). According to Wentges & Gossy (2008), agency theory describes the relationship between one actor or group, the agent and another actor or group, the principal where the agent has to fulfill certain obligations for the principal. The basis of the relationship between the actor and the principal is on an explicit or implicit contract.

Contracts describe the relationships between any two parties seeking to involve or already involved in collaborative actions or assignments. Agency theory then helps in describing the relationship between different contracting parties and the factors which influence these relationships including laws and regulations, expertise, lack of material and equipment, legal issues and contractual relationships. The most fundamental problem with the agency theory is that although it describes the relationship between the contracting parties, it is not clear whether these relationships can always be sustainable enough to prevent project delays. This theory guides in the understanding of the second research question on how contract management influence project delays.

2.9 Theoretical Variables

2.9.1 Organization Structure

Cooper and Schindler (2011) define a theoretical framework as an account about the phenomenon which avails the researcher the lens to view the world. Since this study is based on the client/employee relationship the agency theory of contract management and various capability theories will apply.

According to Akinsiku et al. (2012), organizational structure is responsible for those delays that result into variations and failure to provide site information on time, extension to time, escalation of costs due to inflation, delay in payments of interim certificates, delayed decision making, late site handovers, poor pre-project planning, bureaucracy, and inadequate planning.

According to Al Khalil & Ghafli (1999), Chan & Kumaraswamy (1998), Mezher et al (1998), slow decision making and executive bureaucracy in owner's organizations, poor risk management and supervision slow decision making and project management issues were identified as the most outstanding and common in most projects. According to Desai et al (2013), organizational related delays are delays that are caused or influenced by the actions of the project delivering organization. They discuss the following organizational related delays poor risk management and supervision, slow decision making processes and work variations as the main organizational causes influencing project delays.

According to Naizai et al (2012) organizational related delays are delays originating from actions of a client. Some of the factors causing organizational related delays include clients' understanding of the project constraints, the ability to effectively brief the design team, the ability to contribute ideas to the design and construction processes, the ability to make authoritative decisions quickly and the stability of these decisions.

According to Chan & Kumaraswamy (1998), Mezher et al (1998), they identified the following client related delay factors approval of shop drawings, design changes, financial issues, and client-initiated variations as the most outstanding and common in most projects. According to Naizai et al (2012), some of the major organizational factors influencing project delays include project payments, delay to furnish and deliver the site to the contractor by the owner, change orders by owner, late in revising and approving design documents by owner, delay in approving shop drawings and sample materials, poor communication and coordination by owner and other parties, slowness in decision making process by owner, financing, political interference, conflicts between joint-ownership of the project and unavailability of incentives for contractor.

2.9.2 Variations

In a study to determine the factors contributing to variation orders, a survey of construction projects in Kenya was done. Using a survey methodology and questionnaires to capture information clients, consultants and contractors, Wanyona et al (2014) has identified ten factors causing variation. These include delay in acquisition of right of way which they argue is the most important cause of variation orders in construction projects. Others include differing site conditions, change of plans by clients, lack of coordination between overseas and local designers variation in weather conditions, errors and omissions in design, unavailability of materials change of schedules by clients and conflict between contract documents. However Wanyona et al does not discuss problems of contract management and or availability of human resources with the right mix of skills and experience.

2.9.3 Contract Administration

A contract is said to be a legally enforceable promise made by parties between each other. It is binding and contains obligations for both parties. Contracts are said to be specified to meet certain legal requirements in which parties involved agree to give something of legal value. Contracts ensure meeting all the specific requirements needed Kohil (2001).

Akinsiku et al., (2012) describe contractor's delays as those delays caused by contractor's inability to proceed with the project diligently and efficiently as a result of lack of materials and equipment and other contractor relationships. Contractor related delays can be beyond the control of the contractor. They further describe contractor related delays as those delays that are caused by a contractor's inability to proceed with the project diligently and efficiently as a result of inadequate labor provisions and insolvency of the contractor.

Study by Musa (2010), identify contractor related delays as improper planning by contractor, inefficient site management, inadequate experience of the contractor, financial problems of contractors, sub-contractor issues, quality of contractor's work, poor site management, sub-contractors, approaches used for construction and insufficient experience of contractor, clashes in sub-contractors schedule, rework due to errors, deprived communication and organization unsuccessful planning and scheduling of project, improper implementation of construction methods, insufficient contractor's work, inadequate sub-contractors work. According to Frimpong et al. (2003), contract related factors play an important role in delaying any construction project. Slow decision making and executive bureaucracy in owner's organizations, poor risk management and supervision slow decision making and project management issues are some of the main factors influencing project delays.

Msafiri (2015) carried out a survey to investigate the factors causing delays in road construction project in Kenya. Using a purposive sampling technique he found out that the top five causes of project delays were erratic payment by clients, slow decision making and bureaucracy in client organizations, independent planning and

scheduling and rain. However specific managerial interventions for controlling the effect of rain on project management are not clear.

Assaf et al., (2009), identified 56 main causes of delay in Saudi large construction projects and established their relative importance. Based on the contractors surveyed, the most important delay factors were preparation and approval of shop drawings, delays in contractor's progress, payment by owners and design changes. From the view of the architects and engineers, cash problems, the relationships between subcontractors and the owner's slow decision making were the main causes of delay. The owners agreed that design errors, labour shortages and inadequate labourers were also important delay factors.

Chan & Kumaraswamy (1998) surveyed the causes of construction delays in Hong Kong as seen by clients, contractors and consultants and examined the factors affecting productivity. The results of their research indicate that the five principal and common causes of delays are poor site management and supervision, unforeseen ground conditions, slow decision making involving all project teams, client initiated variations and necessary variation of the work. These causes were categorized into the following groups: project related factors: project characteristics, necessary variations, communication among the various parties, speed decision making involving all project teams and ground conditions. Client-related factors influencing client characteristics, project financing, their variations and requirements and interim payments to contractors. Design team related factors including design team experience, project design complexity and mistakes and delays in producing design documents. Contractor related factors including contractor experience in planning and controlling the project, site management and supervisions, degree of subcontracting and their cash flow. Materials related factors including shortages, materials changes, procurement programming and proportion of off-site prefabrication. Labour related factors including labour shortages, low skill levels, weak motivation and low productivity. Plant / equipment related factors including shortages, low efficiencies, breakdowns and incorrect selections. External factors including waiting times for approval of drawings, test samples of materials and environmental concerns and restrictions.

Mezher & Tawil (1998) conducted a survey of the causes of delays in the construction industry in Lebanon from the perspective of owners, contractors and architectural / engineering firms. It was found that owners had more concerns regarding financial issues; contractors regarded contractual relationships as the most important; and consultants considered project management issues to be the most important causes of delays.

Aibinu & Odeyinka (2002) did a research on the causes of construction delays on project delivery in Nigerian construction industry. The study revealed that factors relating to contractors, clients and consultants influence project delays. The higher the presence of a factor, the more the delay is experienced. The study fails to acknowledge the fact that different project locations can have different factors that influence project delays and that each locations factor of delays may vary as per the environment the project is being carried in.

Kikwasi (2012), studied causes of project delays in Tanzania. He classified the causes of project delays according to material related delays, design related delays, resource related delays, equipment related delays, project related delays, and contractor related delays, consultant related; delays and external related delays as the most common and highly rated factors influencing delays in projects. However the study was carried out in Tanzania.

Gwaya et al., (2014) carried out a critical analysis of the causes of project management failures in Kenya using a survey research approach. In his findings, human resources, client's interference and risk management are seen to cause project management failures in Kenya. Halloum and Bajracharya (2012) focused their research on the causes of delay in infrastructure projects in Abu Dhabi, the capital of UAE. Over 90% of infrastructure projects in the study had time overruns.

