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An Analysis of Project Cost Control Mechanisms Utilized in the Road Construction Sector: A Case Study of Road Projects in Lusaka

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Abstract:

The aim of the study was to analyze the project cost control mechanisms utilized in the road construction sector in Lusaka. Road construction projects often are not completed on time resulting to cost overruns. Cost overrun is the increased cost compared to the actual cost of construction as per the cost estimation in the initial project planning. Various factors such as scope changes, a major design error, and inaccurate project cost estimates, and poor planning can delay project completion time and cost a thousands of dollars. The objectives of this study were to examine the cost management practices performed in the road construction sector, ii) examine how management cost practices affect project performance, iii) establish mitigation measures that can enhance cost performance in road construction. The research design that was used was mixed methods took the form of using a case study and observation of people in their everyday lives. The target population was 60 employees from the organization and individual participants working in different departments. Description design was also used to enhance the validity of the research results in that the method allowed the researcher to stay very close to the empirical world and state the affairs as it exists. The following were the major findings in this study: i) Gender – 25% of the respondents were females and 75% males. ii) Age of the participants- 45% were between 20-35 years, 20% between 36 – 45 years and 35% above 46 years. iii) Qualifications and level of education. 10% of the participants obtained post- graduate and above qualifications, 35% had bachelors and 55% obtained diplomas and certificates. iv) Work experience- 65% accounted for those who had worked between 1 and 16 years, 20% accounted for those who worked between 16 and 35 years, while 15% recorded for those worked for 36 years and above. v) Marital status. 25% of those who participated in the survey were single while 75% were married and were the majority. vi) Status of engagement. 25% accounted for those who were on permanent basis, 55% was recorded for those on temporal and 20% accounted for those on contracts. vii) Level of engagement. 55% was recorded for those working in technical areas and were the majority, 35 % for those in middle management while 10% in senior management. viii) Occurrence of cost overruns. 62% of the participants said it was very low, 4% said it was low, 10% said it was medium, 4% also said it was very low, while 20%

said very high. ix) Effectiveness of cost management practices performed in the road construction sector. 40% strongly agree that it was effective, 35% agreed, 15% disagree, 4% were not sure, and 6% strongly disagree. x) Project cost practices affect project performance. 78% said yes and 22% said no. xi) How cost overrun affect projects. 50% said it affected completion time, 37% said it affected quality of the deliverables, and 10% said it dented the contractor image while 3% said it had no effect. xii) Measures that can enhance cost performance in road construction. The first scenario was based on introducing strong management skills. 50% strongly agree that these are needed, 25% also agree, 6% strongly disagree, 4% were not sure and 15% disagreed. The second scenario was to set clear goals. 60% strongly agree that these are needed, 20% also agree, while 8% strongly disagree, 10% disagreed and 2% were not sure. The third scenario as a mitigation measure was to come up with a well-developed and well communicated budget. 40% strongly agree, 30% agree, 3% not sure, 7% strongly disagree, and 20% disagree,

Going by this study's findings, it was concluded that the top factors influencing construction cost management are; experience and competence project managers, weak management support and control, poor project communications, external economic environment, lack of use of project management tools, poor leadership and coordinating skills, underutilization of plant and equipment, excessive material wastages on site and material thefts on site. Further also that all the assessed factors influence cost management and that cost management is highly beneficial to projects and organizations in construction industry. Effective implementation of cost management practices has a very high impact on the survival and sustenance of construction firms. Finally, effective cost management implementation on construction projects ensures that the budget is not exceeded leading to stakeholder satisfaction, timely delivery of work and less conflict.

Keywords: Cost overrun, Management cost practices, mitigation measures, and project performance.

Introduction:

Background:

The factors that influence cost during the conception and design phases within the construction process have been widely investigated, primarily based on the contractor's cost-estimating practices (Akintoye 2000; Cheung et al. 2008). Hicks (2012) revealed that regardless of management competence and the financial strength of the contractor, accurate cost estimation at an early stage is the key to avoid cost overrun in projects (Hicks 2012). The complex nature of construction projects has often made it impossible for the designs shown on drawings, specified and quantified in the bills of quantities to be converted into physical structures without variations. Aje and Jagboro (2013) observed that in any building works, it was a rare occasion that variations would not occur. Variations may lead to Cost and cost overruns in construction projects. Cost overruns may add value to projects by producing a better product, or may add no value and represent wasted money. This study dealt with cost overruns that occur in projects contracts. Mbatha (1986), in his study of performance of government projects, observed that causes of delay and cost overrun are: inefficient technical and economic appraisal, most projects are commenced without carrying out thorough site investigation and market surveyors that are necessary for planning purposes. Cost overruns may arise due to poor estimates by client and project Quantity Surveyor as a result of the project brief being inadequate or using un-updated cost data. Cost overruns may be as a result of badly written conditions of contract in projects, although standard conditions of contract are widely used circumstances some costs call for amendments and addendums to take into account all the factors affecting or likely to affect a particular contract. He also included in the list inadequate tender evaluation, excessive variation, disruption and lack of competence by contractors and suppliers as other causes of cost overrun. Contractors past experience with clients and his or her advisors influence the estimators pricing method. Differences in quotations prices, purchasing arrangements during procurement and the frequency of purchase, settlement of credit accounts on demand, reliability

