

**FACTORS INFLUENCING COMPLETION OF CONSTRUCTION  
PROJECTS; A CASE OF CONSTRUCTION PROJECTS IN NAIROBI  
KENYA**

**BY**

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**This Research Project report is submitted in Partial Fulfillment of the  
Requirements for the Master of Arts degree in Project Planning and Management in the  
University of Nairobi.**

**2014**

## **DECLARATION**

This research project report is my original work which has not been presented for an award of a degree in any other university.

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Date

This research project report has been submitted for examination under my supervision as the university supervisor

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## **DEDICATION**

This work is dedicated to my mother Dorothy Mumbi Munyoki. She conceived me twice, naturally and spiritually. My father David Munyoki Kiteme cast a vision for his family that I have lived and which has defined much of my reason for success. It will define many generations after him.

## **ACKNOWLEDGMENT**

My life has been impacted by many people and I greatly value their input in making me who I am. My parents Rev. David Munyoki Kiteme and Dorothy Mumbi Munyoki for providing me with the parental guidance, prayers and love. My departed Uncle William Mulwa Kiteme for his many words of advice that he gave to me. My siblings who have respected and appreciated my role as their elder brother. The many young people that I have interacted with in the course of my profession who have helped me grow in my career. Of importance to mention here are my classmates with whom in discussion teams we learned a lot.

My employer A.I.C Kijabe Hospital for giving me the exposure to the management duties that a project manager is called to perform. I have had a privilege to undertake various projects on behalf of the hospital and this has given me insight into running projects of varying budgets and complexities. This has also been the ultimate inspiration to undertake further studies in project management.

I greatly value the teaching faculty of the University of Nairobi. Dr. Raphael Nyonje has greatly guided me in my project. Mr. Levi Koyio Matesehe really impressed me on his mastery of the subject. The lecturers exposed me to the various subjects with a commanding clarity which made me get grasp on project management issues current today.

I thank God the Father, Son and the Holy Spirit by whose grace I am saved from eternal damnation and who sustains me to achieve any of the little achievements that I have in this life.

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## **ABBREVIATIONS AND ACRONYMS**

**M<sup>2</sup>**-meter squared

**Km**-kilometers

**KES**-Kenya shillings

**KNBS**-Kenya National Bureau of Statistics

**DBFO**-Design Build Finance Operate

**BOT**-Built Operate Transfer

**Nr**-Number

**M<sup>3</sup>**-Cubic meter

**Lm**-Linear meter

**FIDIC**-International Federation of Consulting Engineers

**JBC**-Joint Building Council

**AAK**-Architectural Association of Kenya

**IEK**-Institution of Engineers of Kenya

**EBK**-Engineers Board of Kenya

## ABSTRACT

This research study sought to identify factors influencing completion of construction projects. The research objectives were; to determine how contract duration influences completion of construction projects, to investigate whether project financing influences completion of construction projects in Nairobi, to examine how planning influences completion of small construction projects in Nairobi, to find out how supervision/inspection of work influences completion of construction projects in Nairobi, to assess how the type of project delivery chosen influences completion of construction projects in Nairobi. The research questions were; how does the construction contract duration influence completion of construction projects in Nairobi? How does project financing influence completion of construction projects in Nairobi? How does planning influence completion of construction projects in Nairobi? How does supervision/inspection of work influence completion of construction projects in Nairobi? How does the type of project delivery method chosen influence completion of construction projects in Nairobi? The research design was a descriptive and explorative or correlative. This is because it sought to discover the relationship between aspects of a problem. A survey questionnaire was applied in the study. The sample population includes architects, quantity surveyors, structural engineers, civil engineers, mechanical engineers, electrical engineers, land surveyors construction project managers and private developers. The sample size is 77 respondents, and the non-probability sampling technique used in the study is purposive/judgmental and snow-balling. The questionnaire was the data collection instrument used in the study. The validity test methods employed were expert review, face, content, sampling and construct validity tests while the tools used to verify the reliability of the tool is cronbach's alpha. Data analysis techniques used were descriptive statistics, inferential statistics used is Karl Pearson's as well as Spearman's correlation factors while regression analysis was applied to identify a mathematical relationship between variables. A likert scale was also used. The findings showed that project cost increased with an average of 13.5% while project duration increased by 33.6%. 98% of respondents believe project financing and inspection/supervision influence completion of construction projects. 73% and 71% respectively gave the information that construction contract duration and project delivery type chosen respectively influence completion of construction projects. 100% of the respondents believe project planning at all stages influences completion of construction projects. The majority respondents said EPC/Turnkey projects are the most successful in ensuring project completion though the type of project delivery chosen may vary for various reasons. The recommendations include project managers need to engage project stakeholders all through project lifetime. Competent project managers should be involved in projects while clients should provide adequate project financing. Contractors should not have cash flow problems and project teams should be trained on project success factors. A quality culture in construction industry should be encouraged. Every stakeholder in construction projects implementation should be sensitized on the reality that projects will most likely suffer delay in contract duration and definitely increase in project costs. Efforts should be collectively made to manage this in a way that clients don't suffer consequences of projects not being completed in time, budget and to meet the design scope and quality.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background to the study

Construction project delivery is affected by many factors. Every investor wants to be sure of the project time and cost. This is because challenges that may affect project completion have far reaching effects ultimately on the owners' interest. Chism and Armstrong ( 2010) in study carried in USA aver that in the current economic landscape, project owners are scaling down or eliminating capital construction projects due to lack of financing, uncertainty over costs, and concerns about potential delays that could impact the feasibility basis of projects. While in a study carried out in the UK Fapohunda and Stephenson ( 2010) state that in construction, conflicts exists between the projects' stated objectives with regard to the appropriateness of cost time and quality. They also identify the distinct knowledge management areas for project managers' efficient performance to include among others project time management which includes to provide an effective project schedule for project delivery besides actually delivering on the schedule. McNair (2011) referring to the Australian context of applying EPC contract advances the importance of a contractor delivering a complete facility for a guaranteed price and by a guaranteed date. It must also perform to the specified level. He further observes that failure to achieve this will usually result to a contractor incurring monetary liabilities.

The subject of completion of project is therefore a universal concern that affects all parties to a construction project. It is thus in the interest of the project management as an emerging profession to address all the factors that affect completion of construction project. Indeed the idea of EPC contracts was conceived to partly transfer the risks involved in project implementation largely to the contractor charged with implementing it. The contractor usually has a limited ability to claim additional money which is limited to the circumstances where the project company has delayed the contractor or has ordered the variation of the works. (McNair, 2011).

In a study carried out in Florida State Ahmed, Azhar, Castillo and Kapagantulla (2002) state that delays of construction projects are indeed a universal phenomenon. They are also most always accompanied by cost and time overruns. Construction project delays further have a

debilitating effect on all parties (owner, contractor, and consultant). It is therefore correctly deduced that factors affecting construction project completion is a study of interest to all parties. This in agreement with Ahmed et al. (2002) observation that project delays have been a topic of concern in the construction industry. Gabel (2006) refers to the WSDOT formula for CRA and CEVP with the quip ....for the price we said and when we said... to emphasize this aspect of delivering construction projects on time and within the budget. He therefore narrates the guiding questions of how much will it cost. How long will it take? To identify the two key questions in the mind of every owner as he thinks of investing in a construction project. The two follow up questions are why does it cost that much and why does it take that long? Indeed remaining on this topic Bruce Carnes is quoted as saying “we have perhaps too often, taken a best case scenario and then committed on delivering on it, when in order to deliver on it. We have to have seven or eight miracles to occur. We’re going to be a lot more deliberate and a lot more careful about what we say we can do, at what cost and when we can do it”. This captures the interest in having projects delivery within schedule, budget and scope.

Chai and Yusof (2013) in a study carried out on reclassifying housing delivery delay in Malaysia state that “time is essence” and “time is revenue” this being a way of capturing the relationship between project delay to revenue loss. They further state that to complete the construction projects on time and within schedule is as essential benchmark for proprietor and executors as well as house buyers. They conclude then that the sources of delay should be promotes in order to analyse and classifying so that a more approachable manner is expected. In a similar vein, Sambasivan and Soon (2006) cite Assaf and Al-Hejji (2006) as saying that in Saudi Arabia 30% of construction projects are completed within the scheduled completion dates and that the average overrun was between 10% and 30%. A similar conclusion was arrived at by Chan and Kumaraswamy (1997) in a study carried out in Hong Kong concluding that timely delivery of projects within budget and to the level of quality standard specified by the client is an index of successful project delivery. This seems to be a conclusion of many studies. They further observe that failure to achieve targeted time, budgeted cost and specified quality result in various unexpected negative effects on the projects. It is further observed that normally when the projects are delayed, they are either extended or accelerated and therefore incur additional cost.

Hussin and Omran (2011) in a study carried out in Malaysia observe that a major criticism facing the construction industry is the growing rate of delay in project delivery. He identifies the

conventional approach to managing the extra cost as to include the percentage of project cost as contingency in the pre-contract budget. In India, in a study about success factors for construction projects, Tabishil and Jha (2011) state that performance of Indian construction projects has not been very encouraging owing to time and cost overruns. They state that time and cost overruns have been a major problem affecting the public sector projects. Their conclusion also agrees with another conclusion by Ramanathan, Narayanan and Idrus (2012) that in their study carried out in Malaysia to examine 41 studies carried out around the world on construction delays conclude that there is an increase in the number of construction projects experiencing delays leading to exceeding the initial time and cost budget. Odeh and Betaineh (2002) as cited by Ramanathan et al state that to the dislike of owners, contractors and consultants, many government projects experience extensive delays and therefore exceed the initial cost and time estimates. They further aver that this problem is more evident in the traditional type of contracts in which the contract is awarded to the lowest bidder.

Ayudhya (2011) in a study carried out in Singapore observes that the characteristic of the construction industries is uncertainties unpredictability and susceptible to understandings leading to delays. He further observes that delays on constructions can affect the overall projects participants adversely.

In Africa, delays in construction projects delivery is also a common reality Odeyinka and Yusif, (1997) as cited by Hussin and Omran (2011) state that in Nigeria, seven out of ten projects surveyed suffered delays in their execution. Also cited by the same authors is Akinsola (1996) as observing that in Nigeria 5-10% of construction pre-contract cost is based on contingency. This has been found inadequate which means extra financial commitments occasionally beyond the capacity of the owner. Clients are sometimes not prepared for this and so fund in terms of loans are sought to offset this additional costs. In a study carried out to examine construction projects performance in Sudan, Omran, Abdalrahman and Pakir (2012) observe that despite large number of reported cases, construction ranging from the simplest to more complex projects platforms have increasingly experienced cost overruns. This phenomenon is also similarly observed in Ghana where Gaba (2013) observes that studies reveal increase in cost overruns, delayed completion, unsatisfactory and unmet project objectives in most construction projects. While investigating the subject of project delays in South Africa, Olatunji (2010) observes that it is a phenomenon that can be attributed to the inability of the client/his representative and the

project team to have a comprehensive view of the construction project from inception to completion. Aibinu and Jagboro (2002) state that construction delay has become endemic in Nigeria. They therefore advance the need to create awareness of the extent to which delays can adversely affect project delivery. Delay they found out had significant impact on completion cost and time of 61 building projects studied.

In Kenya, building and construction industry has been robust (Kenya facts and Figures, Kenya National Bureau of Statistics, 2012). Foreign investors have shown a lot of keenness to have a stake in Kenya considered a business hub in east and central Africa and a center from which they can operate with in Africa. As a result of this, Nairobi and its environs has witnessed a boom in construction projects. These projects are government, private individuals, private companies and international businesses and institutions sanctioned.

Building and construction is quite central to creating numerous employment opportunities which would help in reducing the unemployment levels which are a problem in many countries Kenya included. Many of the projects are labour intensive and thus very many of otherwise unemployed people of the working age are employed in this industry. Indeed there is a statistical evidence of this growth with figures indicating an upward trend as noted in Figure 1. In Nairobi many projects fail to be completed in time causing cost overruns and at times complete abandonment. This can be seen in various number of building projects which stand unfinished. Even more are those projects that are in the end finished but at an inflated budget and at a date later than agreed in the project schedule. This research study therefore investigates the various factors that influence completion of construction projects in Nairobi and its environs.