According to a study done by Ibironke et al. (2013), in which 25 consultants and 28 contractors were interviewed, contractor related delays including inaccurate time and cost estimates, poor site management, improper project planning and scheduling, incompetent project teams, incompetent subcontractors and inappropriate construction methods regarded as the highest causes of delay.

Equipment –related delays were ranked second insufficient numbers of equipment, inadequate modern equipment, equipment allocation problems, frequent equipment breakdown and shortage of equipment parts. The client-related delay factors were ranked third, these included change orders which both parties considered very important, slow decision making by the client, lack of communication and coordination between parties, lack of priority urgency to complete the project, special needs for project commissioning, ownership transfer and neighborhood pleading. Material related delays including shortage of construction material, poor site, management and supervision, poor procurement programming of materials, contractor’s financial difficulties, material related delay factors ranked by the respondents. Finance related delays including delay monthly delayed payments and high interest rates, inadequate consultant experience, poor design and delays in design, inadequate project management assistance, slow response and poor inspection, incomplete drawing / detail design and inaccurate site investigation. External factors related delays including slow site clearance, comprehensive project feasibility studies and accurate site investigations.

2.9.4 Technology

This is the branch of knowledge that deals with the creation and use of technical means and their interaction with life, society and the environment, drawing upon such subject as industrial art, engineering applied science, and pure science (Schwalbe, 2008). It is also the application of knowledge for practical ends.

On the other hand technology provides the answer to the need for greater efficiency and quality in construction. First, there is need to sort out the culture in the construction industry, followed by defining and improving processes of construction and the aspect of management of construction then apply technology as tool to support these cultural and construction processes changes.

2.10 Deterrents to Delays

2.10.1 Breach of Contract due to Delay

If one party has broken the terms of a valid contract, the innocent party is entitled to recover damages for any loss suffered. He must be restored to the position he would have been in if the particular damage suffered had not occurred, insofar as money can be sufficient compensation. Recovery may be confined to those losses that arise naturally in the usual course of events from the breach, and are thus assumed to be within the contemplation of the defaulting party. In a contract for construction works, where there is a client and a contractor, the measure of damages recoverable by the contractor or the client is the difference between the contract price and the new cost at the time when the contractor ought to have delivered the completed project.

2.10.2 Damages Due to Delay

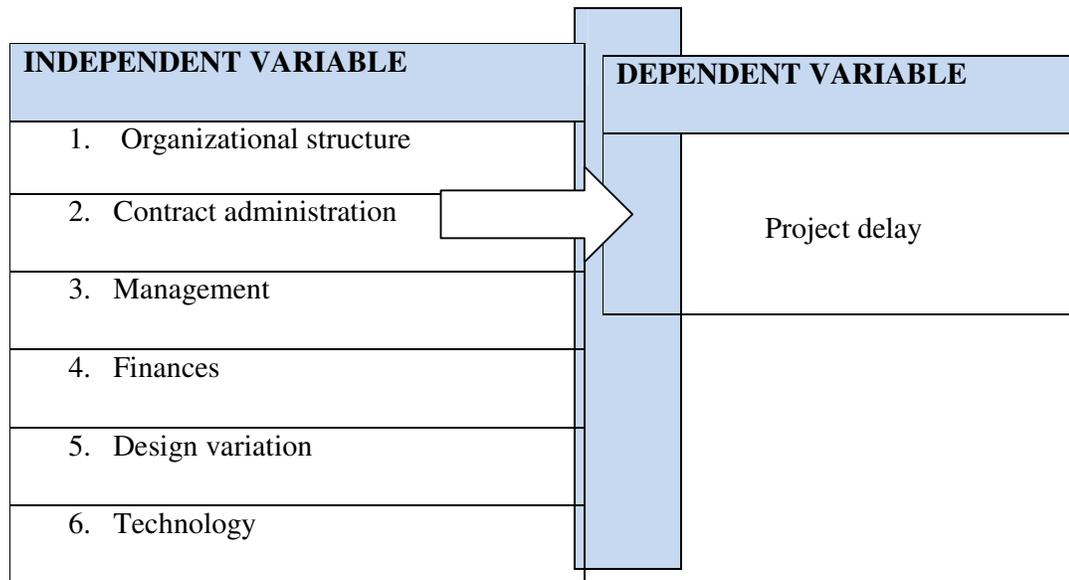
A contract may provide that, in the event of a breach, the innocent party may recover from the defaulting party a sum stated in the contract itself. This sum is called liquidated damages. This type of arrangement has the advantage of saving the time, trouble and expense of litigation should a breach of contract occur. Only the agreed sum is recoverable, even if the actual loss suffered greatly exceeds the sum fixed by the contract. If damages are to be assessed by the contract itself, it is essential to estimate with precision the monetary effect of any possible breach in most cases compromising on quality.

2.10.3 Conceptual Framework

Conceptual frameworks, according to Kothari (2006), are structured from a set of broad ideas and theories that help a researcher to properly identify the problem they are looking at, frame their questions and find suitable literature. Most academic research uses a conceptual framework at the outset because it helps the researcher to clarify the research questions and aims. Researchers use conceptual framework to guide their data collection and analysis. According to sociologists Haralambos and Holborn (2008), a conceptual framework enables the researcher to find the link between the existing literature and his own research goals.

Figure 2.2 shows the relationship between dependent variable and the independent variables.

Figure 2.2: Relationship among Variables



2.11 Case studies

Commonly, case studies will employ triangulation in the case study itself, but it is essential to be aware of the validity of generalizing the findings of a case study research project (Fellows and Liu 2003). Case studies are used in this research as an investigative tool to identify the causes of claims in construction projects. The outcomes are not generalized, but provide insights into such causes. The structure of each case study includes a description of the background of the project, followed by an overview of each of the claims involved. The following three case studies are for a hotel in Sinai, a hotel in the North Coast and an administrative building in Cairo.

2.11.1 Case Study One

The project of concern is the renovation of a five star hotel in Dahab, Sinai. The owner of the hotel decided to contract a professional project management firm. The project was tendered using a unit price contract and via a short list of selected contractors, which had wide experiences in such type of construction.

The planned duration was 6 months and was delayed 130 days in actual construction. Additionally the original contract cost of 10.75 million Egyptian Pounds (EGP) was increased to 12 million EGP. The contractor introduced 8 claims for the project. The following is a summary of each claim and its cause. (El-Razek, Bassioni and El- Salam, 2007).

Claim No. 1: Type - Time

Special structural requirements led to a structural modification which was delayed by the structural consultant. The cause of this claim contributed to “variations initiated by the owner/consultant”.

Claim No. 2: Type - Time and Cost

The excavation depth was increased due a clause in the specification that the contractor must reach the old foundation level and connect it with the new foundations. The cause of this claim was attributed to “Contract documents having errors, defects and omissions”.

Claim No. 3: Type - Time

The electromechanical consultant made a modification in the electrical design. The cause of this claim can be contributed to “variations initiated by the owner/consultant”.

Claim No. 4: Type - Time

The electromechanical consultant made modifications in the procedures referenced in the specifications for maintenance of air conditioning equipment. The cause of this claim can be attributed to “variations initiated by the owner/consultant”.

Claim No. 5: Type - Time and Cost

Due to the modification to adjust air conditioning in rooms, the electromechanical consultant asked to add an opening in a beam for air return. The cause of this claim can be attributed to “variations initiated by the owner/consultant”.