of suppliers, method statement and construction program were also cited as causes of cost overruns. Talukhabha (2019) observed, although studies by Mbatha (2016), Mbeche and Mwandali (2016) and Baradyana (2016) identified factors such as subcontractors, weather, materials, underestimation of project Cost, variations, equipment, incorrect design drawings and slow process in decision making among others, as causes of overruns the significance of each of the causes of cost overrun was not also established. The construction sector in Zambia has increasing demand, and its contribution to the Gross Domestic Product (GDP) is increasing during this period of five years from 2016 to 2020. The report shows that during the period of these five years, its contribution to GDP has increased from 11.3% in the year 2016 to 14.4% in the year 2020 (RDA,2020). Even though this sector is growing at a significant rate, it faces a lot of challenges in the implementation of its projects one of which is the management of cost in the life cycle of the project. Cost management is an act of planning, estimating and control of the budget in the life cycle of the project (NRFA, 2019); in any project, there are two main types of costs which are direct costs and indirect costs. Direct costs include the cost of materials that are directly used in the project like building materials if it is a construction project, indirect costs include all overhead expenses such as salaries of the employees (Palmer, 2020). Cost management can also be defined as the process of planning, interpretation, detailing, directing, agreement, cost control and evaluation of a project during its initiation and implementation phases (PMBK), 2015). However, cost management has got different techniques which when used effectively, can be very helpful in managing the cost of highway roads construction projects, these techniques are; cost planning, cost control, budgeting, cash flow forecasting, financial and cost reporting, cost code systems, value management and final judgement

1.2 Statement of the Problem:

The causes of delay and cost overruns in projects have been identified and ranked, in terms of their significance in past studies, including project performance comparison between traditional and non- traditionally procured projects, the confirmation of causes of delay and cost overruns specifically for non- traditional contract have never been done. Mbatha (2016) observed the causes and nature of the variations are, however, an area requiring further research. This is because it is only by knowing the contribution to variations by the various parties concerned i.e. professionals, contractors, and the client that further investigation can be conducted so as to avoid the delays and the cost overruns. All this is in the endeavor to establish the root causes of delay and cost overruns. Many researchers have shown interest in this area and have attempted to explain the relationships of the various factors involved. Kivaa (2020), has faulted the Cost estimation method used that are unscientific and resulting to difficulties in estimating Cost-related project costs such as cost of finance, insurance, water, electricity and telephone, difficulties in assessing and justifying extension of Cost and difficulties in managing the estimated contract period efficiently to ensure that a construction project is completed on Cost. From the preceding discussion, it may be stated that this research is concerned with identifying causes of cost overruns and their significance in construction projects. So due to that, there is a need to research their practices on how to manage the projects' costs and come up with recommendations about the issue even though this study will only focus on one area of the construction industry which is road construction.

1.3 Objectives of the Study:

The main objective of the study is to Analysis of Project Cost Control Mechanisms Utilized in the Road Construction Sector

1.4 Specific objectives of the study:

I. To examine the cost management practices performed in the road construction sector.
II. To examine how management cost practices affect project performance.
III. To establish mitigation measures that can enhance cost performance in road construction

1.5 Research Questions

I. What are the common cost management practices performed in the road construction sector?

II. How does cost management practices affect project performance?

III. What mitigation measures enhance cost performance in road construction

1.6 Theoretical Framework

Theory of Constraint (TOC).

Theory of Constraints (TOC) is new concept of project management. It has been effectively used in the manufacture industry. The five basic steps of TOC to remove the constraints are identifying the constraint, exploiting the constraint, subordinating to exploitation, elevating the system performance and repeating process. Critical Chain Project Management (CCPM) approach has considered the human behavior factors like Parkinson's Law and student syndrome while rescheduling the project. Buffer management was introduced with considering the human behavior factors for manipulating the activity duration to aggressive Cost estimates. Buffer Management uses the Cost buffers viz. Project Buffer and Feeding Buffers as well as Resource Buffers. These buffers signal the warning of its consumption as the activities are implemented and suggests to critical look at the processes without exceeding the project duration. It was assessed that project could be completed 30 weeks prior to originally proposed deadline with application of CCPM. It might not be very ideal condition and could not be completed 30 weeks prior to deadline but CCPM ensures the project completion within originally proposed deadline with effective management of buffers. Thus, this study has assumed that project could be completed within previously proposed deadline if different counter measures which have been suggested with consideration of TOC. Project Management objectives are the successful development of the project's procedures of initiation, planning, execution, regulation and closure as well as the guidance of the project team's operation towards achieving all the agreed upon goals within set scope, Cost, quality and budget standard (Oberlender, 1993). The purpose of the project management is to foresee or predict as many dangers and problem as possible; and to plan, organize and control activities so that the project is completed as successfully as possible in spite of all the risks. The ever-present element of risk and uncertainty means that events and tasks leading to completion can never be foretold with absolute accuracy. However, many constraints exist in practice with regard to construction project resulting the failure of projects. There are numerous challenges facing today's Construction Manager (CM) due to direct and indirect peripheral activities in construction processes. A surprising number of challenges are not construction issues but must be addressed and managed by the construction manager to ensure project success. Some of the construction issues include workforce considerations, Cost constraints, resource constraints, quality constraints and the changing nature of the work. These constraints are the most limiting factors that has restricted the overall project performance for Costly completion of projects. Non-construction challenges that CM face that are part of business landscape include legal issues, governmental regulations, environmental concerns, and socio-political process. Most of the road construction projects in Zambia, both completed and ongoing are suffering badly from Cost and cost overrun and its consequences. Some of them have Cost overrun for short duration while some have Cost overrun for many years causing loss of project's profit, increasing cost and leading to technical and managerial problems between project's parties (Shah, et al., 2017). Thus, delay as a Cost constraint due to consequences of several other constraints, has a frightening economic problem, which not only wastes financial resources but also reduces the pace of development activities. To overcome such delay and overrun, effective project management with planning, scheduling and controlling is necessary. For effective planning, scheduling and control, the identification of constraints in the system is very necessary. The identification of the constraint in early stage of