It is identified that when a construction project is not completed in time, the cost increases, there is denial of use to the developer and at times the projects are completely abandoned.

**Table 1.1**

**Construction trend in Kenya's construction industry 2008-2011**

<b>Year</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>Kshs (millions)</b>	<b>223175.9</b>	<b>265755.5</b>	<b>288937.8</b>	<b>319361.8</b>

**Note. From (Kenya facts and Figures; Kenya National Bureau of Statistics, 2012)**

**1.2 Statement of the Problem**

The entire cycle in a construction project begins with identifying the project which is meant to meet a need identified. This is followed by project planning, project design, implementation, project closure and project handover. When the investor plans to develop he engages consultants to help design a project. These consultants will include Architects, Quantity Surveyors, Engineers, sociological and environmental experts. The list will change depending on the project to be undertaken. Bennett and Gordon (1990) State that the design should ensure that design features factor in site constraints, construction speed, labour availability and competitive prices. When the design is put out it largely defines the project scope. Project implementation varies among various options. A project could be implemented as a public private partnership (PPP), Design Built Finance Operate (DBFO), Built Operate Transfer (BOT) or leasing type projects.

In all the implementation options, various factors will play out to determine if the project will be implemented successfully. It is however established that investors have an interest in project being completed in a timely way and according to the budget and that it will meet quality expectations. A recent and rapid development of privately financed projects demanding contract terms ensuring increased certainty of price, time and performance this is observed by FIDIC Conditions of contract for EPC/Turnkey Projects (1999). When the project is not completed according to the initial time plan, a delay occurs. A delay is a situation whereby an act or event that extends the time required to perform the tasks under the contract Sambasivan (2007). It is the postponement of time from the original estimated completion time which might be caused by the contractor, owner or consultant as well as external factors Koushki and Kartam (2004). The major impact of delays is increase in project cost, which causes the drain in project contingency fund. Chism and Armstrong (2010) state that in construction time is money. If the contractor



exhausts the contingency and is unable to make profit in the project, he may abandon the project and allow the client to attach the performance security. This will in turn cause major losses in multiple fronts from the client. This scenario will include uncontrollable other variations, disputes, bludgeoning project budget claims and often a painful end to the client whose dream may end up in abandonment.

The need for successful implementation arises from the desire for the project to start serving its intended use and thus recouping the investment ploughed in. In the event that this is not realised, various outcomes play into such a reality. For instance cost of implementation will escalate and capital will remain tied in such a project unutilised until it is completed. Project sponsors claim it will be a conservative estimate to state that approximately 50% of construction projects experience time overruns and approximately 63% of all information systems encounter substantial budget overruns with the value of overruns “typically between 40-200%.” Most projects are eventually completed more or less to specification, although they are seldom on time and within budget (Olatunji, 2010).

Thus clearly there are factors which play into account to affect completion of construction projects. This is because it is a global phenomenon that construction projects have not enjoyed a smooth implementation all the way to completion. On the contrary many projects have been affected by various challenges greatly affecting their completion. It is a major concern for every stakeholder in a project to understand these factors. This research study therefore looks at the factors that will affect completion of construction projects that the stakeholders will need to address. It is hoped that in addressing these factors, the success in completion of construction projects will greatly be enhanced.

### **1.3 Purpose of the study**

The study sought to investigate factors affecting completion of construction projects within Nairobi County and its environs.

### **1.4 Objectives**

The objectives of the study were:-

- i. To determine how construction contract duration influences completion of construction projects in Nairobi ,

- ii. To investigate how project financing influences completion of construction projects in Nairobi,
- iii. To examine how planning influences completion of small construction projects in Nairobi.
- iv. To find out how supervision of work influences completion of construction project in Nairobi.
- v. To assess how the type of project delivery chosen influences completion of construction projects in Nairobi.

### **1.5 Research questions**

The research questions of the study were:-

- i. How does construction contract duration influence completion of construction projects in Nairobi?
- ii. How does project financing influence completion of construction projects in Nairobi?
- iii. How does planning influence completion of construction projects in Nairobi?
- iv. How does supervision of work influence completion of construction projects in Nairobi?
- v. How does the type of project delivery method chosen influence project completion of construction projects in Nairobi?

### **1.6 Significance of the study**

This study may help construction professionals increase the success of construction projects completion by managing well the factors that will help their successful completion. The architects, engineers, quantity surveyors, construction project managers and site agents may benefit from this study by applying the results of its findings while carrying out construction projects.

Project developers/clients may also benefit from the findings of this study and therefore achieve greater success in their construction projects. This is because they may apply the findings of this study in ensuring the risk factors that may cause their projects not be delivered successfully are mitigated.

### **1.7 Limitation of the study**

This study faced the challenge of time which was a constraint. The study also faced the challenge of inadequate budget. The unavailability of budget also negatively affected the study.

### **1.8 Delimitation of the study**

This study targeted construction project carried out within the Nairobi County a radius of sixty kilometers. Nairobi being the Kenya's capital and the engine of the economy. It also boasts many construction projects which are as a result of a growing middle class. The sample population targeted included architects, structural engineers, civil engineers, construction project managers, mechanical engineers, electrical engineers, quantity surveyors, land surveyors and developers.

### **1.9 Assumptions**

The study assumed that the respondents would be available; they would also be prepared to respond to the research questionnaires. It is also assumed that the respondents will be honest and faithful while responding to questions in the research questionnaire.

### **1.10 Definition of the significant terms used in the study**

**Contract duration-** This refers to the time agreed by the drafters of the contract in order to complete the terms of the contract. The contract duration was captured in the project schedule

**Project planning-** this involves, looking ahead and developing objectives, programs, schedules, budget and procedure that help in delivering construction project

**Construction project completion-**this refers to successful carrying out of a construction project as per the time agreed to in the contract agreement and as captured by the project schedule, within the budget and design scope.

**Project delivery method-** this refers to the type of carrying out a project that the client chose to use in order to have the construction project carried out from planning, implementation and handover.

**Supervision of work-** this refers to the actions taken by the project team leadership in ensuring that the project is carried out as per the specification. The aim is to ensure that the construction project plan is successfully implemented and any difficulties experienced during implementation are appropriately addressed.

**Project financing-** this refers to the ways that a client provides the funds that cater for the cost of design, planning, labour and approvals required to ensure the construction project is successfully carried out.

### **1.11 Organisation of the study**

This study was organized into five chapters. The chapters are divided into chapter one which has the background of the study, purpose of the study, research objectives and research questions. As a general introductory chapter to the research study, chapter one also outlines the significance of the study, scope of the study and delimitation of the study, limitation, assumptions and definition of significant terms in the study. In chapter two we reviewed the literature which is related to the research study. Chapter three outlined the research methodology. The chapter includes the research design, target population, sample size and sampling procedure. Also presented in chapter three is the data collection instruments, data collection and analysis procedures.

Chapter four contains data analysis, presentation and interpretations. The findings are also discussed. Chapter five has the summary of the findings, discussions, conclusions and recommendations for action based on the study findings.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter discusses the literature related to the study. The chapter majors on the discussion of the research objectives as outlined and as researched by other scholars. The review also looked at the other factors identified by different scholars as affecting construction project completion. The conceptual framework is presented here as well as the identified research gaps during literature review.

#### 2.2 Construction contract duration and completion of construction projects

Usually the client will enter into a contract agreement with a second party. The legally binding agreement has terms stipulated to ensure that the second party will provide the delivery of the construction project that the client desires to see completed. The construction contract agreement clearly stipulates contract duration (in the project schedule), it also defines the scope of project to be delivered (in the design drawings and specifications) and it also includes the project cost (in the Bills of Quantities). McNair (2011) states that key clauses in any construction contract are those that touch on time, cost and quality. Thornton (1988) advances the hypothesis that there exists an optimum contract duration for which the owner receives an optimum price. He further avers that if the facility is desired in less than optimum duration, the owner pays a premium for acceleration. If the owner allows the contractor more than the optimum duration, he pays additional costs for the facility in terms of lost revenue, denial of use of the facility, and possibly additional costs to the contractor. McMinimee et al., (2009) identifies the use of innovative contracting practices as a good practice leading to successful project delivery. Construction contract duration is a key determinant as to whether the project will be delivered in a successful manner or it will not. Soon and Sambasivan (2006) state that the problem of delays in the construction industry is a global phenomenon. More specifically, in a study carried out in the Saudi Arabian construction industry Assaf and Al-Hejji (2006) as cited by Soon and Sambasivan (2006) state that a paltry 30% of construction projects were completed within the scheduled dates with a time overruns of between 10% to 30%.

The importance of the subject of delay in construction projects comes up because it throws in the crucial element of quality in construction projects as has been observed by many scholars. This is

because among the many facets of quality of a product or service from the customers view is satisfaction to his expectations. When a project delays in its delivery then the customers' expectations are not obviously met in terms of construction cost. Contract duration therefore places time expectation for the clients on when they can enjoy the benefits of the construction project. Studies conclude that partial admission to the reality of possible contract delay because of very many unforeseen factors is always acknowledged in the contract agreement where some delays are permitted to the contractor on notice. Beyond these delays however any further contract delay is considered in-excusable.

In many contracts the contractor will be required to give a notice of an anticipated contract delay within the specified dates (Ahmed, Azhar, Castillo and Kapagantulla, 2002). The authors also observe that minor delays are always overlooked until their cumulative effects become financially apparent. In Kuwait a study by Koushki, Al-Rashid and Kartam (2005) on construction contract delays showed that 64% of owners had established penalties for any contract delay. Ayudhya (2011) in a study cites Chalabi and Camp (1984) stating that contractual disagreement caused both delay and cost overruns. Another study by Bromilow, (1974) found that only one-eighth of building contracts were completed within the scheduled completion dates and that the average time overruns exceeded 40%. Ayudhya in 2011 continues to state that contract disagreements may lead to both delay and cost overruns in early stages of construction. Cost overruns due to delay in contract duration can run into a considerable percentage of the contract value. Fixed price contracts are used to transfer the risk of cost overruns to the contractor while fixed time contracts ensure that the contractor incurs daily liquidated damages if the project delays. (McNair 2011). Dadzie, Abdul-Aziz and Kwame (2012) aver that it is an open secret that many projects often delay and most of the contract figures at the beginning of the project turns up to swell more than double the original tender figure due to variation.

### **2.3 Construction project financing and construction project completion**

Finnerty (1996) defines project financing as raising of funds to finance an economically separable capital investment project which the providers of funds look primarily to the cash flow from the project as the source of funds to service their loans and provide the returns of equity invested in the project. Nevitt and Fabozzi (2000) as cited by Matese (2013) define project financing as financing a particular economic unit in which a lender is satisfied to look initially to the cash flow and earnings of that economic unit as the source of funds from which a loan will be repaid

and to the assets of the economic unit as the collateral for the loan. Financing of construction projects is therefore expected to be an economic investment. In an economy of a country, construction industry helps in creating wealth and employment opportunities Olatunji (2010). It helps build and or expand infrastructure that facilitates the service industry. This way it can spur economic growth across the board. Further in a development of any country, the construction industry plays vital roles in transforming the aspirations and the needs of its people into reality by implementing various physical structures Ahmed (2002). As such government agencies prioritise investments in construction projects.

Two aspects key to every construction contract are time and money. With each item, the essence of a construction contract can be defined. For a specified sum of money, a contractor will be required to perform within the specified period of time Thornton (1988). When every investor ventures in a construction project therefore they invest money within a specified time and expect the investment to repay itself. As such timely completion of the project ensures the cost incurred to be the necessary project cost. Any delay leads to cost overruns which raise the project cost. Indeed Hussin and Omran (2012) states that 70% of the projects abandoned in Malaysian housing construction projects was due to financial problems of developers. Sambasivan and Soon (2007) are in agreement with this conclusion as they state that clients' financial position affects project timely completion. In government projects they continue payments take longer time and this also affects the project timely completion negatively.