Claim No. 6: Type - Time and Cost

The architect and structural consultants asked to make a variation in the slabs and wall of suites. The cause of this claim can be attributed to “variations initiated by the owner/consultant”

Claim No. 7: Type - Time and Cost

The electromechanical consultant also changed the path of the air conditioning ducts. The cause of this claim can be attributed to “variations initiated by the owner/consultant”.

Claim No. 8: Type - Time

The architect had designed a small pool in the private garden of suites. However, within construction time the owner asked to replace the constructed pools as designed by architect with smaller ones to mitigate the total cost of the project. The cause of this claim can be attributed to “variations initiated by the owner/consultant”.

2.11.2 Case Study Two

The second case study concerned the renovation of a hotel in the Mediterranean North Coast. The project was tendered using a unit price contract and contractors were short listed from a list of approved contractors. The contractor introduced 8 claims within the project. Following is a summary of each claim and its cause.

Claim No. 1: Type – Time and Cost

The structural consultant had identified 16 columns to be repaired, which turned out to be 135 columns during construction. The cause of this claim was attributed to “changed conditions” and “inferior quality of design, drawings and / or specifications”.

Claim No. 2: Type - time

The architect changed the design of some room furniture components. The project manager studied the claim and determined concurrent delay, thus refusing the EOT. The cause of this claim can be attributed to “variations initiated by the owner/consultant”.

Claim No. 3: Type - Time

The architect had decided to use the old sanitary services which were found to be deteriorated during construction and the architect decided to replace all old ducts. The cause of this claim can be attributed to “variations initiated by the owner/consultant “and “inferior quality of design, drawings and / or specifications.

Claim No.4: Type - Cost

Due to the extra structural work nominated in claim no.1, some extra work resulted in reinstalling of walls and electrical works. The cause of this claim was attributed to “variations initiated by the owner/consultant”.

Claim No.5: Type - Cost

The architect decided to choose a different type of bath and shower mixer than those nominated in the BOQ. The cause of this claim was attributed to “variations initiated by the owner/consultant”.

Claim No. 6: Type - Time

The architect and owner decided to make changes to the project’s façade. The cause of this claim can be attributed to “variations initiated by the owner/consultant”.

Claim No. 7: Type – Time

Procurement of ceramic tiles was delayed by a supplier due to their special color. The cause of this claim can be attributed to “stakeholders involved in the project”.

Claim No. 8: Type - Time

The contractor submitted a claim for 10 days and clarified the cause of this claim by the delay in the approval of electrical and fire alarm shop drawing and fixtures. This affected the start and finish of these works. The cause of this claim can be attributed to “delays of approval of shop drawings, instructions and decision making”.

2.11.3 Case Study Three

The project discussed in this case concerns the construction of an administrative building complex project in Nasr City, Cairo. The owner tendered the design as a competition between architectural / engineering offices and chose the design that best accomplished his requirements. The project was tendered using a unit price contract through an open tender for companies categorized as grade one companies. The planned duration was 30 month and was constructed in three phases. Construction stopped for 7 months, and the projects consultant was replaced by a new consultant (El- Razek, Bassioni and El-Salam, 2007).

The contractor introduced 15 claims within the project. Following is a summary of each claim and its cause.

Claim No.1: Type - Time

Contact documents nominated a subcontractor responsible for the system of excavation. Through execution of the proposed system, some problems appeared and caused delays. The cause of this claim can be attributed to “stakeholders involved in the project” and “insufficient time for bid preparation and inadequate investigation before bidding”.

Claim No.2: Type - Time

As requested from the structural consultant, the foundation level was increased, after reaching the design depth. The depth of some pumps needed increase and some electromechanical problems required consideration. The cause of this claim can be attributed to “variations initiated by the owner/consultant”.

Claim No. 3: Type - Time

An earthquake had hit Egypt that caused some damage to site works. The cause of this claim is not found in the causes list.

Claim No. 4: Type – Time and Cost

The consultant instructed the contractor to construct a new water barrage in the lower basement. This led to stoppage of work in the original barrage walls and also delayed part of the lower basement roof until the new design for this part had completed. The cause of this claim can be attributed to “variations initiated by the owner/consultant”.

Claim No. 5 Type - Time

The contractor asked the consultant to provide some details for columns and slabs of basement that required a delay of 28 days. The cause of this claim can be contributed to “inferior quality of design, drawings and / or specifications” and “delays of approval of shop drawings, instructions and decision making”.

Claim No.6: Type - Time

The consultant made modifications to the levels around the building that caused a delay in the construction of the upper basement slab. The cause of this claim can be attributed to “variations initiated by the owner/consultant”.

Claim No.7: Type - Time

The contractor suggested changing the structural system. The owner agreed to change the system and was redesigned with the consultant's approval. The cause of this claim can be attributed to "Inferior quality of design, drawings and / or specifications".

Claim No. 8: Type – Time and Cost

The changes that happened in the basements slabs lead to an increase in the percentage of reinforcing steel in the concrete cubic meter than specified in the design drawings. The cause of this claim can be contributed to "Inferior quality of design, drawings and / or specifications" and "variations initiated by the owner / consultant". Egyptian building construction 153.

Claim no. 9: Type – Time and cost

The consultant gave some notes on the electromechanical workshop drawings which had already been approved. The contractor considered these notes as a stoppage order as the notes would need time to execute. The cause of this claim was attributed to "Inferior quality of design, drawings and / or specifications", "delay of approval of shop drawings, instructions and decision making" and "variations initiated by the owner/consultant".

Claim no. 10: Type – Time

Due to the decision taken by the government to change the foreign exchange rate, the contractor introduced a claim asking for the difference between the old United States dollar price and the new one. The cause of this claim can be contributed to "Unexpected changes in exchange, interest and inflation rates".

Claim no. 11: Type – Cost

The contractor introduced a cost claim due to the sudden and unexpected increase in steel prices from 1200 EGP/ton to 3000 EGP/ton. The cause of this claim can be attributed to "Unexpected change in materials prices".

Claim no. 12: Type – Cost

Stainless steel sheets were used for cladding whose specifications was not specified in the contract documents. The consultant refused the contractor's sample. This caused a claim that can be attributed to "Inferior quality of design,

drawings and / or specifications” and “unbalanced bidding, underestimation and incompetence of contractors”.

Claim no. 13: Type – Cost

Contractor introduced a claim asking for cost of overhead costs in the period of work stoppage. The cause of this claim can be attributed to “acceleration and stop-and-go operations”.

Claim no. 14: Type – Time

The owner contracted with a new consultant after the second phase and the project was delayed due to review of designs, redesign and new works by the new consultant. The cause of this claim can be attributed to “variations initiated by the owner/consultant” and to “inferior quality of design, drawings and / or specifications”.

Claim no. 15: Type – Time

Due to variations that happened by the new consultant to solve project problems, the contractor introduced prices for new items in a claim. The cause of this claim was attributed to variations initiated by the owner/consultant”.

2.11.4 Summary of the Literature Review

The literature review looked at the factors influencing project delays. This entailed organizational structures, contract administration, finances, project design variation and the use of new technology on large construction projects. Reviewed literatures generally agree on the factors influencing project delays. Research shows that organizational structures, contract management, finances and technology have an influence on project delays. This then has effects on projects delivery such as time overruns, cost overruns, litigation and contractual claims. The three project constraints sought for in a project are time, budget and scope may not be enough to measure project success(Schwalbe,2008).Case studies have been used as a research tool for the deep investigation into the topic of delays in large construction projects.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides the methodology used to carry out the study. The methodology elements considered include the research design, population, sample size and sampling design, data collection methods as well as data analysis.