the project assist to make the organizational decision. The traditional scheduling approaches have been extensively applied in construction to identify the necessary activities and determine activity start and finish Costs. The basic approach has the problem in the ability of dealing with non-precedence constraints, human behavior factors, although traditional approach is simple to use and solve sophisticated problems. It is fact that constraints should be managed effectively in view of construction schedule planning and control. Most available methodologies to solve the non-precedence constraints include hit and trial approach, optimal solutions and simulation approach. Another solution for solving the problem regarding construction constraints is use of Theory of Constraint (TOC). TOC has been widely used and accepted in the manufacture

Literature Review

2.1 Cost management practices performed in the road construction sector.

In Kenya especially where professionals are involved the most utilized contractual procedure is the bills of quantities in conjunction with drawings and the Joint Building Council (J.B.C) Conditions of contract. The Joint Building Council (J.B.C) conditions of contract allow for variations and hence cost overruns, for example in Clause 22 the Architect is authorized to issue instructions. He is expressly empowered by this clause to issue instructions in regard to any matter. The assumption here is that the instruction shall be for the good of the project and hence the express authority. The instruction to be issued herein could have the effect of either omission or addition to the contract. The process of formalizing the instruction in writing gives it the authenticity and the binding effect of the responsibility on the part of the Architect. Mbatha (1993) Observed that the Quantity Surveyor does not design work, he is considered the specialist in costs and prices. This specialization is mistakenly referred to as cost control when it is only cost monitoring and reporting, whose data may be used for cost control. In the Joint Building Council (J.B.C) Conditions of contract clause 30 states "the architect may issue instructions requiring a variation and he may sanction in writing any variation made by the contractor otherwise than pursuant to an instruction of the Architect. He is expressly empowered by this clause to issue variations of a net value of not more than 15% of the builders work, any additional variation requires the consent of the employer and the contractor.

Causes of cost overruns

As contained in the standard form of building contract clause (11.2), "variation is envisaged as the modification of the design, quality or quantity of the work as shown upon the contract drawings and described by the contract bills and includes the addition, omission or substitution of any works". Fundamentally variation arises with change of opinion, changes of fact, and previous error or omission and may not necessarily mean a change in cost. However fluctuation refers to the increases or decreases in cost due to legislative or market forces over and above the 17 quoted price. It should be noted that in most construction contracts provision is normally made for the contractor and employer to enjoy the benefits of increases or decreases in the prices of basic resources arising from inflation or deflation as the case may be. Therefore fluctuation claims are explicitly limited to labor and materials of construction contracts whose completion period exceeds twelve calendar months while variations apply to the alteration in the scope of work. Talukhabha (1999) observed that variations can be divided into two broad categories.

Financial or economic cost overrun

Financing of construction projects is also another cause of cost overrun, it can be divided into two stages, i.e. short term funding; long term funding. Short term funding is paid off on completion of construction or before that date, whereas long term financing is obtained from a mortgage loan that will be repaid for a number of years and is therefore often called permanent financing. Short term financing has many different forms and phases and includes such loans as land purchase loans, land development loans, construction payroll loans, 'gap' financing and the construction loan itself. The

choice of source of finance for a project depends on its size and nature. According to Grebler (1973), large companies undertake to erect high rise buildings and use financing devices like unsecured notes or debentures, unsecured commercial bank credit, commercial paper, stock warrants, subordinated convertible debentures and issuance of preferred stocks. Some firms do use construction loans in advantageous circumstances.

Cost estimate related cost overruns Githaiga (2006) observed, a number of cost estimating methods are used to ascertain and possibly project buildings costs at the pre-tender stage. These include the unit method, floor area 25 method, cube method, approximate quantities, elemental analysis and pricing bills of quantities before tender. Such an estimate merely attempts to forecast that a building of a certain size can be built for certain sum of money. It cannot analyze whether a particular design is going to meet that cost.