It is not quite easy to understand the entire construction process from inception to completion. This is because even for the most experienced professional hand, there will always be uncertainties posed by the environment, soil conditions, climate, political situation and even the economic situation. This uncertainty due to various factors raises an element of risk in construction project management. A good risk management strategy will then need to be put in place and properly implemented for a timely project implementation. This in the end should retain financial viability of the project as an investment. The overall lack of finance to complete a project, or delays in the payment of the services by the project owners or clients can lead to significant problems Hussin and Omran (2012).

There are enough cases of project failure to meet project timely completion in the construction projects. It has been contented that the diverse and multifaceted natures of construction projects make it "difficult to plan for, forecast, manage and control" Smith, Jaggar (2007). As a

construction project is an investment that should in the end make economic sense, there is therefore the need for the construction professionals to offer tangible solutions in terms of overcoming construction delays. Projects are strategic activities “initiated to create economic value and competitive advantage” Shenhar et al. (2002). Key to financing projects is sustainability. The traditional forms of financing projects have been equity and debt. However in the recent past innovative ways of financing projects have come up and these include special project vehicle, venture capital etc. construction projects are also funded by multilateral bodies and foreign aid. Contributions to the delay emanating from the owner can include late release of funds. If the owner does not pay the services of the contractor in time, then the project implementation may greatly be affected by contractors’ poor cash flow. This will affect the contractors’ ability to ensure sustained supply of the construction materials. Clearly therefore, owners financial position will greatly affect project finance flows and which will influence construction project completion. Olatunji (2010) identifies project finance as one of the constraints or circumstances/situations which outside the immediate control of parties to the contract agreement but still affect the smooth flow of scheduled activities. Many observers agree that if payment by project owner is slow, the contractor may begin to commit fewer resources to a project, and may even ease work if cash flows become a problem.

#### **2.4 Construction project planning and completion of construction projects**

Construction project generally takes various stages. The first stage is usually project initiation where the project is identified and a feasibility study carried out to establish the viability and build a business case. The second stage is the project planning stage and in here the project design is carried out, resources and finances allocated. Project execution which is the third phase involves implementing the designs within the allocated resources in the set duration and to the set specification and quality.

Project closure involves handing over the final product to the customer, handing over the as-is-built drawings, giving the operation and maintenance plan, terminating the contracts and informing all stakeholders that the project is closed. If project completion date has been frozen without arranging inputs and proper planning, this can lead to hasty and unsystematic work towards the end of the project (K.N. JHA et al., 2006). Failure to clearly comprehend the project, all its aspects can lead to works being executed erroneously and the attendant correctional steps to remedy the errors will cause project delay. The consequences are actually



grave, ranging from litigation to claims and disputes, to outright abandonment of the project (Olatunji, 2010).

When a project delay can no longer be absorbed by the client, the project is abandoned. It helps then to predict and identify problems in the early stages of construction (Hussin and Omran, 2011). Planning stage is therefore very key to success of construction project. “Delivery of materials on site will quite affect the project progress. If that supply does not ensure that quality materials are delivered on site then it will cause delay of project completion” (Wambugu D.M., 2013). This is because material not meeting the quality of design will most likely be rejected and the process of getting the right material will be taking more project implementation time.

When materials are lacking on site it means that the employees will not have work to do. This is quite demoralizing and will affect the project delivery negatively. This is largely a product of poor planning in the construction project. Indeed material availability is the most frequent problem that leads to delay in majority of the countries as identified by Olatunji (2010). Second to this is inadequate planning methods and ineffective coordination of resources. Failure at the conceptual planning and design stages may lead to significant problems in the successive stages of the project. Koushki et al., (2005) in a study carried in Kuwaiti illustrates that owners who carried out pre-planning phase prior to the commencement of the planning phase experienced shorter time delays than their counterparts who did not. The amount of time delay also increased with an increase in pre-planning time period.

Sambasivan and Soon (2007) identify contractors improper planning as one of the causes of project delay. If a contractor fails to come up with a workable work program at the initial stages, this will affect project timely completion. A similar observation is made by Jagboro and Aibinu, (2002) in Nigeria. Equally emphasizing on the need for proper planning of construction project is Pakir et. al, (2012) in a study carried out in Sudan. McMinimee et. al., in (2009) stated that it was clear that investments in advance planning and project development paid off. Mojahed (2005) states that proper planning in all phases and components of construction project are necessary to avoid re work which in turn leads to delay in project completion.

Wideman (2001) concludes that the success of the execution phase of the project is highly depended upon the quality of planning in the prior planning phase. Wambugu, (2013) observes that planning affected the timely completion of rural electrification projects in Kenya and that the

quality and importance of project planning had been considered a major cornerstone of every successful project. Tabishl and Jha, (2011) in a study carried out in Singapore conclude that comprehensive site investigation helps in sound planning which in turn helps in clarifying the scope and developing a thorough understanding. This also helps minimize change of scope during construction. Chan (1996) as quoted by Pakir et al., (2012) state that accurate construction planning is a key determinant in ensuring the delivery of the project on schedule and within budget.

## **2.5 Supervision of work and completion of construction projects**

“The competence of the project manager during project implementation will also affect the timely completion of a project. Positive attitude of project manager and project participants has emerged to be the most important success attribute for quality compliances at project sites” JHA and IYER, (2006). The authors additionally observed that some of the attributes are with high importance are all related to the project manager. For example effective monitoring and feedback by the project manager, project managers technical capability, leadership quality of the project manager, effective monitoring and feedback by the project team members. Authority to take day to day decisions by the project managers’ team at site. “Furthermore, the success of project hinges on the efficacy of the project team in managing the process”. (Olatunji, 2010). This indicates adequate capacity of the project manager as well as the project team to ensure proper inspection and investigation of work done on site.

“A weak link in the process such as a lack of project management experience, could adversely affect timely execution/ timely completion of the projects” Dainty et al. (2003) as cited by Olatunji (2010). When there is no proper inspection/supervision, quality control is greatly compromised. Chism and Armstrong, (2010) agree by stating that inspection and workmanship standards are quite important to achieve quality. Fapohunda and Stephenson, (2010) state that to achieve the pre-determined project objectives, the construction site manager should have a significant influence over cost, time, scope and quality which make it paramount for the manager to have ability of exercising authoritative and absolute control.

Wambugu, (2013) concluded in a study that inadequate supervision and inspection of work in construction project led to rework in instances of poor workmanship and this led to delay in project timely completion. This also leads to project cost overrun and may result to project abandonment. Inadequate site inspection is one of the factors identified as causing project delays

in timely completions according to Jagboro and Aibinu, (2002). Mojahed in study carried out in 2005 states that occasions of rework are mainly attributed to incompetent craftsmen because of insufficient working skills and knowledge of drawings or to incompetent supervisors because of lack of experience leading to deficient supervision. The study clearly emphasized the impact of management and supervision on the overall success of the construction project. If there is no proper supervision, workers will tend to take break whenever they desire and work will tend to delay. Timely inspection is of great importance to ensure effective operation, material quality, and timely progress of the project schedule. Subsequent activities on a construction schedule may not be carried out before the required inspection is carried out on the preceding activities. Chai and Yusof, (2013) identify poor site management and supervision as ranking high in the order of causes of construction project delay.

## **2.6 Project delivery systems and completion of construction projects**

Project delivery system will also affect project timely completion or not. “Project delivery system refers to the various processes required in materialising the goals and objective of a client into a project through integrated project team efforts” Chen et al. (2011) the same authors also state that the project delivery system acts as a management function of the owner in project execution. It is quite important that the right choice on the project delivery system is made. “The decision made in the selection of the project delivery system for a project impacts all phases of execution of the project and greatly impacts the efficiency of project execution” (Oyetunji and Anderson, 2006). The choice of the project delivery system largely depends on the funding available.

A funding agency will most likely determine the project delivery system that will be able to guarantee the cost control and in the end the project control. This choice is based on past practices, traditions and experiences, advice of consultants, funding sources and constraints. Other project stakeholders’ views will also be factored. A choice will then be made between design bid build DBB, design build DB, contract management CM, construction management at risk CMAR, engineering procurement construction EPC, integrated project deliver IPD.

If the project lies within the owners’ skills, experience and resources then the owner may identify owner provided delivery method. This will most likely occur in projects that are not as complex and involving small internal renovations of an existing facility or works of repetitive nature like minor facility improvements.

However in a case where the owner needs professional design services and construction services, design bid build may be the preferred option. DBB gives the owner a high degree of control. The owner can also closely monitor projects. It is also applicable if the owners are public owners and must account in detail for expenditures.

In DBB, the owner defines project goals and objectives, secures the financing and specifies the standards and contract terms.

Construction management option involves getting the services of the construction manager to manage a construction project. The construction manager will be concerned with the general planning and control of resources in the project. The manager uses procedures that will guide on how best the resources will be best used during the construction process with the aim of achieving timely and efficient application in the construction process. Wambugu, (2013) avers that a construction manager will generally be trained in the management of construction processes.

Yet another project delivery system is the design build (DB). In this type the owner contracts a single entity to provide the design and implement the design. This system enables the owner to deal with a single contact and so eliminate the various conflicts that occur when a team of consultants in design team on one hand differ with the contractor on the other hand.

In DB the design builder makes many of the decisions that the owner would otherwise be required to make in DBB. There is therefore a quite delegated authority by the owner. There are variations in the type of design build arrangements. They may be lease develop operate where the owner gives the operator a long term lease to develop, operate and then revert to the owner. Public private partnership is another arrangement for project implementation where a public sector authority enters into a contract with a private party. The private party provides a public service or project and assumes a substantial financial, technical and operational risk in the project. In a typical case a private sector consortium forms a special company vehicle called “a special purpose vehicle” (SPV) to develop, maintain and operate the asset in the contracted period. The PSV then signs the contract with the public entity and then signs a contract with sub contractors to construct the project and then maintain it.

Turnkey contracts or engineer procure construct projects. In these contracts, the owner prepares the principle and basic design of the construction on a functional basis (FIDIC, 1999). The owner

exercises limited control over and should in general not interfere with the contractors work. A feature of this type of contract is that the contractor has to prove the reliability of the project after completion at the turn of the key. (FIDIC, 1999)

**Table 2.1**

**Forms of project delivery systems illustrated. Source European commission (2003), IMF (2004)**

Type of Project Delivery System	Description
Service contracts	The private party procures, operates and maintains an asset for a short period of time. The public sector bears financial and management risks
Operation and management contracts	The private sector operates and manages a publicly owned asset. Revenues to the private party are linked to performance targets. The public body bears financial and investment risk.
Leasing-type contracts <ul style="list-style-type: none"> <li>• Buy-build-operate(BBO)</li> <li>• Lease-develop-operate</li> <li>• Wrap-around-addition</li> </ul>	The private sector buys or leases an existing asset, from the government, moderates, renovates, and/or expands or modernizes it. And then operates the asset. Again with no obligation to transfer ownership back to the government.
Build-operate-transfer (BOT) <ul style="list-style-type: none"> <li>• Build-own-operate-transfer (BOOT)</li> <li>• Build-rent-own-transfer (BROT)</li> <li>• Build-lease-operate-transfer (BLOT)</li> <li>• Build-transfer-operate (BTO)</li> </ul>	The private sector designs and builds an asset, operates it and then transfers it to the government when the operating contract ends, or at some other pre-specified time. The private partner may subsequently rent or lease the asset from the government.
Design-built-finance-operate (DBFO) <ul style="list-style-type: none"> <li>• Build-own-operate (BOO)</li> <li>• Build-develop-operate (BDO)</li> <li>• Design-construct-manage-finance (DCMF)</li> </ul>	The private sector designs, builds, owns, develops, operates and manages an asset with no obligation to transfer ownership to the government.