3.2 Research Design

The design of a study defines the study type (descriptive, correlational semi-experimental review, meta-analytic) and sub-types. Research design is the framework that has been created to seek answers to research questions (Orodho, 2003). A descriptive cross-sectional study design was used. The study involves collection of data at a single point in time in the target population. The collected data was useful in establishing causes of delay in large construction projects in Kenya. Apart from the variables under consideration, the study also collected information on demographic factors and firm characteristics which were employed as control variables.

3.3 Descriptive Research

This is a study designed to depict the participants in an expected way. It is all about describing people who took part in the study. There are three ways researcher could go about doing a descriptive research on the project report: by observation, case study and survey which is defined as a brief interview or discussion with individuals about specific topic (Orodho, 2003).

3.4 Survey Method of Data Collection

This comes in different ways be it interviewing people face to face or handing over questionnaire to fill out (Orodho, 2003). This method is preferred because it allows for prudent comparison of the research findings. It was the descriptive survey that helped the researcher to determine the delay factors in the cause of implementation of large construction projects in Kenya. This requires primary data collection on quantitative data for comparison. It has been used in similar studies for finding causes of delay in building projects in Kenya.

3.5 Target Population

Sekaran (2003) defines a population as an entire group of people, events or things of interest that researchers wish to investigate. The study population was the stakeholders in the construction industry in Kenya. The study was carried out in Nairobi County due to time and financial constraints as well as easy availability of respondents. The respondents included the project owners, consulting firms and the contracting firms. The project owners included customers and people responsible for financing or promoting construction projects in Kenya. These people were deemed influential in project delivery since they are the people with the road map to construction project success hence their ability to produce useful and variety information on delays in Kenya. This is because they own adequate knowledge on project construction and their experiences in project performance is valuable hence their use as the target population. The study dealt with construction projects of value between Kenya shillings 500 million to Kenya shillings 35 billion. The population of construction projects and contracting firms involved in the projects were obtained from National Construction Authority (NCA). The population of consulting firms was obtained from the Association of Consulting Engineers of Kenya (ACEK) and the Architectural Association of Kenya (AAK) situated in Nairobi. The study covered both private and public projects.

The number of each group is as shown in table 3.1 below

Table 3.1: Target Population

Stratum	Registered members
Project owners	460
Consulting firms	152
Contracting firms	1518
Total	2130

Source: NCA, ACEK and AAK (2016)

3.6 Sample and Data collection Procedures

3.6.1 Sample Procedure

Orodho (2009) gives representation of all respondents' opinions in the target population and this assists in generalization of research findings when the study design is descriptive. Morris (1990) suggests absence of fixed number of percentages of subjects that determine the size of an adequate sample. To them, the ideal sample is large enough to serve as an adequate representation of that population about which the study wishes to generalize and small enough to be selected economically in terms of subject availability, expenses in terms of time and money and complexity of data analysis. Israel (1992) indicates that for a descriptive study, 10 per cent of the entire population will be a good representative sample. The study therefore adopted stratified sampling in obtaining sample size from the actors in the construction industry.

3.6.2 Sample Size

From the population of 2130 actors (NCA, AAK and ACEK) in the construction industry in Kenya, a sample size of 213 was considered as shown in table 3.2 below.

Table 3.2: Sample of Actors in the Construction Industry

Stratum	Number of registered Members	10% Number of registered Members
Project Owners	460 x 10/100	46
Consulting firms	152 x 10/100	15
Contracting firms	1518 x 10/100	152
Total		213

Source: authors own computation (2016)

3.6.3 Data Collection Procedure

The study used primary cross sectional data obtained from actors in construction industry sampled randomly across Nairobi County. Data collection procedure is the process of gathering pieces of information that are necessary for research process (Morris 1990). In this study questionnaire was administered to a total of 213 respondents comprising of; project owners, consulting firms and contracting firms. Self – administered, structured and standardized questionnaire was used to obtain information from the respondents.

3.7 Test for Validity and Reliability

The accuracy of data collected largely relies on the data collection instruments in terms of validity and reliability (Mugenda and Mugenda 2003). Validity refers to the extent to which results obtained data analysis actually represents the phenomenon understanding. On the other hand, reliability refers to a measure of the extent to which research instruments give consistent results (Mugenda and Mugenda 2003). In this study, data reliability was guaranteed by pre-testing the questionnaire with a selected sample. Contents of the validity helped the researcher to ascertain whether they included or represented all the content of the research in the study. Test-retest approach enabled the researcher to test consistency among different questionnaires as filled by the respondents (Frankel and Wallen,1993) .Verbal consent was also obtained from the respondents who consented to be part of the study. Privacy and confidentiality was ensured throughout the study. The researcher held moral obligation and treated all information with utmost propriety due to sensitivity of the information to be collected, the researcher reassured the respondents a high level of confidentiality of all the information given. In general the researcher complied with all research ethics.

3.8 Data Analysis

3.8.1 Descriptive Statistics

The study assessed the means, standard deviation, minimum and maximum of the determinants of delays in large construction projects in Kenya. Specifically, project delay was used as a dependent variable and organizational structure, contract management, labor management, finance and variations were used as the independent variables. The responses are presented followed by a brief interpretation guided by the research objectives and a discussion on research findings from the analysis of the data.

CHAPTER FOUR

RESULTS AND DISCUSSION.

4.1 Introduction

This chapter provides the analysis of the data collected from the respondents. The analysis was based on the objectives of the study where personal data of the respondents were analyzed as well as statistics from the respondents with a view to establishing the factors in the investigation into the causes of delays in large construction projects in Kenya. The analysis provided the descriptive statistic, mean and the standard deviation and the outcomes presented in a form of frequency tables and charts.

4.2 Response Rate of the Study

The questionnaires were distributed to 213 purposively selected respondents of which 200 were completed and returned.

Table 4.1 Study Response Rate

	Frequency	Percentage
Responded	200	93.90
Non-Response	13	6.10
Total	213	100

Table 4.1 gives a response rate of 93.90%. The collection procedures involved personal administration, reminder and personal collection whenever possible. The 93.90% response was an adequate number suitable for the research and can be attributed to an extension of time to the respondents to complete and return the questionnaire. Further the questionnaire was developed in a way that every respondent could easily understand all the items on it. The non-response rate of 6.10% could be attributed to ignorance of some of the respondents or generally loss of the questionnaires by the respondents.

4.2.1 Background of the Respondents

4.2.2 Gender of Respondents

The respondents were asked to indicate their gender. The figure 4.1 shows gender distribution in the construction sector.

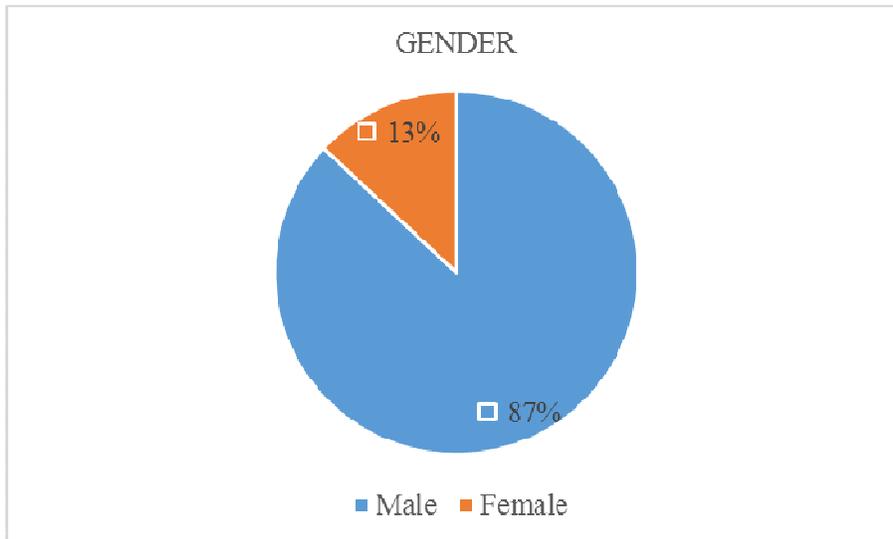


Figure 4.1: Gender Distribution of Respondents

From the results in figure 4.1 above it is evident that majority of the respondents were of male gender (87%) while minority were of female gender accounting for 13%. The nature of construction works dictates for masculinity with limited positions of administrative and clerical positions. This explains the disparity in the distribution of gender.