Management or administrative related cost overrun

The construction industry in general is highly fragmented with significant negative impacts, perceived low productivity, cost and Cost overruns conflicts and disputes, and resulting claims and Cost-consuming litigation. These have been acknowledged as the major causes of performance-related problems facing the industry. The legacy of this high level of fragmentation is that the project delivery process is considered highly inefficient in comparison with other industry sectors. The type of contract awarded usually has a significant bearing to the level of efficiency attained in a construction project. 'The various types of contracts include; fixed price-these comprise package deal or fixed price/lump-sum contracts. Package deals being when the supplier is offering a service in which he is regularly engaged, while lump sum contracts are based on detailed specifications and drawings and variable price. Mureithi (2006) observed that proliferation of different procurement routes necessities systematic method of selecting the most appropriate procurement route for each particular Project. The traditional approach to contracting for construction projects has been design-build, in which design is carried out independently of the construction process. Once the owner 26 agency approves the design, the project proceeds to the actual construction phase. Under this approach, construction projects are awarded to the qualified bidder with the lowest total price, pay items are established on a unit-price basis, specifications are strictly focused on materials) and method, and the role of the owner or agent is to inspect and maintain. Competitive bidding among contractors controls cost.

2.2 How management cost practices affect project performance.

Masterman (1996) observed that under this category we have the design and build which comprises, package deal, turnkey and build own operate transfer (BOOT) we also have design and manage which comprises of contractor or consultant based management contracting. Design and build systems of procurement are not new and have been in operation for a long Cost. Architects/builders were supplying buildings for their clients before architecture and design became separated from the building process. Design and build is a procurement method where one organization is responsible to the client for both design and construction, organizations currently supplying the procurement option of buying a finished building are most generally building contractors. Consultants can also supply the finished building by taking the tasks of design and construction. The components of the design and build system are, establishing the need to build, establishing the clients requirements, selecting and inviting tenderers to bid, the contractor or contractors , Preparing their proposals for design* Cost and cost, evaluation and acceptance of a tender which then becomes a contract, design and construction of the works, the client will need to have in house skills or to obtain them in order to, prepare his ‘client’s or employer’s requirements’, carry out his responsibilities in the contract or to develop these to a client’s or employer’s agent’.

Variations on design and build Masterman (1996) argued that the common variations of design and build are; direct design and build, in this case no competition is obtained in form of tenders, some appraisal of possible competitors may be made and one contractor is chosen.

Management contracting

Smith R. (1986) described management contracting as a method of managing a project where the main contractor assumes full responsibility for the organization and carrying out of the work on site. The common variations of management contracting are, managing contracting where the appointed management contractors provide the service of managing for a fee all the works contractors who are to deliver the project by employing them as his subcontractors. Management contracting has the disadvantage that a management contractor is neither a traditional contractor, who bears the risks, nor a consultant (constructional manger) with equal status with a design team. The other variation is the appointment of a construction management organization that provides the service of managing for a fee all the contractors who are to deliver the project but each of them enters into a contract with the client. Construction management is a method in which the construction manager, by taking a more active role, can better manage the process. A construction manager, by taking a more active role, can better manage the process. A construction manager could also provide cost control services and even design services, providing then the virtually design and manage procurement. Construction management can be preferred by clients who have the confidence and capability to follow a management path.

Prime cost contracting

The appointed contractor provides the service of managing for a fee all construction work which is then carried out on a ‘prime cost’ basis, including the employment of subcontractors, to deliver the project. Fee management is not considered as ‘pure management’ because the contractor does 35 himself provide a considerable proportion of the labor, material and plant and is often heavily involved in the doing, as well as the managing, of the works. It is considered that this is incompatible with the philosophy of a contractor supplying pure management expertise.

Separated and cooperative procurement system

Separated and cooperative procurement systems are used in non-traditional procured projects where the client wants to transfer the risk of design inadequacy to the contractor. In these systems there are types of procurement used.

Design-Bid-Build

Masterman (1996) argued that the traditional method of building where work is designed by a team of architects and engineers and then advertise the plan to solicit bids from construction firms. The winning firm becomes the General Contractor, responsible for overall completion of the project using the firm's own employees, sub-contractors, or a combination of both. The design and construction phases of the project are clear and distinct. A complete set of design documents is finished before the builder becomes involved. There are several advantages to this process. First of all it has been around for a long Cost and is well understood. The design documents must be thorough and complete which lessens the chance of misunderstandings. This method should allow plenty of Cost to consider alternatives and to complete a thorough integrated design that involves all the occupants and design team members. The disadvantages are that this method takes the greatest amount of Cost to complete 36 and that the designers and builders can some costs become antagonists when the builder is unable to understand or even unable to build what has been designed. Design-Bid-Build is most frequently done using a lump sum bid contract, but guaranteed maximum price is some costs used. One pitfall to look for is that some costs builders will intentionally bid low in order to win the project and then hope to make up the loss in profits through change orders.

Lump Sum

A lump sum, some costs called stipulated sum, contract is the most basic form of agreement

between a supplier of services and a customer. The supplier agrees to provide specified services for a specific price. The receiver agrees to pay the price upon completion of the work or according to a negotiated payment schedule. In developing a lump sum bid, the builder will estimate the costs of labor and materials and add to it a standard amount for overhead and the desired amount of profit. Most builders will estimate profit and overhead to total about 12-16 percent of the project cost. This amount may be increased based on the builder's assessment of risk. If the actual costs of labor and materials are higher than the builder's estimate, the profit will be reduced. If the actual costs are lower, the builder gets more profit. Either way, the cost to the owner is the same. In practice, however, costs that exceed the estimates may lead to disputes over the scope of work or attempts to substitute less expensive materials for those specified (Mastermann 1996).