## **2.7 Other factors influencing construction project completion**

Various other factors were identified during the course of literature review; these include proper management of construction tasks, prompt execution of duties and responsibilities of every stakeholder, proper workable designs, proper project management which will be able to navigate

the project well. The type of project in terms of size will greatly impact on the time it will take to complete it. A small project will likely take shorter construction time and will most likely not present so many unknowns which will if uncovered cause project delays. A big project involves many tasks of complex nature and as such will likely cause delay in the originally set project duration. When the tasks that lie in the critical path face any delay.

A small construction project will either be a new project or a renovation to an existing property. A new project will involve constructing where no other construction stood. While existing structures like say a building can be identified for renovation. The renovation details define the scope of the project. Such a project will face difficulties if for example it is a building in use. It will mean dealing with occupants in such a way as to cause minimum and necessary disturbance. If it is a road that is being renovated, it will still have to be done while the road users are still enjoying the use. This will mean the project may not move as fast.

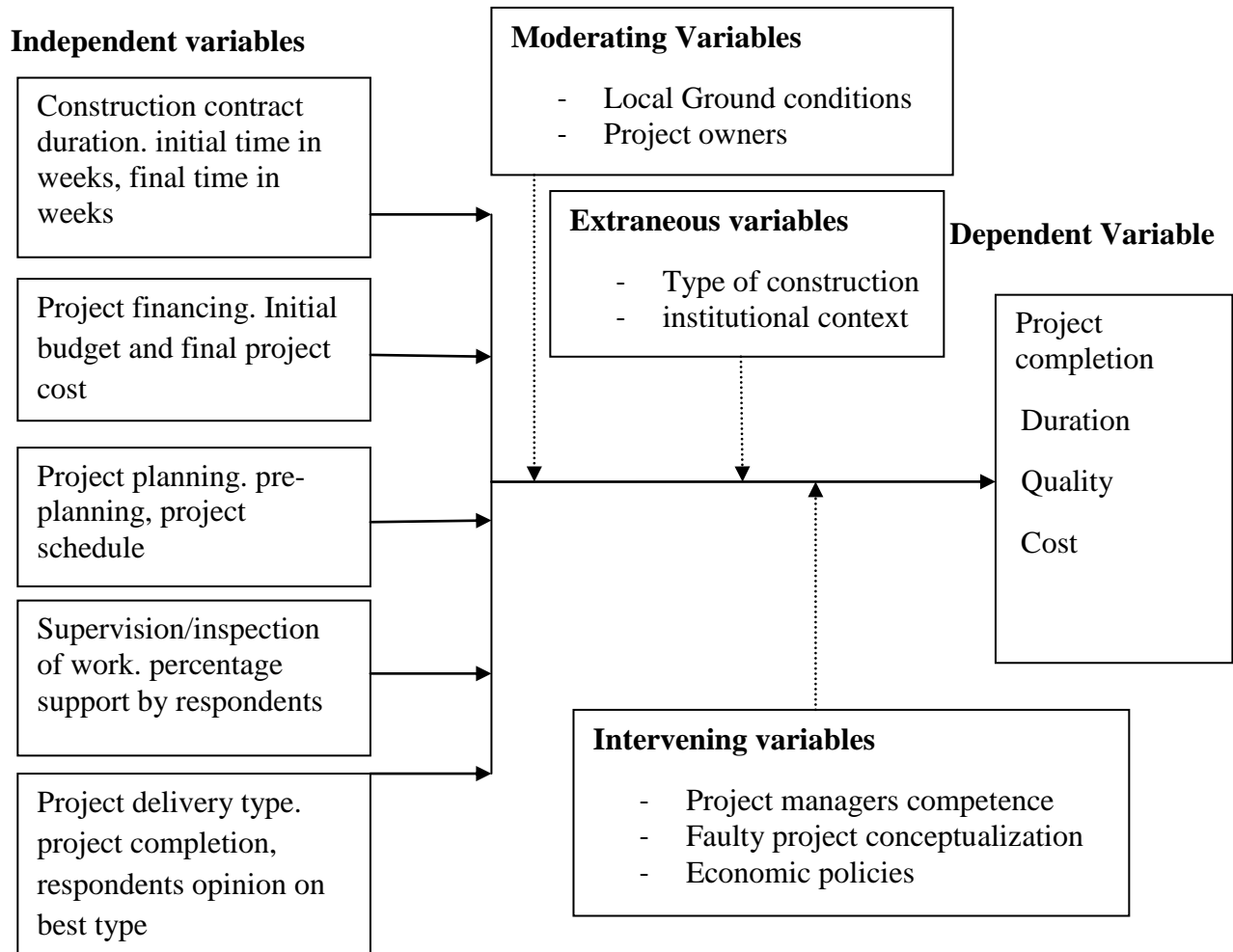
The nature of the project in terms of its execution will also affect the project duration. When a project is a construction of a high rise building, it poses challenges because of the fact that working on higher floors will mean more planning on how to get the materials up and down. The same construction of building on the ground will not be as involving in planning. This will be true even for the same floor area.

The owners' contribution to the project will also have a potential to cause project delay in timely completion. Contributions to the delay emanating from the owner can include late decision making, late release of funds and late change of scope. The owners understanding of the project constraints, ability to effectively brief the design team, ability to contribute ideas to the design and construction processes and finally the ability to make authoritative decisions quickly and the stability of these decisions Lim and Ling, (2002) as cited by Olatunji (2010).

Lack of constructability reviews and designs. It will be important to set design reviews where the stakeholders are made to understand the aspects of the design. During these reviews, the constructability of the designs, the alignment of the designs with the owners' needs and the understanding of the likely risks can be identified and dealt with accordingly. If these reviews are not done, then the timely completion of construction projects may greatly be affected.

## 2.8 Conceptual framework

The study was guided by conceptual framework



**Figure 2 conceptual framework**

## 2.9 Explanation of relationships of variables in conceptual framework

The conceptual framework helped to illustrate the causal relationships between the independent variable and the dependent variable. The concepts that helped develop the objectives of the study are clearly broken down. Figure 2 shows the relationship between the independent variables which are the project delivery system identified, supervision/inspection of work, planning of the project before the start of actual implementation and project financing. Their relationship with the effect they have on the dependent variable which is construction project completion.

There were other variables identified during the study and these are project managers' competence, faulty project conceptualization and economic policies which are intervening variables. Local ground conditions and project owners were identified as moderating variables

while the type of construction and the institutional context that the project is being carried out were identified as the extraneous variables.

The research was guided by the objectives as identified and defined by the continuous arrows in the conceptual framework. These objectives formed the independent variables whose impact in the dependent variable was investigated. Other variables were identified for the purposes of retaining a global picture and acknowledgment of research done by other scholars but were not the basis of investigation of the study. They are captured by broken lines in the conceptual framework.

### **2.10 Research gaps**

The reviewed literature revealed various studies in different parts of the world that have largely touched on factors relating to project delivery in terms of quality, the most important factors determining project performance in (Sudan 2012), impact of project delivery systems, cost minimization and project control on construction project success (Ghana 2013), project cost prediction model (Nigeria 2010), managing the project environment (Canada 1995), critical factors affecting quality products in construction projects (India 2006), construction contracts duration (USA 1988). Further, determinant of successful completion of rural electrification projects in Kenya (Kenya 2013) and influences on construction delivery time (South Africa 2010). These studies have been carried out and published.

However there is no literature available on the factors influencing completion of construction projects in Nairobi County. This study therefore aimed to establish (i) whether construction projects in Nairobi County are completed in a successful way (ii) the actual factors influencing completion of construction projects in Nairobi County.

### **2.11 Summary of the Chapter**

Chapter two discusses the literature relevant to the objectives of the study. Contract duration, construction project financing, supervision/inspection of construction projects during implementation, construction projects planning and the type of project delivery method applicable to construction project implementers. These are discussed in detail and how they influence construction project completion which is the dependent variable.



This is also captured in the conceptual framework which is a tabulated relationship between the independent variables and dependent variable. Finally the research gaps are also identified in this chapter

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter gives the details of the research approach. The research design is explained and illustrated. The target population is described as well as data collection instruments. Also included in the chapter is data collection procedures, methods of data analysis, operationalisation of variables and ethical issues observed in the research.

#### **3.2 Research design**

This study employed descriptive and correlative research design. For the intent of seeking new knowledge, it is an explorative design (Olatunji, 2010). It is also correlative because it sought to establish a relationship between independent variables and the dependent variable. Their implication for cause and effect were also investigated. Further the study doesn't in any way intent to alter the theses and the phenomena but merely discover and explain the relationship. It is descriptive for it aims as its result of data analysis the description of the relationship between the dependent and independent variables. The descriptive research involved gathering data and systematically treating it to present a comprehensive and intelligible inference. (Saleemi, 1997). The author further describes the entire process as including organization of data, presentation, analysis and interpreting it after collection. A descriptive design sought to give a causal relationship between construction project completion which was the dependent variable and the independent variables being construction contract duration, project financing, poor inspection/supervision, poor planning of construction project and the type of project delivery system chosen for the construction project.

#### **3.3 Target population**

The target population in this study was practitioners in construction industry. These include Architects, Quantity Surveyors, Civil Engineers, Structural Engineers, Mechanical Engineers, Electrical Engineers, Construction Project Managers and Land Surveyors. Developers also formed part of the population. The sample size was 77. The main aim of choosing this type of population was to be able to get current and past information from people who have participated in the implementation of construction projects and thus experienced the implementation challenges that the projects face.

### 3.4 Sample size and sampling procedures

This section deals with the scientific process used to arrive at the sample size. It also applies the researchers' interpretation of the theory and its applicability in the realisation of the data information required for the study.

#### 3.4.1 Sample size

The sample population was chosen within the delimitation of the study which is within the Nairobi county and its environs. According to Leedy et. al., (2005) as cited by Olatunji, (2010) researchers should endeavor to maximize the sample size. The following guidelines for selecting the sample size are suggested.

- Survey the entire population for a population of less than 100 people or units
- Sample 50% of the population if the entire population is 500
- For a population of about 1500 sample 20%
- Beyond a population of say 5000 and more, the population size is almost irrelevant and a sample size of 400 should be adequate.

Krejcie and Morgan, (1970) suggested a formula for arriving at the sample size which is as follows.

$$S = \frac{X^2 NP (1-P)}{d^2 (N-P) + X^2 P (1-P)}$$

In this formula S is the required sample size,  $X^2$  is the table value of Chi-square for 1 degree of freedom for confidence level of 3.841, N is the population size, P is the population proportion assumed to be .50 which gives the maximum sample size, d is the degree of accuracy expressed and it is chosen to be .05 in this case.

The target population is Architects who are registered 1308, QS who are registered 687, Civil Engineers, Electrical Engineers, Mechanical Engineers who are registered 6330. Registered land surveyors 206 but only 85 were practicing. The data for property developers and registered construction managers was not available.

**Table 3.1****Sample size and sample frame**

<b>Professional group</b>	<b>Registered Number</b>	<b>Registering body</b>	<b>Number Practicing in Nairobi County</b>	<b>Sample size</b>
<b>Architects</b>	1308	BORAQS/AAK	(.4*1308)/47	11
<b>QS</b>	687	BORAQS	(.4*687)/47	5
<b>Engineers</b>	6330	EBK/IEK	(.4*6330)/47	53
<b>Land surveyors</b>	206	ISK	(.6*85)/47	1
<b>Property developers</b>	-	-	-	5
<b>Construction project managers</b>	-	BORAQS/ICPMK	-	2
<b>Total</b>				<b>77</b>

Using the Krejcie and Morgan formula as applied in the table 1 for determining sample size for a known sample population. The following assumptions were made; 523 architects were practicing in the country, 274 QSs, 2532 Engineers, 51 land surveyors about 15 Construction project managers and 100 developers in Nairobi county alone. All these were distributed within the 47 counties and the population arrived at is  $11+5+53+1+100+15=186$

From the table the sample size was 125. Unavailability of data for property developers and registered construction project managers meant the accuracy of the formula by Krejcie and Morgan was highly compromised. Using the best judgment and industry experience the sample size was arrived at as shown in table 3.1. The sample size S was therefore taken as 77.