4.2.3 Age of Respondents

The respondents were asked to indicate their age. Five categories were given and the following table indicates the age brackets.

Table 4.2 Ages of Respondents

Age	Frequency	Percentage
19-29	108	54
30-39	58	29
40-49	21	10.5
50-59	9	4.5
Above 60	4	2
Total	200	100

Table 4.2 shows that majority of respondents fall in the bracket of 19-29 years while only a small percentage (2%) falls in the category of age bracket from 60 years and above. This could be attributed to the dynamics of the construction industry that is now characterized by excess performance expectations which would only be achieved and coped by the young generation. This illustrates a generational change from old to young. However, since majority of the players are young they lack the required exposure thus contributing to the delays in construction projects.

4.2.4 Highest Education Qualification

The respondents were asked to indicate the highest level of academic qualification achieved. Table 4.3 illustrates the level of qualification across the sample.

Table 4.3 Highest Education level

Education level	Frequency	Percentage
Primary	3	1.50
Secondary	7	3.50
College	16	8.00
University	174	87.00
Total	200	100.00

Table 4.3 shows that majority of respondents were university graduates, followed by college, secondary respectively. Only a small percentage of the respondents had only completed primary education. This means that level of education in the construction industry is dynamically changing. This implies that the level of education has no direct relationship to the reduction of delay in large construction projects in Kenya.

4.2.5 Years of Stay in the Current Firm

The respondents were asked to indicate the number of years they have stayed in the current firm. Table 4.4 illustrates the number of years of stay in the institution of the sample.

Table 4.4 Years of stay in current firm of Respondents

Variable	Obs	Mean	Std. Dev.	Min	Max
Years in the institution	200	5.393939	5.229075	1	36

The total number of respondents who answered this question was 200. The number of years of stay in the current firm deviates from its mean (5.393939 years) by 5.229075 years but ranging between 1 year and 36 years. A mean of 5.3 years implies that majority of respondents in the sample had stayed in their current firm for five years. This means that respondents are conversant with what is happening in the construction industry.

4.2.6 Identification of Causes of Delay

The respondents were asked to identify causes of project delay. A total of 200 respondents answered this question. The results were tabulated in the table as shown below with the corresponding category and rank of the cause.

Table 4.5 Causes of delays

Rank	Client	Consultant	Contractor
1	Contractors cash flow problems	Poor site supervision and management by contractor	Inadequate and unclear details in drawings
2	Manpower shortage (skilled and unskilled labour)	Contractors difficulties in financing the project	Contractors difficulties in financing the project
3	Contractors difficulties in financing the project	Contractors Cash flow problems	Mistakes, inconsistencies and ambiguities in specifications and drawings
4	Delay in progress payments by the client	Inefficient quality control by the contractor during construction leading to rework due to errors	Change in scope of the project
5	Poor site supervision and management by contractor	Tendering system of choosing the lowest bidder	Poor site supervision and management by contractor
6	Labour strikes by the contractor workforce	Ineffective scheduling and planning of project by contractor	Poor qualification of engineers staff assigned to the project
7	Changes in scope of the project	Difficulties among the contractor and subcontractors with regards to payments	Delays in progress payments by the client
8	Inefficient quality control by the contractor during construction leading to rework due to errors	Delays in progress payments by the client	Delay to furnish and deliver the site to the contractor by the owner

From table 4.5 above the top five causes of delay with respect to clients opinion are: Contractors cash flow problems, manpower shortage, contractors difficulties in financing the project, poor site supervision and management by contractor and delay in progress payments by the client. This shows that the top five cause of delays are related to: Contractor, labour and client problem.

From the consultants viewpoint the top five causes of delay are: Poor site supervision and management by contractor, contractor's difficulties in financing the project, contractors cash flow problems, inefficient quality control by the contractor during construction, leading to rework due to errors and Tendering system of

choosing lowest bidder. This indicates that the top five causes of delays are related to contractor and external causes of delay. It is also to be noted that three of these factors are similar to those asserted by the client.

According to the contractor’s perspective the first five causes of delay are: Inadequate and unclear details in drawing, Contractor’s difficulties in financing the project, mistakes, inconsistencies and ambiguities in specification and drawing, poor qualification of engineer’s staff assigned to the project and change in scope of the project. These causes are related to design, contractor and client.

4.2.7 Frequency of Delay Causes

Frequency indices were calculated from the data collected and the significant causes of delay according to contractors, clients and consultants are shown in table 4.6. From the contractor’s point of view, the most significant frequent causes of delay are related to client, contractor and design.

Table 4.6 The most frequent causes of delay identified for the study area.

Rank	Contractor	Client	Consultant
1	Delay in progress payments by the client	Poor site supervision and management by contractor	Tendering system of choosing the lowest bidder
2	Conflicts with subcontractors schedule and implementation	Contractors difficulties in financing the project	Difficulties among the contractor and subcontractors with regards to payments
3	Slowness in decision making process by owner	Contractors Cash flow problems	Contractors Cash flow problems
4	Delay in subcontractors work	Inefficient scheduling and planning of project by contractor	Ineffective scheduling and planning of project by contractor
5	Frequent change of subcontractors due to their inefficient work and poor screening of subcontractors	Inefficient quality control by the contractor during construction leading to rework due to errors	Poor site supervision and management by contractor

The results in table 4.6 indicate that contractors are realizing that delay in progress payments by the client, conflicts with subcontractors' schedule and implementation of works, slowness in decision making process by owner, delays in subcontractors' work, frequent change of subcontractors due to their inefficient work and poor screening of subcontractors, inadequate and unclear details in drawings and changes in scope of the project are the highest frequent causes of delay.

Inputs of the client indicate that the more frequent causes of delay are allied to the contractor and materials. Like poor site supervision and management by contractor, contractor's difficulties in financing the project, contractors cash flow problems, ineffective scheduling and planning of project by contractor, inefficient quality control by the contractor during construction, leading to rework due to errors.

Unlike the contractors and clients, the consultants point out that the most important frequent delay causes are related to external factors and contractor. The results also indicate that tendering system of choosing the lowest bidder, difficulties among the contractors and subcontractors with regard to payments, contractors' cash flow problem, ineffective scheduling and planning of project by contractor, poor site supervision and management by contractor and lack of technical professionals in the contractors organization are the most frequent causes of delay. Mostly the lowest bidders are unqualified contractors with low capabilities and inadequate resources which directs to low performance and cause delay.

4.2.8 Evaluation of Causes of Delay

The total number of respondents who responded to this question was 200. The causes of project delay according to the respondents were erratic payment, slow decision making, bureaucracy in client organization, design changes, labor shortages, low skill levels, plant equipment related problems, environmental concerns and restrictions, management problems, material changes and low design team experience. Figure 4.1 illustrates frequency of each of the above factor.