Unit Price

In a unit price contract, the work to be performed is broken into various parts, usually by construction trade, and a fixed price is established for each unit of work. For example, 37 painting is typically done on a square foot basis. Unit price contracts are seldom used for an entire major construction project, but they are frequently used for agreements with subcontractors. They are also often used for maintenance and repair work. In a unit price contract, like a lump sum contract, the contractor is paid the agreed upon price, regardless of the actual cost to do the work (Mastermann 1996).

Guaranteed Maximum Price

In a guaranteed maximum price (GMP) contract, the contractor estimates the cost just like in a lump sum bid, but profit is limited to a specified amount. In the event that actual costs are lower than the estimates, the owner keeps the savings. In the event costs are higher, the contractor pays the difference and profit is reduced. Some cost, savings are shared between the owner and the contractor as an incentive to keep costs down. As in a lump sum contract, higher than anticipated costs can lead to disputes. The GMP will only apply to the work specified in the cost estimate. Changes, possibly including unforeseen circumstances or additional work which the contractor agrees to perform can result in a final payment that is higher than the GMP.

Cost Plus

In a cost plus contract the contractor's profit is set “at a fixed amount. If actual costs are lower than the estimate, the owner keeps the savings. If actual costs are higher than the estimate, the owner must pay the additional amount. The great advantage of a cost plus contract is that, generally speaking, the project will result in the building that was envisioned, even if costs run high. The builder is less likely to cut comers or argue for less expensive materials because his 38 profit is not in jeopardy. By the same token, the builder has little incentive to keep the owner's costs down.

2.3 Mitigation measures that can enhance cost performance in road construction

Bowen, P etal (2013) describe a situation where the price and cost differentiation is crucial. They contend that price always reflects some consideration of profits while the term cost does not always do this. In the empirical part of this research, rental apartment projects are the centre of attention and in these projects developers use independent contractors who charge construction cost plus some profit margin. In such a case construction price is the logical concept to use. The developer’s overhead is also not easy to identity, as a number of overheads within an organization have to be divided between projects. Since our intention is to investigate the construction cost increases in the various regions of Sweden where many contractors also act as developers, the use of the words cost and price will depend upon the market structure and the specific question asked.

The next section will start by trying to identify components of the construction cost/price that are charged by the contractor to the developer.

Construction costs categories and components

Cost categories Having discussed the difference between price and cost in the previous section, further clarification of the word “cost” itself is

indeed necessary in order to be able to identify whether a specific cost element is quantity, location, or Cost dependent. In accounting circles, the word "cost" is seldom used without qualifying adjectives and hence different kinds of cost must be clearly expelled out (Lock, 2003). There are some costs that are simply recognizable and self-explanatory that relate to a specific item or product such as labour or material costs. Thus, they have been termed as direct costs. Other costs that are neither specific nor easily identifiable, i.e. overhead costs are often labelled as indirect costs.

2.4 Personal critique on Literature reviewed

There are much more challenges at stake in the construction industry as evidence gathered in the frame work of influencing factors. Elghaget al,(2005) states that most of the significant factors affecting project costs are qualitative such as client priority on construction cost, constructors planning capability, procurement methods, and market conditions including the level of construction activity. A number of cost estimating methods are used to ascertain road construction, but such estimates merely attempt to forecast that a project of a certain size can be done for certain sum of money.

2.5 Research Gap

A Research Gap develops as a result of the design of the study constraint, the use of poor tools, or external influence that the study could control or not control. Research needs can be viewed as gaps in knowledge, which will help expand the field of study. The literature reviewed observed that in any project construction works, there are variations that occur which lead to cost and cost overruns. These may add value to the project by producing a better product or may add no value and waste money.

The issue was more studied in the past and its importance is reduced because the literature do not state clearly the best and realistic project cost control mechanisms that should be utilized in today's and tomorrow's Road construction sector. To fill up the knowledge gap, there still needs to be researched on the analysis of project cost control mechanisms utilized in the road construction sector.

Methods and Procedures

3.1 Research Design

A research design is the blueprint for the collection, measurement and analysis of data in that it maximizes control over factors that could interfere with the validity of the findings. It is a strategic framework that is used to generate answers to the research problem in a manner that combines relevance with research purpose (Lincoln and Guba, 1985). Bearing this in mind, this study will adopt a mixed method using a case study.

Firstly, the descriptive case study design enabled the description of the study unity in whole, in context and holistically. As a result, a great deal will be learned from the phenomena under study. A case study will also allow an in-depth investigation of the problem at hand.

3.3 Sampling technique

Sampling is the procedure a researcher uses to gather places or things to study. It is a process of selecting a number of individual or objects from a population such that selected group contains elements representative of the characteristics found in the entire group. Therefore, a probability sampling method was be adopted in this study which is according to LoBiondo-Wood and Haber (1998:249), will allow non-zero probability of being incorporated into the sample. Probability will also allow the selection of the sample in such a way as to be representative of the population. It will provide the most valid or credible results because they reflect the characteristics of the target population from which they will be selected from.