**3.4.2 Sampling procedure**

Because of the pre-determined sample population and the nature of the study, the sampling methodology used was non-probability. Purposive or judgmental sampling and snow-balling sampling methodologies were therefore applied in this study. The sampling procedure was also

guided by the records available on the registered professionals in the construction industry who formed the population. The identified construction professionals were issued with the questionnaire. When they recommend fellow professionals that the researcher could give more questionnaires they were further requested to fill the research questionnaire.

### **3.5 Data collection instrument**

The instrument of data collection employed was a questionnaire. The questionnaire has section A giving the background information of the respondent. This includes their gender, construction profession they are in and the experience they have in the construction industry. They were also requested to state whether they were in public or private sector. Section B gives project scope details. In this section, project cost details were asked, as well as comparison between initial budgeted cost and the final project cost.

Project duration details were asked in terms of initial time projected versus the final duration of the project. Various factors that determine project timely completion were also listed in a table. The respondents were required to rate their level of importance in terms of influencing project completion. In this section also, all the research questions were asked in a yes or no response format. If the answer is yes the particular aspect about the aspect say poor planning that cause delay in project timely completion was sought from the respondents. Section C of the questionnaire sought the data on previous projects that the respondent had handled. The specific data asked included initial cost and time projections and final/actual time and cost incurred. Also asked was the reason for each project delay. A last question sought the respondents' personal opinion on the single most cause of construction projects not being completed in a successful manner.

#### **3.5.1 Piloting of the instrument**

The researcher personally administered the first 10 questionnaires. This was applied to two architects, Civil Engineer, Structural Engineer, Mechanical Engineer, Electrical Engineer, Quantity Surveyor, Land Surveyor, construction project manager, a developer. This study was carried out in Nairobi. The responses were then assessed to determine whether they provided the actual information as anticipated. The results were then used to improve the research instrument and the responses got used to further define the questions used in order to make sure that the information sought was to be realized using the research instrument. Once the results were received and analysed from these questionnaires, improvement was done, the entire data

collection process was rolled out. One last similar study was applied to 10 respondents by the end of the data collection. These were personally administered by the researcher with the aim of testing the consistency of the findings. These two studies were used to assess the accuracy of the instrument in getting the desired results.

### **3.5.2 Validity of instruments used**

Validity refers to the ability of the instrument to measure what it is designed to measure. Kumar, (2005) as cited by Ndegwa, (2013) defines validity as the degree to which the researcher has measured what he set out to measure. It is the accuracy and meaningfulness of inferences which are based on research results. Validity therefore is whether an instrument is on target in measuring what is expected to measure. To check the validity of the instrument the researcher worked with the supervisor as the expert and agreed whether the instrument was valid or not. The tool was also subjected to peer review to ensure its validity. The instrument was subjected to face validity, content validity test and construct validity test through testing it using the research done in the past.

### **3.5.3 Reliability of the instrument used**

Reliability is a measure of the degree to which a research instrument yields consistent results or data the same way each time it is used under the same condition with the same subjects. If consistent results are obtained by the same participants in the same repeated measurements then the higher the reliability of the measuring procedure. If a research tool is consistent and stable, and hence, predictable and accurate, it is described as reliable. Inter-item reliability test was applied to test the reliability of the research instrument. Multiple items were used to measure a single concept in the questionnaire. This involved a set of related questions which were designed to measure a certain concept being associated with each other.

Cronbach's coefficient  $\alpha$  test was applied to test the reliability. This was applied for each of the five research questions. A cronbach  $\alpha$  value ranging from 0.5 to 0.7 was considered acceptable as indicating internal reliability of the instrument. A score of  $>.7$  was regarded as an adequate proof of internal consistency.

Cronbach's formula

$$\hat{\alpha} = \frac{k}{k-1} \left( 1 - \frac{\sum_{i=1}^k p_i(1-p_i)}{\hat{\sigma}_x^2} \right)$$

Where  $\alpha$  is the cronbach's coefficient,  $k$  is the number of items  $p_i$  is the proportion of respondents answering a research question in a certain way.

Table 3.2 was used to interpret the results of analysis.

**Table 3.2**

**Interpretation of Cronbach's alpha values (Nunally, 1978)**

Values	Reliability
< .5	Poor
.5 to .7	Sufficient
> .7	Good

The results of Cronbach's alpha test as conducted on five questionnaires representing five classes of respondents are shown. The respondents were a Quantity surveyor, a developer, a Land Surveyor, a Construction manager and an Architect.

**$\alpha$  value obtained was  $10 / ((10-1) \times (8.7/2.191^2)) = 0.613$**

The cronbach's value got was 0.613 which means there is sufficient reliability of the instrument used. This means the research instrument has sufficient internal reliability.

**3.6 Data collection procedure**

The researcher acquired a research permit from the National Commission for Science Technology and Innovation. This was then followed by the actual distribution of questionnaires to the respondents. The target population is an educated class with at least college education and so they were able to read and understand questions put out in the questionnaire. The

questionnaire was handed as a hard copy to some respondents. Other respondents were send soft copies over the e-mails. In both cases the respondents had the freedom of filling in the questionnaire and handing it back as hard copy in post office parcel or scanning the filled hard copy and send it through the e-mail.

### **3.7 Data analysis techniques**

This research is quantitative in nature. As such the data gathered was put in a numerical form for the purposes of analysis. As a preliminary to data analysis, all the data was examined and verified for correctness. Section A which dealt with the respondents' information was analysed by using the measurement to allocate numbers to the observations made. Kothari, (2004) as cited by Ndegwa, (2013) defines measurement as the process of assigning numbers to objects or observations, the level of measurement being a functions of the rules under which the numbers are assigned. The descriptive inferences deduced were mean, mode, frequencies. They were used to analyse experience in the industry, the sector involved, the profession involved and the type of the construction the respondent was involved with. For ease of clarity in communication and presentation of results multiple analytical tools were employed. This also aimed to improve on validity of the data. The data about project budget and duration was inferred using correlation to determine whether there was a correlation between the project cost and project time.

In part B which touches on project scope, mean scores for observations made were calculated based on the ordinal scale developed where (1) not important (2) low importance (3) some importance (4) important (5) very important (6) not applicable N/A.

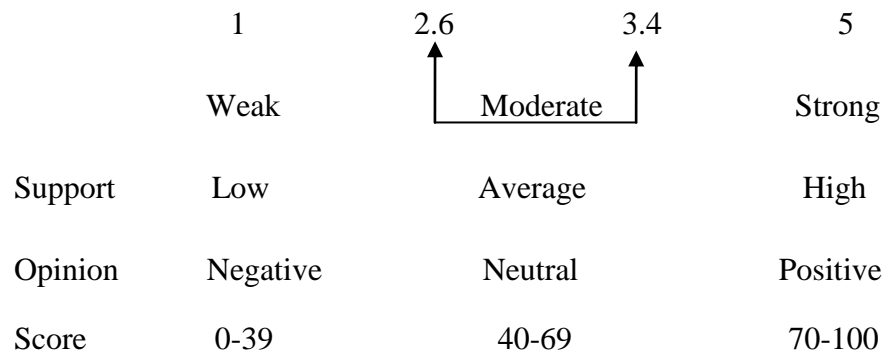
$$MS = \sum \frac{(f \times s)}{N}$$

Where MS=Mean Score, s=the score given to each factor between 1 to 6 and f =frequency of respondents rating 1 to 6.

A likert scale was used to help in developing an inferential statistic to get conclusions on the results of the observations on what the respondents felt affected project completion. The scoring as indicated in the questionnaire describes scoring (1) as not important and scoring (5) as very important. For the purposes of the likert scale, not applicable or N/A was treated as a neutral score and so considered as carrying the weight of (3).

The likert scale used is shown in figure 3





**Figure 3 Likert scale**

Using the above scale data will be analysed using different indicators as illustrated below.

Assuming 77 responses with six responses ticking (1), ten responses ticking (2), fourteen responses ticking (3), seven responses ticking not applicable N/A, twenty responses ticking (4) and twenty responses ticking (5) then the analysis will be as below

$$\frac{(6 \times 1) + (10 \times 2) + (14 \times 3) + (7 \times 3) + (20 \times 4) + (20 \times 5)}{(77 \times 5)}$$

The percentage score= 69.87% which on the likert scale indicates many construction professional are neutral on the identified factor and how it affects project timely completion.

For the five questions on which this research sought to answer the scores were determined and the position of the dominant opinion by the construction professionals interviewed was determined. The mean scores were used to deduce the majority opinion of construction professionals on each of the question. Percentage of respondents responding in a certain way for example yes or no were presented to help determine the dominant view, opinion or practice which is an indicator to a general consensus about an answer to a particular research question in as far as construction professionals are concerned. Taking this observation for instance say 98% of respondents answered yes in question 22, then an analysis of question 12 on the likert scale produced 4.7 results, then it was deemed that there is an overwhelming agreement among construction professionals that project financing issues affect construction project completion.

The data was also ranked using the spearman rank coefficient to determine whether there was agreement between the different construction professionals on a particular issue and how it

determined construction projects delivery. Take for instance if the data was ranked based on the different scorings of the mean scores of observations for different professional's Engineers and construction managers. Their ranks based on the five research questions were tested for a correlation. If there is a strong correlation then it was concluded that a certain conclusion applied universally in the opinion of analysed professions.

$$\text{Spearman rank correlation } r_s = 1 - \frac{6 \sum d^2}{N(N^2-1)}$$

Where  $r$ =rank coefficient of correlation,  $d$ =difference between the ranks,  $N$ =number of pairs.

Linear regression was used to get a mathematical relationship between initial contract time and final contract time. Karl Pearson's co-efficient of correlation was used to determine a correlation relationship after the regression analysis was done.

$$\text{Karl Pearson's rank correlation } r = \frac{\sum dx \cdot dy}{n \cdot \sigma_x \cdot \sigma_y}$$

Where  $dx$ =deviations from mean from values of  $x$  series and  $dy$ =deviations from mean from values of  $y$  series,  $n$ =number of pairs,  $\sigma_x$ =standard deviation of  $x$ -series and  $\sigma_y$ =standard deviation of  $y$ -series.

### 3.8 Ethical issues

Ethics in research should be viewed as integral part of the research planning and implementation, not viewed as an afterthought or a burden (Gakuu and Kidombo, 2013). This research was guided by strict adherence to research ethics which do not allow the researcher to engage in deception or invasion of privacy. The respondents' right not to respond to the questions was clarified from the onset and consent sought from the word go. The anonymity of the respondents was also assured and confidentiality was guaranteed as an integral part of the research.

The researcher maintained humility and conducted the research with utmost honesty avoiding distortions and misleading data manipulation. The researcher also strove to uphold intellectual honesty and sought collaborative support which was duly acknowledged. The researcher also endeavored to arrive at conclusions based on objective inferences that are purely and blindly guided by the data collected.

### 3.9 Operationalisation of variables

**Table 3.3 Operationalisation of variables**

Research objective	Type of variable	Indicator	Measurement	Measurement scale	Data analysis technique
To determine how construction contract duration influences completion of construction projects in Nairobi ,	Independent	Length of contract duration. Initial and final time in weeks	% completion within the initial contract duration. 1-20%=1, 21-40%=2, 41-60%=3, 61-100%=4, >100%=5	Ratio, Interval	Regression, Karl Pearson's rank correlation
To investigate whether project financing influences completion of construction projects in Nairobi,	Independent	Initial project cost and final project cost	% completion within the initial budget. 1-20%=1, 21-40%=2, 41-60%=3, 61-100%=4, >100%=5	Nominal, Interval	Regression, Karl Pearson's rank correlation
To examine how planning influences completion of small construction projects in Nairobi.	Independent	Pre-contract planning and project schedule, during implementation planning	Available project schedule=1, No project schedule=2, keeping project schedule=3	Nominal	Likert scale, Spearman's correlation factor
To find out how supervision/inspection of work influences completion of construction project in Nairobi.	Independent	Respondents percentage support of the effect of supervision/ Inspection	Good supervision helps=1, good supervision doesn't help=2	Nominal,	Likert scale, Spearman's correlation factor
To assess how the type of project delivery chosen influences completion of construction projects in Nairobi	Independent	Respondents dominant opinion of the effect of the delivery type chosen	Design-Build=1 Design-Bid-Build=2 Built-Operate-Transfer=3 Design-Build-Finance-Operate Others=4 Others=5	Nominal,	Likert scale, Spearman's correlation factor

Project completion	Dependent	Percentage number of projects completed in time	Project completed=1 Within time=2 Within budget=3 Desired Quality=4	Nominal	Descriptive,
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## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATIONS AND INTERPRETTATIONS

#### 4.1 Introduction

This chapter presents results of the data collection. This was guided by the objectives to present empirical evidence to agree or controvert. The objectives were to determine how construction contract duration influences completion of construction projects in Nairobi, to investigate whether project financing influences completion of construction projects in Nairobi, to examine how planning influences completion of small construction projects in Nairobi, to find out how supervision/inspection of work influences completion of construction projects in Nairobi, to assess how the type of project delivery chosen influences completion of construction projects in Nairobi. Descriptive statistics have been used to describe respondents' characteristics. Further regression analysis has been used to determine the relationship between the initial duration and final project duration. Correlation test has been applied to test the instrument reliability and the correlation of responses on the same issues coming from different professions.