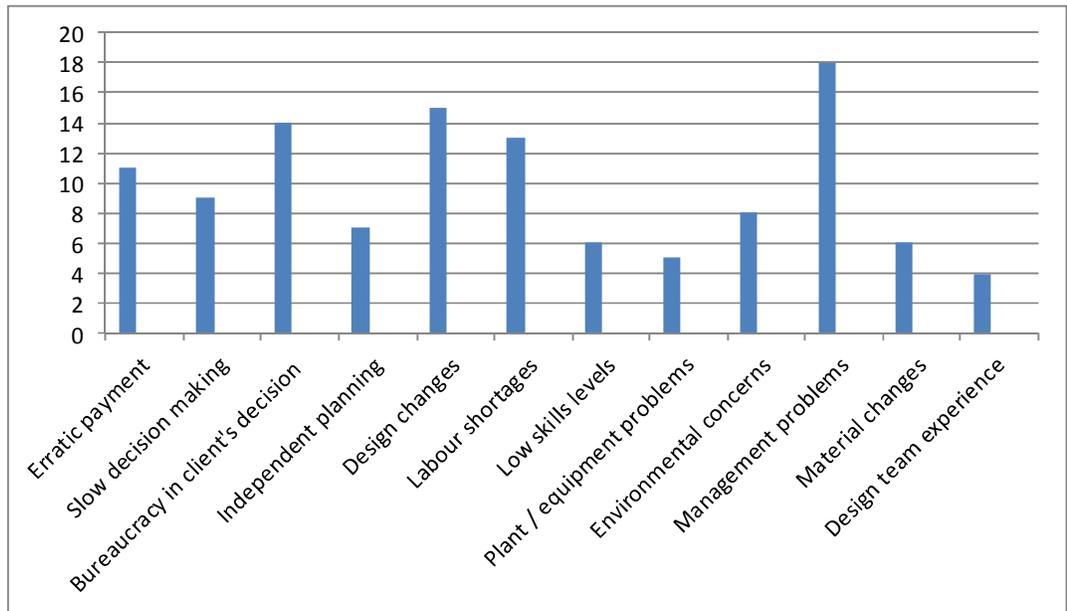


Figure 4.2: Evaluation of Causes of Delay

From figure 4.2, it is evident that management problems, design changes, bureaucracy in decision making by clients and labor are the major causes of project delay in large construction projects in Kenya. It is therefore important to find mitigating solutions to the problems of management, design changes and bureaucracy in clients system of decision making.

4.3 Analysis of Major Categories of Causes of Delay

To understand determinants of project delay on large scale construction projects in Kenya, descriptive statistics were done. To capture the dependent variable, respondent were asked to indicate whether they have once experienced a delay in the completion of a project and how long in terms of years the delay was. To capture the independent variables, respondents were asked to indicate whether the indicated delay was as a result of the variables under study or otherwise.

The data collected was analyzed and the following table show the frequency index (FI) and rankings of major categories of delay

Table 4.7 Frequency Index and rankings of categories of causes of delay

Categories (sources)	Client		Consultant		Contractor		Overall	
	FI	Rank	FI	Rank	FI	Rank	FI	Rank
Design related	67.42	9	59.65	8	63.67	4	63.58	7
Project related	67.80	8	59.75	7	56.72	5	61.43	9
Client related	75.18	4	68.80	4	64.36	3	69.45	3
Contractor related	78.18	3	72.77	2	56.06	7	69.00	4
Consultant related	69.59	6	59.25	9	66.44	1	65.10	5
Material related	82.00	1	71.72	3	66.00	2	73.24	1
Equipment related	72.31	5	67.10	5	45.75	9	61.72	8
Labour related	79.66	2	75.61	1	56.07	6	70.45	2
External	66.83	7	66.35	6	56.03	8	63.74	6

Table 4.7 above shows the frequency index and ranking of all categories of delay in large construction projects in Kenya. The ranking is made based on Pareto rule assumption that the highest ranked have the greatest influence.

As shown in Table 4.7, the result of materials related indicates the greatest source of delay for the three respondents of the survey and is ranked first, second and third according to client, consultant and contractor respectively. This result is consistent with the outcome of the overall analysis as materials related category of delay is highly ranked and is placed at the first position. This agreement between all respondents of the survey is traced to the difficult economic situation which Kenya suffers. Due to slow down of global economic and change in currency exchange rate the construction sector has been experiencing a slowdown in Kenya especially with respect to imported construction materials. According to Gwaya et al (2014) the economic policy of Kenya construction industry significantly affects project delivery time.

Materials related category delay can be considered as important source of delay for the three stake holders since it directly affects the performance of the project. If materials are not available as intended throughout construction project duration, the project will suffer from the problem of delay and cost overrun. Materials related delay causes have mixed responsible parties: clients, consultants, contractors and governments. Since no single party is responsible for this category of delay causes, it therefore means that any effort to prevent or minimize delay has to be a joint endeavor and based upon teamwork. A similar observation is suggested in the survey of Abdul-Rahman et al. (2006) conducted in Malaysia.

The results of table 4.7 shows that contractor related sources of delay and client related sources of delay are highly ranked by the respondents. The rank accorded by each category of respondents seems to differ due to the opposing views between the respondents and appears to resemble conflicting attitudes. On the other hand, both contractors and clients are not willing to admit or take responsibility for project delays and also it can be considered as “pinpointing” of accountability of delay on other parties. It is predictable that contractors and clients are more responsible for materials and contractor related categories of project delays. These adversarial points of views, blaming each other for delay causes are not very helpful for the project success, however in order to reduce or eliminate delays teamwork is required.

Overall causes of delay in large construction projects in Kenya are caused by various factors, some of which are within the consultant’s responsibilities, some are owner’s responsibilities and some are within the contractor’s responsibilities. According to Gwaya et al (2014), the overlapping nature of construction events makes it difficult to distinguish what proportion of the overall cause of delay is which party’s responsibility. Delays in large construction projects in Kenya can be reduced through joint efforts of the participants of the construction industry i.e. clients, contractors and consultants. It is also the responsibility of government to create stable economy, to co-ordinate necessary facilities and to renew or develop infrastructure to control time and cost overruns.

Based on overall results Project and Equipment related categories of delay have less important causes identified by the survey. The results show good agreement between the respondents of project parties in ranking of causes of delay being the least categories.

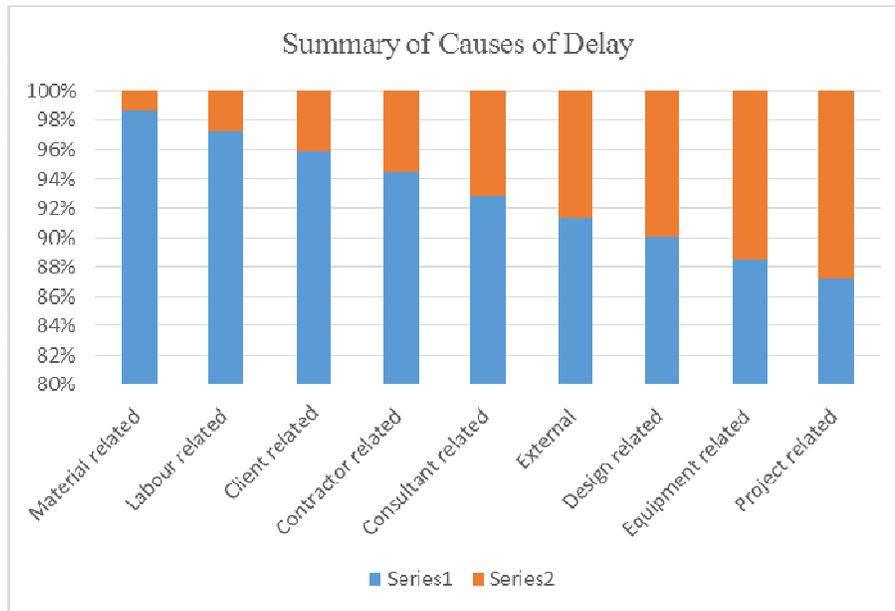


Figure 4.3: Summary of causes of delay

In conclusion, from the analysis of the results figure 4.3 above, it is found that the most frequent cause of delay in large construction projects in Kenya is materials related as it has the first rank among all. Similarly labor related cause of delay has been ranked in the second position and client related the third position. Project related category of causes of delay is the least frequent and has been ranked in 9th position.