In selecting respondents, the researcher was used a stratified purposeful sample to facilitate comparisons and triangulation during data analysis. Patton (2002) described stratified samples as samples within a sample, allowing the researcher to capture variations of the larger sample represented within its layers or tiers. In this study, the tiers will be levels of management which are top management, middle management and lower management level. The researcher will chose 15 from each department. While 5 will be top

management and 5 from middle management and 5 from lower management using the following formula:

ni =N1 (nt)/Nt

Where:

ni = Sample size per management level

N1 = Population per management level

nt =Total sample size

Nt = total population

3.4 Sample size

A sample (n) is a finite part of a statistical population whose properties are studied to gain information about the whole (Webster, 1985). When dealing with people, it can be defined as a set of respondents (people) selected from a larger population for the purpose of the study. Research conclusion and generalization are only good as the sample they are based on. Hence in this study, a sample of 60 respondents will be obtained. There are many factors that will be considered when choosing the sample size

It will be unnecessary to collect data from the entire population of local government organization officials since the challenges of accountability will be understood by securing information from chosen sample. It is hope that by interviewing 67% of the population the researcher will be able to reach a saturation level and no new data will be found to develop new categories and relationships.

3.5 Techniques for data collection

The researcher used participant observation and face-to-face structured and semi-structured interview as a key data collection technique. As a conversation with a purpose (Lincoln & Guba, 1985, p.36 268), an interview will be used to engage both the researcher and the respondent in a conversation that will be spontaneous yet at the same Cost focused on the research questions guided by the research study (Merriam, 2009). Despite the fact that interviews are considered to be expensive and Cost consuming, interviews will be used in this study because interviews will enable the researcher to solicit detailed information about the respondents' personal feelings, perception and opinion about the topic under study. Interviews will also allow more detailed questions to asked and obtain information that might not be availed using other means such as focused group discussions. Furthermore, interviews will allow high response rate, ambiguities will be clarified and incomplete answers followed up and precise wording will be tailored to respondents and precise meaning of the question clarified.

3.6 Instruments for data collection

Research instruments are mechanism that the researcher will use to capture data and include the following; questionnaires, inter-view schedule, observation and focus group discussion. Concerning this study, the researcher will use only four instruments: interview schedule, questionnaires, participant observation and the researcher herself as a human instrument.

3.7 Questionnaire

A questionnaire is an instrument for collecting data and almost involve asking a given subject to respond to a set of oral or written questions. Though a questionnaire has a few pitfalls which include: difference in understanding and interpretation of question by respondents, bias by respondents and cannot capture emotional responses or feelings of the respondents, a questionnaires will be used in this study because the benefits of using a questionnaire outweigh the pitfalls. Some of the benefits that will be accrued from using a questionnaire in this study are: they are cost effective, they are practical, they assure speedy results, they are scalable, they are easy to analyze and do not need experience in statistics, they allow user anonymity and they can be structured to cover all aspects of the topic. Therefore, a questionnaire will be used to gather data from 23 middle management and 17 in-charges from the local government organization.

3.9 Participant observation

Observation entails the systematic noting and recording of events, behaviors, and artifacts (objects) in the social setting chosen for study.

Observation is a fundamental and highly important method in all qualitative inquiry. Therefore, it will be used in this study to discover complex interactions in natural social settings. Observation will also play an important role in that it will allow the researcher to dig deeper, see through the eyes of the research group, see the same perspective as group members, generate new ideas, get the truth and also obtain information from hard to reach groups. However, the researcher will be very careful and avoid the following shortfalls of biasness as well influencing the behavior of the research group.

3.10 Human Instrument

Uniquely different from non-human instruments, a human instrument is capable of adapting to the various contexts encountered in the study, to interpret and evaluate the interactions. The human factor is indispensable in qualitative research because contextual inquiry demands a human instrument (Lincoln & Guba, 1985, p. 187). Therefore the human instruments that will be used in the study is the researcher herself and 1 research assistant.

3.11 Procedure of data collection

Data is one of the most important and vital aspect of any research and data is a basic unit in statistical studies. Therefore data for this study will be collected from both primary and secondary sources. Primary data is data that will be collected by the researcher particularly for the purpose of this study and will be essential to the study as the researcher tries to answer the problem for which the study was initiated. For this reason, primary data will be customized according to the requirements of the researcher and will be collected directly by the person who will analyze the data. Primary data will be important in this study because primary data is more accurate since it will be directly collected from the population and by using primary data the researcher will be able to get latest and up to date information about the topic under study and the information might be unbiased since it collected and process by a researcher,

On the other hand, secondary data relates to information that will be collected by others for their own purposes, but is found to be useful in linking up the study. Such data is cheaper and more quickly available when primary data cannot be obtained. Secondary data is also Cost saving, helps to improve the understanding of the problem and it provides a basis for comparison for the data that will be collected by the researcher.

3.13 Document review

This involved collection, studying and analysis of existing written (submitted and un-submitted) material. Documents to be reviewed will include official institutional reports (agency reports, statistics and figures); published books on accountability and public sector management; as well as data displayed in the software. Document review is an unobtrusive (non-reactive) method that will allow collection of information without any direct interaction with individuals/respondents. In this case, certain types of errors such bias, emotions and attitude will be avoided. It will also enable the researcher to be independent of the organization under investigation, and reduces reliance on the memory of individuals (common with questionnaire and interview), which can at Costs lead to inaccurate information. However, the document review method is associated with problems of retrieval, display of author subjectivity and limitations on accessibility, which may lead to incomplete information and portrayal of the wrong picture.