#### 4.2 Questionnaire return rate

The researcher issued 77 questionnaires. This was followed by telephone calls to the respondents to request them to fill the questionnaires. Various reminders were done in this way to ensure the questionnaires were filled and returned. Out of these 48 were returned.

Questionnaire Return rate=  $50 \times 100 / 77 = 64.9\%$

The questionnaire return rate as per the calculation is 65%. This return rate is considered sufficient for the purposes of data analysis. Babbie as cited by Ayudhya (2011) suggested any rate of success of over 50% can be considerably reported. While the overall value of above 60% and 70% can be mentioned as good and excellent respectively.

#### 4.3 Data on information of respondents

This section will show gender of the respondents, the experience in years they have in construction industry and what sector they work in. it will also show the construction professions of the respondents.

#### 4.3.1 Sector distribution in frequency and percentage

Table 4.1

##### Sector distributions

SECTOR	FREQUENCY	PERCENTAGE
PRIVATE	23	56
PUBLIC	18	44
TOTAL	41	100

It was important to get the respondents sector. The government has been encouraging the growth of the private sector. This is well captured in the results with the majority respondents 23 (56%) coming from the private sector. This indicates the construction industry has a robust private sector a good economic indicator for this is what complements the public sector in employment creation. This finding also agrees with Olatunji (2010) who found out that majority of the respondents 76% came from the private sector.

#### 4.3.2 Years of respondents experience in construction industry

Table 4.2

##### The number of respondents experience (years) in construction industry

CLASS (Years)	FREQUENCY	PERCENTAGE
1-5	26	70
6-10	7	19
10-15	3	8
16-20	1	3
TOTALS	37	100

The respondents experience in construction industry aimed to reflect on whether they have dealt with enough number of projects long enough to be able to report an observable pattern that can be deduced to form a research opinion. The last question also depended largely on the respondents' experience. Majority of the respondents 33 (89%) have a experience of between 1 to 10 years. This reflects on the Kenya's general demographics where the majority of the

population has an age bracket of 25-54 years representing about 32.4% (CIA World Factbook, 2013). Kenya's total population has a median age of 18.9 years.

#### 4.3.3 Gender distribution of the respondents in percentages

**Table 4.3**

##### **Gender distributions of respondents**

<b>GENDER</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
<b>MALE</b>	37	90
<b>FEMALE</b>	4	10
<b>TOTALS</b>	41	100

The distribution of gender in the construction industry professionals was important to show how it affects completion of construction projects. 90% of the respondents are male and 10% female. This shows that the construction industry is still male dominated. This is in agreement with a study carried by Ndegwa (2013) on the training of artisans to do metal silo business where there was no female at all.

#### 4.3.4 Construction professions' distribution of respondents

**Table 4.4**

##### **Construction Professions of the respondents**

<b>CONSTRUCTION PROFESSION</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
Architects	1	2
Quantity Surveyors	1	2
Engineers	38	76
Land Surveyors	1	2
Construction Managers	3	6
Property Developers	6	12
<b>Totals</b>	<b>50</b>	<b>100</b>

Majority of the respondents 38 (76%) were engineers. Property developers 6 (12%) and construction managers 3 (6%) were second and third respectively in returning the questionnaires. All the targeted groups within the sample frame were also represented in the returned questionnaires. The questionnaire distribution was guided by the sampling design. Respondents were reminded through telephone calls to fill the questionnaires. All the questionnaires were however not returned as hoped.

#### **4.3.5 Response to research objectives analysis based on the Likert scale**

**Table 4.5**

**Respondents' opinions on the research questions**

	<b>Valid Number</b>	<b>Mean Score</b>	<b>Interpretation on Likert Scale</b>
<b>Construction contract duration</b>	40	3.98	Strong, high, positive
<b>Project financing</b>	40	4.7	Strong, high, positive
<b>Project planning</b>	40	4.75	Strong, high, positive
<b>Supervision/inspection of work</b>	41	4.61	Strong, high, positive
<b>Project delivery method chosen</b>	41	3.98	Strong, high, positive

There is a consensus among all the respondents that the five research objectives strongly affect the construction project completion based on the table 4.5 analysed results.

#### **4.4 Contract duration and construction project completion**

This is designed from the objective number one and relates the effect of contract duration to the completion of construction projects.



**Table 4.6****Percentage variation in project Duration**

Valid Number	Descriptive Statistics	
	Mean	Standard deviation
33	33.62	63.31

There is a variation of project duration by 33.62 percentage of time based on initial time duration assumed. This is close to Soon and Sambasivan, (2006) observation who state that the problem of delays in the construction industry is a global phenomenon. (Assaf and Al-Hejji, 2006) as cited by (Soon and Sambasivan, 2006) state that a paltry 30% of construction projects were completed within the scheduled dates with a time overruns of between 10% to 30%. This then means that on average every project duration should be escalated by 30% time in order to reflect the most realistic completion duration. According to Koushki, Al-Rashid and Kartam (2005) in a study carried out in Kuwaiti, owners grossly under estimated time required for the completion of their construction projects by nearly 100% (9.4 vs 18.2 months)

**Table 4.7****Respondents answers on whether contract duration affects project completion**

RESPONSE	FREQUENCY	PERCENTAGE
YES	30	73
NO	11	27
TOTALS	41	100

From the table 4.7 there is a majority 73% agreement that construction contract duration influences completion of construction projects in Nairobi County. The analysis of table 4.5 also shows respondents' strong opinion that contract duration influences completion of construction projects. This means that every construction stakeholder must be concerned that the construction duration must as much as possible be controlled in the project lifetime to ensure a successful completion of the project.

The respondents list the following as affecting contract duration

- i. Timely completion of tasks
- ii. Natural factors like weather
- iii. Project complexity
- iv. Client intelligence
- v. Accurate program of works

Factors within the control of the stakeholders like timely completion of tasks, accurate program of works and clients intelligence can be well managed to ensure a successful project implementation. This will affect positively or negatively the quality of the project, the budget that is if the budget increases or decreases or maintains and the project duration if the project will be delivered on the expected time duration. This conclusion concurs with Rwelamila and Hall (1995) as cited by Ayudhya and Isrankura (2011) where they concluded that timely completion of a project was frequently seen as a major criterion of a project success. Bromilow (1974) also cited by Ayudhya and Isrankura (2011) studying in Australia concluded that only one-eighth of the building contracts were completed within the scheduled completion schedules and that average time overrun exceeded 40%. The main reasons for this as cited by the authors is contractual disagreement, change orders, adverse weather and unclear contract agreement.

#### **4.5 Project financing and project completion**

This is developed form the objective number two on the influence of the project financing on construction projects. The respondents were asked to give project finance details in terms of initial project cost budgeted and final project cost.

**Table 4.8**  
**Percentage variation in project cost**

<b>Valid Number</b>	<b>Descriptive Statistics</b>	
	<b>Mean</b>	<b>Standard deviation</b>
33	13.48	32.5

Table 4.8 shows there is on average a 13.5% increase in project costs. This means that for every project initiated by the time of completion and handover the project cost will have increased by about 14% of the initial cost. This is quite a significant change and may make the difference between a successful project completed or a project whose quality is poor, time taken to

complete the project is longer than expected owing to stalling midway to fundraise or a totally abandoned project due to unavailability of project funds. This conclusion agrees with Aibinu and Jagboro, (2002) who carried out a study on the effects of construction delays on project delivery in Nigerian construction industry. They concluded that there was a 17.34% percentage increase in project cost. They advised that a 17.34% pre-contract estimate price to be included as a contingency. The Department of Energy in United States recommends a 15-20% contingency for construction of new buildings. Omran, Abdalrahman and Pakir, (2012) while studying construction projects success factors in Sudan concluded that 90% of the projects were not finished as per the planned construction budget.

The respondents were also asked to state whether project financing influenced completion of construction projects.

**Table 4.9**

**Respondents feedback on project financing and project completion**

<b>RESPONSE</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
<b>YES</b>	40	98
<b>NO</b>	1	2
<b>TOTALS</b>	41	100

Majority of respondents 40 (98%) state that project financing influences construction project completion. Table 4.5 also shows that respondents clearly support the view that project financing affects completion of construction projects. The respondents list the following as the financing issues affecting completion of construction projects.

- i. Timely release of funds
- ii. The stability of the local currency
- iii. Cash flow
- iv. Change in price of materials
- v. Access to credit from lending institutions

This then means that project financing is a key aspect of construction projects and should be guaranteed to ensure that projects will be successfully completed. (Koushki, Al-Rashid and

Kartam, 2005) found that 100% of housing projects carried out in Kuwaiti had cost increases from the initial cost estimates. Finance issues will cause the contractor to sue the client for cost overruns may be due to design changes or clients' caused delays. Contractors may even abandon a project that has a lot of financing issues because it may tie them and cause them to lose other business opportunities. Project financing is therefore at the heart of a successful project completion.

#### **4.6 Project planning and project completion**

Respondents were asked to state whether project planning affected completion of construction project. This was based on the third research objective.

**Table 4.10**

**Respondents answers in percentage on whether project planning affects project completion**

<b>RESPONSE</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
<b>YES</b>	41	100
<b>NO</b>	0	0
<b>TOTALS</b>	41	100

In their responses 100% of the respondents indicated that project planning affected completion of construction projects. Table 4.5 also indicates a high support and a strong opinion that project planning influences project completion. Table 4.11 gives the project planning issues as identified by the respondents.

**Table 4.11****Construction planning issues affecting construction project completion**

<b>PLANNING ISSUES</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
<b>PRE-PLANNING</b>	32	78
<b>CONSTRUCTION PLANNING DURING IMPLEMENTATION</b>	39	95
<b>MATERIAL DELIVERY ON SITE</b>	33	80
<b>FOLLOWING PROJECT SCHEDULE DURING CONSTRUCTION</b>	33	80
<b>TOTALS</b>	41	100

All levels of planning affect completion of construction projects as the respondents feedback shown in table 4.11. High in the planning is the planning during construction which includes proper allocation of labour, tasks and duties during implementation. The construction schedule should also be faithfully followed and an organized way of ensuring that materials are delivered on site when required, in the right quality and time. This will avoid delays. Pre-planning is also a key area of project implementation. Good pre-planning means foreseeing the entire project at the time of conception, identifying the risks and mitigating them. It also involves allocating the right responsibilities to the right people and it forms the basis for proper monitoring and evaluation. While studying project completion of Rural Electrification project in Kenya, Wambugu (2013) concluded that quality and importance of project planning had been considered a major cornerstone of every successful project and that plans is nothing, planning is everything. “The planning effort is an important factor that influences project performance as identified in different studies, and the project plan is the roadmap that defines how to get to the results from the very beginning”. (Omran, Abdalrahman and Pakir, 2012). The authors therefore conclude that thorough, adequate and effective project planning for all work should be provided to the project team to meet the project objectives during project implementation.