4.4 Strategies to Mitigate Delays as Solution to Project Delay

4.4.1 Closed-Loop Management System

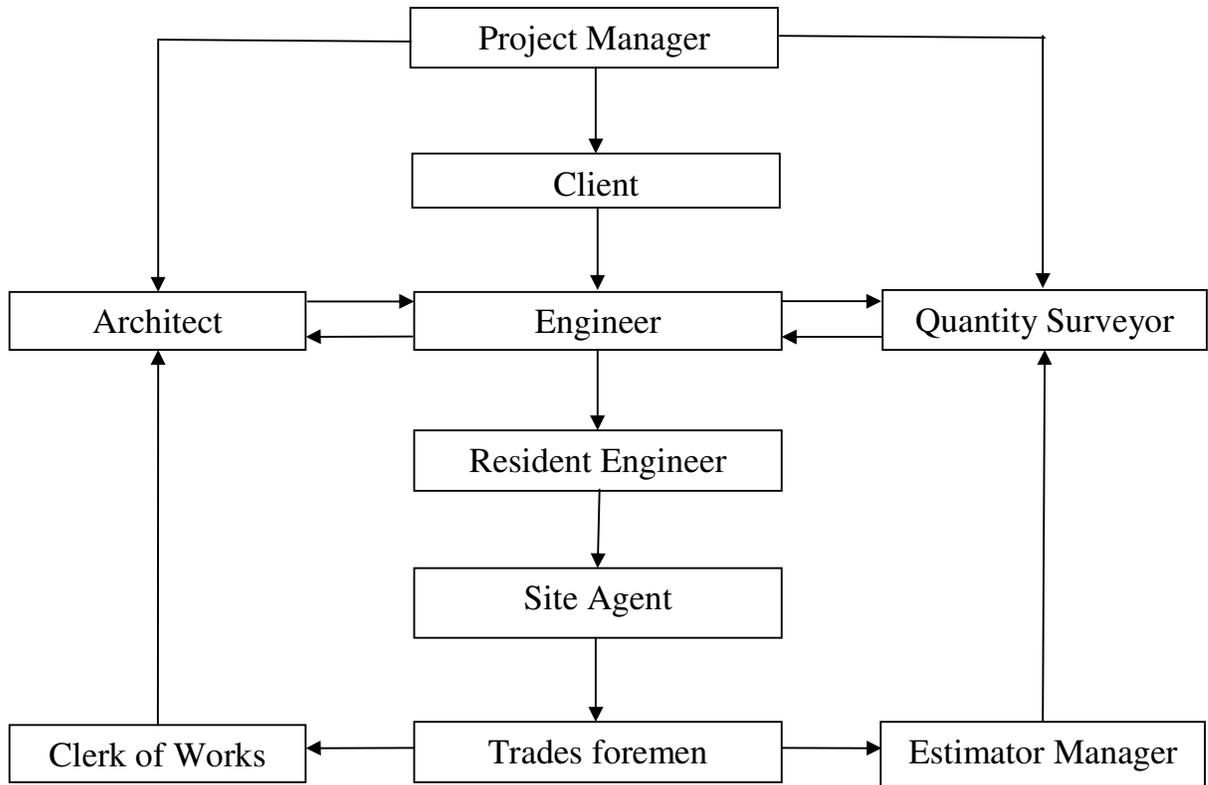
According to Neurol (2007) the first thing to know about integrative management is that it neither is nor includes just one thing. Instead, integrative management is a continually evolving, closed-loop management system. As such, it links strategic and operational plans in such a way that the long-term vision, as well as strategic, daily operational, financial and customer service goals and objectives work with and

depend on each other. It's essentially a single cohesive management system that both defines where your business is going and determines how you will get there.

In construction contracts, proving who and what causes delay or disruption is a critical aspect of resolving and mitigating on future delays. But waiting until after the losses have been incurred before addressing recovery by submitting a claim is reactive strategy and often leads to higher potential for loss among project stakeholders. The following strategies can help the project stakeholders remain aware of the potential for delay and disruption throughout the project planning and execution phases. The three significant factors thus; Materials availability, labor availability and clients' related factors would need strategically be addresses by the parties in the following ways:-

To mitigate project delay as a result of shortage of materials, there is need to have adequate research done on the availability of materials before the commencement of the works. The same applies for labor requirements and keeping of trained personnel in the process of execution of construction works is paramount. Independent and experienced project managers should be employed to deal with the client retarded problems. This will assist in mitigating the problems that have emerged as the most significant in the analysis of causes of delays in large construction projects thus; slow decision making by clients, insufficient labor force, changes by clients and consultants at the site. With regard to finance, to avoid delay in projects, the clients should have adequate finance resource before the commencement of construction works so that contactors are paid promptly. As for technology, contractors should ensure that they have the latest machinery and train their staff on how to use them efficiently therefore saving time in the execution of the projects. It is also important that the following points are taken into account in mitigating delays in construction projects:- The contractor should know the scope of the works, analyze the critical path of the project, establish risk triggers as an early warning system and develop contemporaneous documents to quantify delay and productivity loss.

Figure 4.4: Strategic delay Management Structure



CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the findings of the study in relation to the objectives, literature review and key variables in our study. It later makes substantive conclusions based on explored determinants of large construction project delays in Kenya and thereafter major recommendations are made. Later, suggestions are made for further areas of study.

5.2 Summary of the Study Findings

The study sought to investigate factors causing project delay in large construction project in Kenya. The variables of interest include, organizational structure, management, contract administration, finances, technology and design variation which was further dichotomized into client related causes, contractor related causes and consultant related causes. The study findings showed that Organizational structure, management and design variation insignificantly influence project delays in large construction projects in Kenya. On the other hand, contract administration, finances and technology were found to be significant determinants of project delays in large construction projects in Kenya.

Project delays are a common problem not only with an immeasurable cost to society, but also with debilitating effects to the contracting parties (Ondari & Gakera, 2013). Project delays are a reoccurring problem and have negative impacts on project success in terms of time, cost, quality and safety (Knight, Hurst & Farahani, 2009). Many scholars and practitioners have presented contradictory views on the causes of delays in construction projects. There is also lack of consensus as to the principal causes of delays in public construction projects. For instance, Aibinu et al (2002) argue that the main cause of delay is poor planning. According to Frimpong (2003), poor risk management is to blame while Jonathan et al (2001) argues that lack of experience and intellectual ability among contractors is the main reason.

Other causes that have been highlighted include; poor organizational culture (Kagiri & Wainaina, 2008), poor government policy guidance (Karimi, 1998). Although causes of delay in large construction projects have been explored widely in other regions of the world, little has been done with regards to Kenya. In Kenya, construction projects are some of the main pillars towards the achievement of country's dream of becoming a middle income economy by the year 2030. Delays in Kenyan construction projects are said to be a common and re-occurring phenomenon.