3.14 Data analysis techniques

After gathering data, there is need to process the data before it is analyzed. This involved data 3organization in line with the above themes set to capture the research's specific objectives. Data organization in this study will involve 4 stages as follows:

3.15 Pre-processing

The primary purpose of pre-processing was to correct problems identified in the raw data such as elimination of unusable data, interpretation of ambiguous answers and contradictory data from related questions.

3.16 Development of coding schemes

After correcting the errors that may influence data analysis, the researcher will formulate a coding system. The core function of the coding will be to create codes and scales from responses which will then be summarized and analyzed in various ways. The coding will also help in addressing challenges of missing data in that the missing data will be given its own code hence making analysis easy.

3.17 Deciding on data storage

After coding the data, the researcher wade a decision about the short and long term storage of the data gathered bearing in mind that this will determine the form of analysis to be used and how easy it will be to transfer the data into systems for more complicated analysis. In this study, both electronic and non-electronic (paper) forms will be used. The coded data will be written on paper before analysis due to the following advantage: paper has low cost, allows speedy retrieval and easy to distribute despite it having the challenge of being bulk and non-extensible. On the other hand, the use of electronic storage will make help in overcoming this challenge since it will make the data extensible and low volume.

3.18 Choosing a statistical software package

After storing the data, the next step was deciding on the statistical software package relevant in data analysis. The software's that will be used in the study are word processor (micro soft word), spreadsheet, data base, statistical systems (SPSS) and graphical systems. This will allow versatile analysis and interpretation of data

3.19 Data analysis

After organizing the data, the researcher finally conducted data. The researcher executed two types of data analysis, one during the data collection process at the research site and one following the completion of data collection. Data analysis will involve examining what will be collected and making deductions and inferences. It will also involve uncovering underlying structure, extracting important variables, detecting any anomalies and testing any underlying assumptions, it further goes to involve scrutinizing the acquired data and making inferences to address the initial objectives or propositions of the study.

Therefore, the data obtained from secondary sources was evaluated against and compared with the data gathered from primary sources in order to support the balance of evidence and interpretations that will be made in the thesis. The analysis of secondary sources will begin before and during the interview process. The preliminary review and analysis of documents will enable the researcher to identify the key thematic issues; and later during the interviews, will help in redesigning the questions in order to capture the analytical constructs. The secondary sources will provide some elements of quantitative data in the form of statistical tables, charts and graphs, which will enrich the analysis and help to describe, translate and provide meaning to issues captured from the interview.

3.23 Theory triangulation

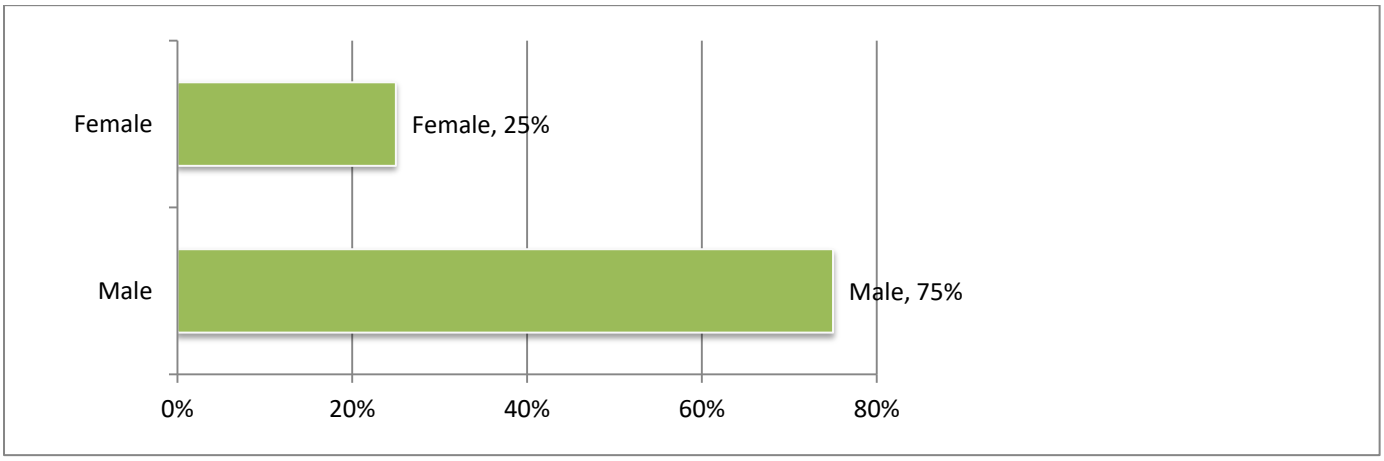
As evident in the theoretical framework, the researcher will use more than one theoretical approach (theory) to interpret and support data

Chapter Four: Presentation of Findings

Gender

The study sought to find out the gender of those who participated in the study. The figure below shows that 25% respondents were females, while 75% were males.