#### 4.7 Project supervision/inspection and completion of construction projects

Based on the fourth research objective, the respondents were asked whether inspection/supervision affected completion of construction projects.

**Table 4.12**

##### **Respondents answers on project planning affecting project completion**

<b>RESPONSE</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
<b>YES</b>	40	98
<b>NO</b>	1	2
<b>TOTALS</b>	41	100

The majority of the respondents 40 (98%) stated that supervision/inspection affect construction project completion. Table 4.5 also indicates a strong support of the respondents that supervision/inspection affects construction project completion. The issues that arose as influencing construction project completion as far as supervision/inspection include:-

- i. Good supervision/inspection is a must. Poor supervision will break a project
- ii. Resource management/manpower deployment is aided by supervision/inspection
- iii. Compliance to statutory obligations is enhanced by supervision/inspection
- iv. Conformance to quality requirements is aided by supervision/inspection
- v. Timely deliveries are largely enabled when supervision/inspection is efficient
- vi. Cost efficiency by avoiding re-doing incorrect works is enhanced by good inspection/supervision
- vii. Clear understanding by staff of the expected outcomes
- viii. It improves communication
- ix. Good supervision/inspection avoids repetition by doing it right first time
- x. You get the results you inspect not the results you expect
- xi. It helps get the correct measurement of the works on site

This conclusion agrees with Sambasivan and Soon, (2007) who identify poor site management and supervision and poor contract management as contributing highly to delay in completion of construction projects. They also identify contractors' inexperience and incompetence as affecting the timely project completion. This therefore clearly identifies supervision/inspection to be key

in ensuring projects are completed successfully. When there is good supervision, projects are done to the design specifications and therefore work is not repeated due to incorrect installations which have to be re-done. Doing the works afresh means delay and increased costs.

#### **4.8 Project delivery type chosen and project completion**

This research question is based on the fifth research objective. The respondents were first asked the type of project types they have dealt with;

**Table 4.13**

**Construction project delivery types that respondents have dealt with**

<b>TYPE OF PROJECT DELIVERY</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
<b>EPC</b>	9	19
<b>DBB</b>	26	55
<b>BOT</b>	4	9
<b>DBFO</b>	2	4
<b>Others</b>	6	13
<b>Totals</b>	47	100

Table 4.13 indicates the high percentage number of respondents 26 (55%) have dealt with DBB project delivery type. Next is EPC projects at 9 (19%). BOT and DBFO are 4 (9%) and 2 (4%) respectfully. This observation is correct because the traditional project type delivery method includes owner designed, contractor bid and awarded where the consultants supervise the contractor during implementation. EPC contracts are relatively new globally and locally.

**Table 4.14****Respondents feedback on project delivery type chosen influencing project completion**

<b>RESPONSE</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
<b>YES</b>	27	71
<b>NO</b>	11	29
<b>TOTALS</b>	38	100

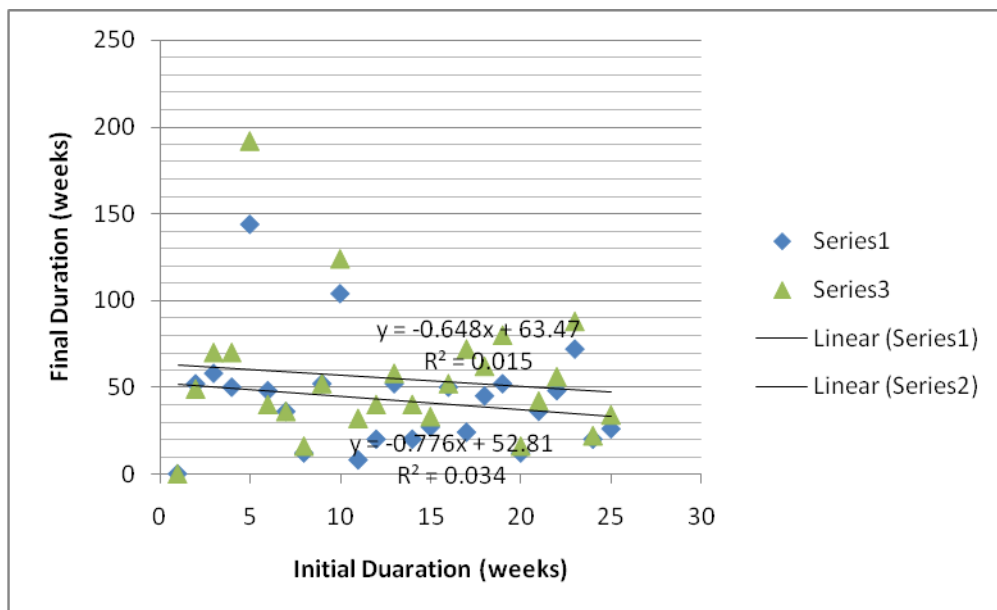
There is a majority's concurrence 27 (71%) that a choice of the project delivery type chosen affects construction project completion. The view also suggested that an arrangement that put as much risk of project delivery on the contractor is most favorable in ensuring the project is delivered within time, budget and to the design scope. The opinion that each project has unique risks which can be best managed by one or more of delivery methods. "One size fits all" may not be there as such also came up from respondents. Chism and Armstrong, (2010) stated that project delivery is about getting a quality project done on time and on budget and not only about the form of contract used to share the risks in a large capital project or organizational structure. This therefore indicates the significance of the project delivery type chosen for a successful project completion.

**Table 4.15****Construction project delivery types that respondents suggested as best in ensuring construction projects are delivered within time, budget and quality**

<b>Project delivery type</b>	<b>Frequency</b>	<b>Percentage</b>
EPC	8	42
DBB	6	32
BOT	3	16
DBFO	2	11
Others	0	0
<b>Totals</b>	<b>19</b>	<b>100</b>



The bigger number of the respondents 8 (42%) said that Design-Build/EPC/Turnkey or PPP contracts were likely to ensure the successful delivery of construction contracts followed by Design-Bid-Build at 6 (32%) as shown on figure 4.15. The strength of EPC contracts is that it deals with the fundamental issues of time, cost and quality of projects in a more sophisticated way than the traditional type of contracts (McNair, 2011). They provide a single point of responsibility, a fixed price contract and a fixed completion date. These guarantee an execution strategy where the contractor takes greater risk for the project delivery. Regression analysis on the project projected duration and actual duration produced an equation based on the figure 4.



**Figure 4 Regression of the initial project duration to the final delivery duration**

The two lines of fit are  $y = -0.648x + 63.47$  and  $R^2$  is 0.015 and  $y = -0.776x + 52.81$  with  $R^2$  being 0.034.  $y$  is the final duration of the project.

**The correlation from the data is 0.18 and 0.12**

There is a correlation in the time duration at the beginning of a project and the final duration of the project. This can be shown in the equations above. This equation compares with one developed by Olatunji (2010). He concluded that the relationship between the initial contract time and the actual completion time can be represented in an equation  $y = 9.9 + 1.0586x$  with a correlation  $r = 0.86$ . Assuming a project with initial duration of twenty (20) weeks the final

duration will be 37.41 weeks based on this study's findings from regression analysis. Based on Olatunji (2010), the actual project duration will be 31.07 weeks. This then confirms the universal phenomenon that projects will tend to incur delay in their actual implementation duration. Project stakeholders then should be able to plan enough contingency to cater for this as a risk factor in construction project implementation.

**Table 4.16**

**Calculation of the Spearman rank correlation**

Research Question	Ranking by Construction Managers=R1	Ranking by Engineers=R2	R1-R2	(R1-R2) <sup>2</sup>
Q1	3	4	-1	1
Q2	5	1	4	16
Q3	1	2	-1	1
Q4	2	3	-1	1
Q5	3	5	-2	4
N=5				∑=23

**Spearman rank correlation is -0.15**

Table 4.16 indicates a negative rank correlation between construction project managers and engineers. This means that they don't necessarily rank the importance of the five research questions similarly in terms of how they influence completion of construction projects. They nonetheless are in agreement that the five research questions influence completion of construction projects.

**4.9 Respondents opinion on the single most important reason that they can attribute to affecting completion of construction projects**

Respondents were asked to state the single most important reason that they could attribute for mostly affecting completion of construction projects. The following were the responses:-

- i. Project planning and timely execution of assigned tasks
- ii. Delivery of materials in a timely manner

- iii. Availability of labour
- iv. Motivation of workers through incentives and allowances
- v. Efficient communication
- vi. Project financing. Delayed payments, availability of project budget
- vii. Changes in project design
- viii. Selection of the most appropriate contract
- ix. Project delivery strategy that best manages the project risks
- x. Developing an unrealistic schedule and not adhering to the schedule
- xi. Contractors not taking the project seriously and bad performance culture
- xii. Corruption in projects
- xiii. Contractors' competence and financial capabilities; his ability to plan
- xiv. Weather challenges
- xv. All project stakeholders; clients, consultants, contractors

The majority view on the most single factor affecting the construction project completion is project financing, cash flow issues and the proper project planning. This is a theme well captured by Sambasivan and Soon (2007) who state that major factors affecting timely project completion as being; (1) Contractor's improper planning (2) Contractors' poor site management (3) Inadequate contractor experience (4) Inadequate client' finance and payment of completed work (5) Problems with subcontractors (6) Shortage in material (7) Labour supply (8) Equipment availability and failure (9) Lack of communication between parties (10) Mistakes during the construction stage

## CHAPTER FIVE

### SUMMARY OF THE FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Introduction

This chapter will give a summary of the findings as analysed in chapter four. The discussions will be guided by the research objectives and whether the data confirms the research questions. Based on the findings, conclusions will be made and recommendations for further research suggested.

#### 5.2 Summary of the findings

The research was successfully carried out and the findings are summarized. From the findings, there is 13.5% cost variation (increase) in the projects. There is a 33.6% variation (increase) on project duration. 73% of the respondents state that construction contract duration influences completion of construction projects in Nairobi County. The respondents also said that; Timely completion of tasks, natural factors like weather, project complexity, client intelligence, and accurate program of works are the ways in which contract duration is effected in a way that it eventually influences completion of construction projects.

98% of the respondents stated that project financing influences completion of construction projects in Nairobi County. The respondents also listed the financing issues influencing completion of construction projects as follows:-Timely release of funds, the stability of the local currency, cash flow, change in price of materials, access to lending institutions. 98% of the respondents observed that project planning influences completion of construction projects in Nairobi County. The respondents also listed planning aspects affecting completion of construction projects as follows:-78% of the respondents stated that pre-planning influences completion of construction projects, 95% of the respondents stated that planning during construction influences completion of construction projects, 80% of the respondents identified material delivery as a planning aspect influencing completion of construction projects in Nairobi County, 80% of the respondents reported that following construction schedule is also an aspect of planning that influences completion of construction projects in Nairobi County.

98% of the respondents observe that supervision/inspection of work influences completion of construction projects in Nairobi County. The respondents also listed supervision/inspection aspects affecting completion of construction projects as: - Good supervision/inspection is a must. Poor supervision will break a project, resource management/manpower deployment is aided by supervision/inspection, compliance to statutory obligations is enhanced by supervision/inspection, conformance to quality requirements is aided by supervision/inspection, timely deliveries are largely enabled when supervision/inspection is efficient, cost efficiency by avoiding re-doing incorrect works, clear understanding by staff of the expected outcomes, it improves communication, good supervision/inspection avoids repetition by doing it right first time, you get the results you inspect not the results you expect, it helps get the correct measurement of the works on site

71% of the respondents observed that project delivery type chosen influences completion of construction projects in Nairobi County. 19.5% of the respondents have handled EPC/Turnkey type of contract. 63.4% of respondents have handled DBB project delivery type. The project delivery type that put risk of project delivery on the contractor is most favorable in ensuring the project is delivered within time, budget and to the design scope. The opinion that each project has unique risks which can be best managed by one or more of delivery methods. “One size fits all” may not be there as such also came up from respondents.