The government of Kenya and its developing partners continue to allocate huge financial resources aimed at improving country's infrastructure. Therefore an investigation into the causes of delays in large construction projects was of great importance. It will help to put in place measures to control delays in construction projects. This study therefore examined players in the construction industry based in Nairobi. The survey involved a sample of 213 respondents comprised of 46 project owners, 15 consulting firms and 152 contracting firms in the study area.

5.3 Conclusions

Construction industry is an important component of Kenya's economic growth and development. Completion of large construction projects on time is therefore critical for country's economic growth. The aim of the study was to investigate the causes of projects' delay for large construction projects in Kenya and hence finding mitigating factors to the problem of delay. From the analyzed field data, some factors have been established as being influential to delay in construction projects in Kenya. This study therefore contributes to the existing literature on delay of large construction projects in Kenya by highlighting the frequent and significant causes of project delays in large construction projects in Kenya (fig. 4.7)The findings showed that materials, labour and client related factors (bureaucracy in client's organization), are significant in determining project delay in large construction projects in Kenya. The findings are in line with a study by Msafiri (2015) who found the same variables to be significant determinants of project delay while investigating the factors causing delays in road construction project in Kenya.

5.4 Recommendations

The construction sector not only has the capacity to create employment but also capacity for transforming the country to developed economy. This will help in achieving the national development objectives as enshrined in the Kenya's vision 2030.

Based on the study finding which revealed management (bureaucracy in clients organization), finances (erratic payments) and design variations to be significant factors that influence large construction projects delays in Kenya, this study under the sections of strategies (chapter 4-) and deterrents (chapter 2-) to stop delays suggests for development of effective and efficient construction system that will mitigate on the projects delays. The study suggests further that when sourcing for a contractor to undertake a large construction project, it is of paramount importance to vet them and to insure that they have capacity to undertake the project in question. The contractor should also show proof of competent and well educated staff and who have handled such projects to completion in the past. The contractor should also show proof of appropriate equipment or ability to rent.

With regard to project design variation, the study suggests clients' contribution from the start of the project. Management meetings are mandatory and their representation is also of great importance so that they are also informed of the progress of the project. Such arrangement will be of essence. This is because if there are changes in design all parties are advised accordingly and thus buy in the idea. With regard to finances, construction firms should ensure adequate and timely provision of financial resources in building construction project. Adequate finance is the hub around which everything else revolves. The project is not only delayed but the morale of workers plummet because of non-payment or irregular payment of wages. Subcontractors and suppliers of materials and components and their employees are likewise affected. The challenge to construction managers and of course, clients, is to identify ways to eliminate or at least reduce the occurrence of financial crisis during the construction process. In that regard, construction clients must ensure that funds are available or adequate arrangements for funds are made before projects are started and contract provisions which allow contractors to claim interest on delayed payments must be

strictly enforced to serve as deterrent to clients. With regards to technology, construction firms need to embrace new technology in their operations. For reducing delay in project contractors must have knowledge about their resources strength and obtain up-to-date Machinery and try to obtain new equipment for construction.

5.5 Areas for Further Studies

This study has comprehensively examined the causes of delays in the completion of large construction projects in Kenya. The study was limited to a few project owners, consulting firms and contracting firms due to time and financial constraints. Similar study could be conducted focusing on all players in the Kenyan construction industry using sampling and comparative analysis performed. This is likely to give a clear picture of the various causes of delays in large construction projects due to regional dynamism. Further, studies are required using other methodologies such as structural equation model whereby the effect of the various causes of delays in the completion of large construction projects are examined. This is because such model will enhance use of many constructs that will show causes of delays in the completion of large construction projects in Kenya.

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APPENDICES

APPENDIX I: COVER LETTER

Dear Participant,

Please allow me to take a few minutes of your time. My name is Symon A. Kwatsima. I am a Master of Science in Engineering and Technology student at Jomo Kenyatta University of Agriculture and Technology. I am undertaking a study designed to evaluate the framework for project delay in large construction projects in Kenya. This study will enable development of evaluation model for improving the project completion in large construction projects in Kenya. Similarly, your opinions and comments will be of great value to me as the researcher. The data collected will be kept strictly confidential and anonymous. At no time will your name be reported along with any of your responses. All the responses will be aggregated, summarized, and analyzed for the award of the Master's Degree. For inquiry about rights as a research participant, feel free to contact Jomo Kenyatta University of Agriculture and Technology.

Thank you for your consideration.

Sincerely,

Symon A. Kwatsima

Master of Science in Construction Engineering and Management student,
Jomo Kenyatta University of Agriculture and Technology, Kenya

APPENDIX II: QUESTIONNAIRE

I have read and understand the above information. I agree to participate in this study.

1. Yes.
2. No.

If No, Please may we know the reason: _____?

PART A: Demographic Data

In this section, the study shall basically focus on the general information regarding the respondents, their experience of the management system. In this case, choose a single option for all questions unless required to do otherwise.

1.1. Gender

Male = 1 []

Female =2 []

1.2. Age: (Years)

1.3. What is your highest level of education?

Primary =1 []

Secondary =2 []

College =3 []

University=4 []

None =5 []

1.4. What is your marital status?

Single =1 []

Married =2 []

Divorced =3 []

Widowed=4 []

1.5. What is your current position in the organization? (E.g. administrator, engineer etc.)

1.6. Years in current position:

1.7. What is the name of your department?

Finance =1 []

Human resource = 2 []

Technical/Consultant =3 []

Management=4 []

Operations =5 []

Other department =6 []

1.8. Date of Interview:

PART B: Main Constructs

This section is concerned more on management system and project details focusing on the key factors forming the contents of the research in general with regard to causes of delay in large construction projects in Kenya. Therefore, you need to select one option at a time unless you have further information or suggestions.

Yes or No

Note that in selecting your choices, tick appropriately (√)

A: Organizational Structure

Organizational structure and project delays	Yes	NO
1. Line organizational structure promotes fast decision making		
2. Staff or functional authority organizational structure provides expertise, advice and support for the line positions		
3. Even though a line and staff structure allows higher flexibility and specialization, it may create conflicts between the line and staff personnel		
4. Personnel are assigned to a project from the existing permanent organization and are under the direction and control of the project manager		
5. Matrix organizational structure has negative effect of dual authority similar to that of project organization		

B: Contract Administration

Contract management and project delays	Yes	No
1. Our organization has low capacity in handling some projects		
2. A lot of time is required/taken in drawing interpretations		
3. The project managers in the firm have wide experience in people management		
4. A lot of time is required in asking for clarifications in case of discrepancies		
5. Staff in this firm adhere to the professional ethics		
6. The organization values capacity building among the staff		

C: Management

Labour and project delays	Yes	No
1. Most of the workers in our organization are not motivated		
2. Workers in this firm are not quality conscience		
3. There is laziness and laxity among the workers in this organization		
4. Workers in this firm do not follow work ethics		

D: Finances

Finance and project delays	Yes	No
1. In our firm, there is delay in approval of budget for assigned projects		
2. Employees are not paid on time and delay in the purchase of material is common in the firm		
3. There is frequent changes of the organization budget		
4. The firm has good credit-worthy records with suppliers and has cultivated healthy working relations with them		

E: Design Variations

Variations and project delays	Yes	No
1. Variations that have cost implications may also have time impact		
2. Changes that have design implications have time impact		
3. The firm is not allowed to apply for extension of contract period		

F: Technology

Technology and project delays	Yes	No
1. Technology implications may also have time impact on project delays		
2. The firm is has embraced use of advanced technology		

G: Summary

Causes of Project Delay	
In your view what is the major cause of project delay?	