42% of the respondents said that Design-Build/EPC/Turnkey or PPP contracts were likely to ensure the successful delivery of construction contracts followed by 32% who advocated for Design-Bid-Build. 16% suggested BOT and 11% said DBFO are likely to be more successful types of project delivery method for successful project implementation.

### **5.3 Discussions**

The research findings indicate that construction contract duration and project delivery method chosen influence a successful completion of construction project. This agrees with research done by other scholars. Project planning, project financing and inspection/supervision of the projects will largely affect a successful implementation of a construction project. A project that is starved of the finance needed for successful implementation will most likely stall. When a contractor has cash flow challenges it will also affect their ability to deliver materials on site and hence implementation challenges will be faced and this will greatly affect project completion.

Insufficient project finances will also present a situation where the contractors cannot pay their staff and so will be faced by the challenge of go slows or work abandonment by the unpaid staff. Court battles also can result as the workers seek legal redress for their unpaid dues.

The planning aspect of project ensures that proper pre-planning is done. If this is not done, difficulties ahead may not be forecast and eventually a contingency plan to mitigate them will not be in place. During construction planning should ensure that the project schedule or program of works is carefully followed. This will ensure that tasks are begun and completed according to the time allocated for that in the schedule of works. This also ensures that material delivery on site is timely because the project tasks are anticipated ahead. Experienced construction workers will also help in coming up with the most practical program of works that is not over ambitious or unrealistic.

Two aspects key to every construction contract are time and money. With each item, the essence of a construction contract can be defined. For a specified sum of money, a contractor will be required to perform within the specified period of time (Thornton, 1988). Averagely there is 13.5% project cost increase. This has the impact of affecting project completion. If the contingency is overspend, then the project may face the risk of stalling for a long time until funds are available and if the funds are completely unavailable then there is a possibility of project abandonment. The view of the respondents is that many public projects are affected by requests for extension of time which result to claims and additional project costs.

There is a mean of 33.6% increase in construction project time duration. This conclusion is close to a study by Bromilow, 1974 that found that only one-eighth of building contracts were completed within the scheduled completion dates and that the average time overrun exceeded 40%. This means that developers are unable to start enjoying the benefits of construction projects for about 30% of the projected time.

#### **5.4 Conclusions**

For a successful completion of a construction project, the client should ensure that the correct type of implementation is chosen. The EPC/turnkey type of contract places more risks on contract delivery to the contractor and thus it is most likely to ensure a successful construction project completion. Enough project finances should be set aside before a project commences to ensure that lack of finances won't cause the project to stall. This should include a contingency

sum of about 15% project cost. Proper planning at all project stages should be done as well as good supervision/inspection of a construction project to ensure the project is successfully completed. Every stakeholder in construction projects implementation should be sensitized on the reality that projects will most likely suffer delay in contract duration and definitely increase in project costs. This way effort should be made to avoid all the contributors to this scenario.

### **5.5 Recommendations**

1. Project managers should hold stakeholder engagement sessions in the lifetime of the project to ensure that every interested party plays their role in ensuring the construction contract does not take longer than intended because of the actions or inactions of any one of the project players.
2. Competent and experienced project managers should be hired to ensure that the right project leadership team is hired to lead a process of construction project implementation. This must also guarantee proper program of works which should be followed by good supervision/inspection to ensure it is followed to the letter and all the amendments done at the right time and in an appropriate way to ensure successful project delivery.
3. Developers/ project champions/ owners should ensure construction projects are not starved of finances. This will ensure that construction projects do not stall. Contractors should also be vetted before contract award to ensure that they have a history of paying their staff and industry good standing to deliver well on their contract agreements. If they show a sign of cash flow problems they are not to be picked to implement a project. They should also cushion the client from some risks through insurance and performance security deposits.
4. All the project players should be trained on all factors that influence successful implementation of construction projects. They should especially be educated on the key metrics of a successful project. Budget, scope and timelines should be deliberately managed so that a quality project can be realized.
5. A quality culture should be encouraged in construction industry so that deliberate efforts are made to deliver quality projects.

## **5.6 Suggested further research**

This study suggests a research to develop a predictor model for successful construction project implementation. This model should include interplay of risks, success factors and weighted factor for the unknowns in construction project implementation. This will ensure that a success or failure of a project can be properly managed with more certainties and anticipated outcomes.



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## APPENDICES

### Appendix I: Letter of Transmittal

Shammah Kiteme Munyoki

P.O. Box 38472 – 00100

Nairobi

13<sup>th</sup> April 2014

Dear Sir/Madam,

RE: **PERMISSION TO CONDUCT RESEARCH AMONG ARCHITECTS/QUANTITY SURVEYORS/ENGINEERS/CONSTRUCTION PROJECT MANAGERS/PROJECT MANAGERS/LAND SURVEYORS/PROJECT MANAGERS**

I am a student at the University of Nairobi undertaking Masters Degree in project planning and management. As part of course requirement I am supposed to conduct a research project in the industry. I have identified the topic determinant of project timely completion: a case of construction projects in Nairobi County.

I am writing to seek for permission to conduct research in among your employees. This will involve filling a research questionnaire I have prepared to enable me to gather the data I need. Upon completion I will commit to share my findings with your office if you accept.

I look forward to your favourable response.

Thank you in advance

Faithfully

Shammah Kiteme Munyoki

**Appendix II: Questionnaire**

My name is Shammah Kiteme Munyoki. I am a post graduate student at the School of Continuing and Distance Education, University of Nairobi. I am carrying out a research on factors influencing completion of construction projects; a case of construction projects in Nairobi County. As one of the professionals/players in the construction industry, I request that you take time and give me your honest answers to the questions below. I will retain your contact and will post you the results of my research after I analyse if you will be interested. Thank you for agreeing to participate in this research. *Please let this information be as anonymous as possible. In case the information hereby provided is published respondent identity will not be disclosed.*

**PART A – RESPONDENTS INFORMATION** (Tick or Fill in the blanks where necessary)

- 1. What sector do you work in? Public  Private
- 2. How many years of experience do you have in construction industry?  
\_\_\_\_\_
- 3. Please indicate your gender..... Male  Female

4. Please indicate by a tick (√) the construction profession you are in

Architect	<input type="checkbox"/>	Builder	<input type="checkbox"/>	Client	<input type="checkbox"/>
Engineer	<input type="checkbox"/>	Project Manager	<input type="checkbox"/>	Construction Manager	<input type="checkbox"/>
QS	<input type="checkbox"/>	Land Surveyor	<input type="checkbox"/>	Site Manager	<input type="checkbox"/>

- 5. Please indicate the type of construction you are dealing with

Residential	<input type="checkbox"/>	Industrial	<input type="checkbox"/>
Commercial	<input type="checkbox"/>	Government owned	<input type="checkbox"/>
Institutional	<input type="checkbox"/>	Other	<input type="checkbox"/>

**PART B – PROJECT SCOPE DETAILS**

- 6. Project Cost

Initial Cost	<input type="text"/>
Final Cost	<input type="text"/>
Variation %	<input type="text"/>

- 7. Did the Project cost increase from the initial cost? \_\_\_\_\_
- 8. If the answer to the above question (7) is yes could you give the reason of increase in project cost?
- 9. Project Duration (please indicate project duration in weeks)

Initial Planned Duration	<input type="text"/>
Actual Project Duration	<input type="text"/>
Variation %	<input type="text"/>

Please rank the following as the factor affecting the project timely completion in your experience.

1. Not important
2. Low importance
3. Some importance
4. Important
5. Very important
6. Not applicable N/A

10. Construction contract duration	1	2	3	4	5	6
11. Project owners	1	2	3	4	5	6
12. Project financing	1	2	3	4	5	6
13. Project managers competence	1	2	3	4	5	6
14. Project planning	1	2	3	4	5	6
15. Type of construction	1	2	3	4	5	6
16. Supervision/inspection of work	1	2	3	4	5	6
17. Local ground conditions	1	2	3	4	5	6
18. Project delivery method chosen	1	2	3	4	5	6

19. Please state five (5) factors in your experience that influence completion of construction project

- i)
- ii)
- iii)
- iv)
- v)

20. Does contract duration affect project completion in your opinion? Yes   
 No

21. If the answer to the above question (27) is Yes what affects contract duration? \_\_\_\_\_  
 \_\_\_\_\_

22. Does project financing affect construction project completion in your opinion? Yes   
 No

23. If the answer to question (22) above is Yes what project financing issues affects construction project completion?

- i) First issue
- ii) Second issue
- iii) Third issue
- iv) Fourth issue

24. Does project planning affect construction project completion? Yes  No

25. If the answer to question (24) above is Yes what project planning issues affect construction project completion?

- i) Pre-planning
- ii) Construction planning during implementation
- iii) Material delivery on site
- iv) Following project schedule during construction

26. Does supervision/inspection affect construction project completion? Yes   
No

27. If the answer to question (26) above is Yes what supervision/inspection issues affect construction projects completion? Say whether good supervision helps or not.

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28. What project delivery type have you dealt with

- i) Design-Build as in EPC/Turnkey or PPP
- ii) Design-Bid-Build
- iii) Build-Operate-Transfer
- iv) Design-Build-Finance-Operate
- v) Others-Please state

29. Does the choice of project delivery type chosen affect construction project completion?

Yes  No

30. If the answer to question (29) above is Yes of the project delivery types listed in question (28) what is the most efficient in ensuring that projects are delivered on time, within the budget, design scope and desired quality?

**PART C – HISTORICAL REPORT ON OTHER PROJECTS YOU HAVE HANDLED OR YOU HAVE BEEN INVOLVED WITH**

Please take time and fill in historical information of other projects you have handled in the table below.

Project No	Project Name	Project Location	Initial contract time in weeks	Final contract time in weeks	Initial contract cost KES	Final contract cost KES	Reasons for delay in completion

**PART D – RESPONDENTS SINGULAR OPINION ON PROJECTS DELAY**

31. In your opinion what is the single most important reason that you can attribute for mostly affecting completion of construction projects?



### Appendix III: Work plan

Activity	January 2014				February 2014				March 2014				April 2014			
	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
Agree on research topic																
Submit Chapter 1 & 2 for Review																
Submit research proposal for Review																
Defend research proposal																
Data collection																

Activity	May 2014				June 2014				July 2014				August 2014			
	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
Data collection																
Data Cleaning and Entry																
Data Analysis, Presentation, Discussion and interpretation																
Report writing, Conclusions and Recommendations																
Presentation to UoN, Partners, Final Defense																
Writing a Paper for the Journal																

#### Appendix IV: Budget Projections

		<b>USD</b>	<b>KES</b>	<b>Budget Notes</b>
1	Per diem	2413.79	210,000	15 days working 2000 per enumerator and 4000 per supervisor (5 enumerators and 1 supervisor)
2	Transport	770.11	67,000	Transporting researcher, assistant, supervisor and enumerators for the entire research
3	Communication on the field	367.82	32,000	8 persons at 1000 per week for four weeks
4	Stationery	91.95	8,000	12 copies of report, 100 questionnaires at 5 per page
<b>Total</b>		<b>3643.67</b>	<b>317,000</b>	

## Appendix V: Research Permit



### NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,  
2241349, 310571, 2219420  
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Website: www.nacosti.go.ke  
When replying please quote

9<sup>th</sup> Floor, Utalii House  
Uhuru Highway  
P.O. Box 30623-00100  
NAIROBI-KENYA

Ref: No.

Date:

**5<sup>th</sup> August, 2014**

**NACOSTI/P/14/1749/2674**

Shammah Kiteme Munyoki  
University of Nairobi  
P.O.Box 30197-00100  
**NAIROBI.**

#### **RE: RESEARCH AUTHORIZATION**

Following your application for authority to carry out research on "*Factors influencing completion of construction projects: A case of construction projects in Nairobi County,*" I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for a period ending **31<sup>st</sup> August, 2014.**

You are advised to report to **the County Commissioner and the County Director of Education, Nairobi County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

  
SAID HUSSEIN  
FOR: SECRETARY/CEO

Copy to:

The County Commissioner  
The County Director of Education  
Nairobi County.



*National Commission for Science, Technology and Innovation is ISO 9001:2008 Certified*