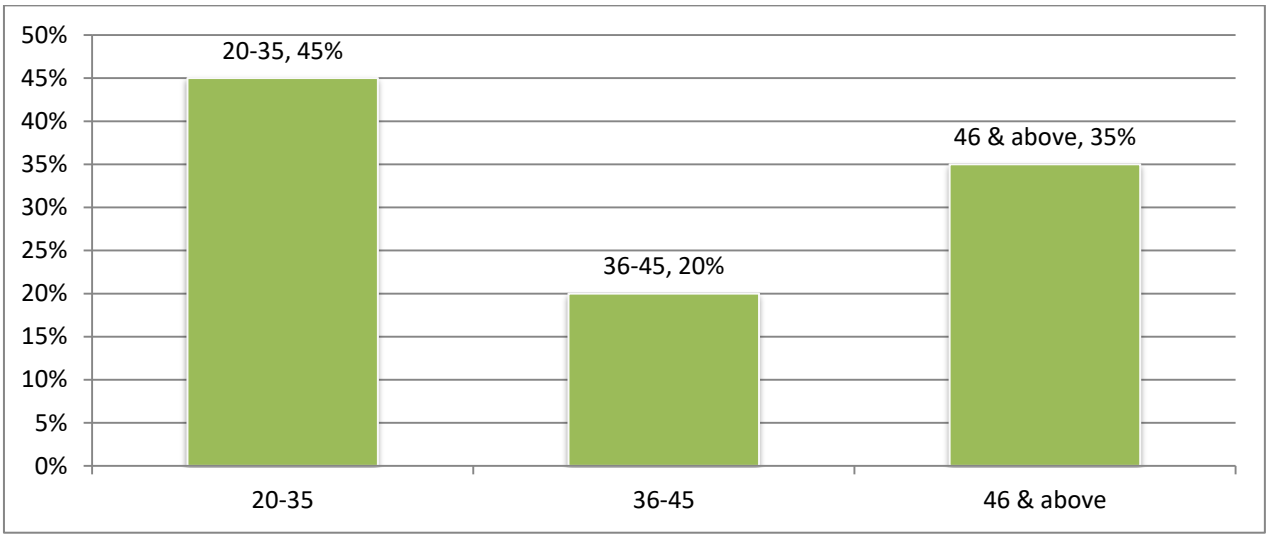
Fig4.1 Gender



Age

The researcher sought to find out the age groups of the participants who took part in the survey. The results below shows that those aged between 20 and 35 accounted for 45% and were majority. Those aged between 36 and 45 recorded 20% while those who were 46 and above accounted for 35%.

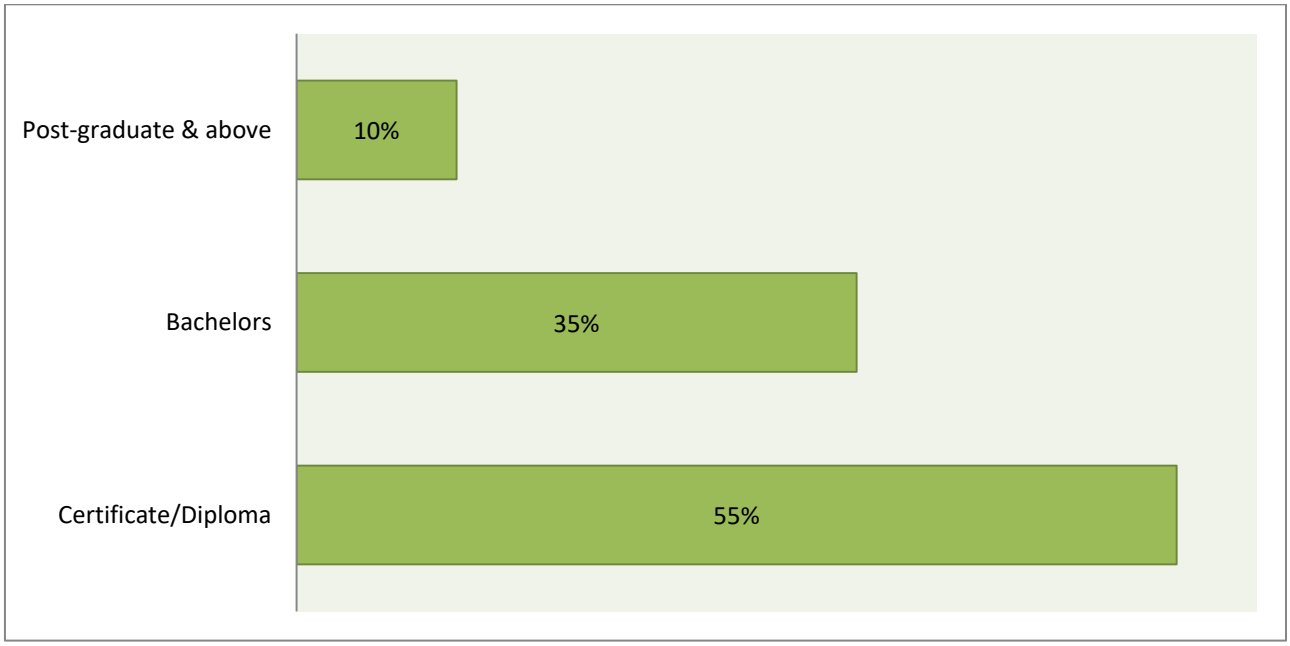
Fig 4.2 Age



4.2 Qualifications and level of education

The researcher sought to find out the qualifications and level of education of those who took part in the survey. Findings below show that those who had certificates/diplomas accounted for 55% and were the majority. Those who obtained bachelors in recorded 35% while those who obtained masters accounted for 10%.

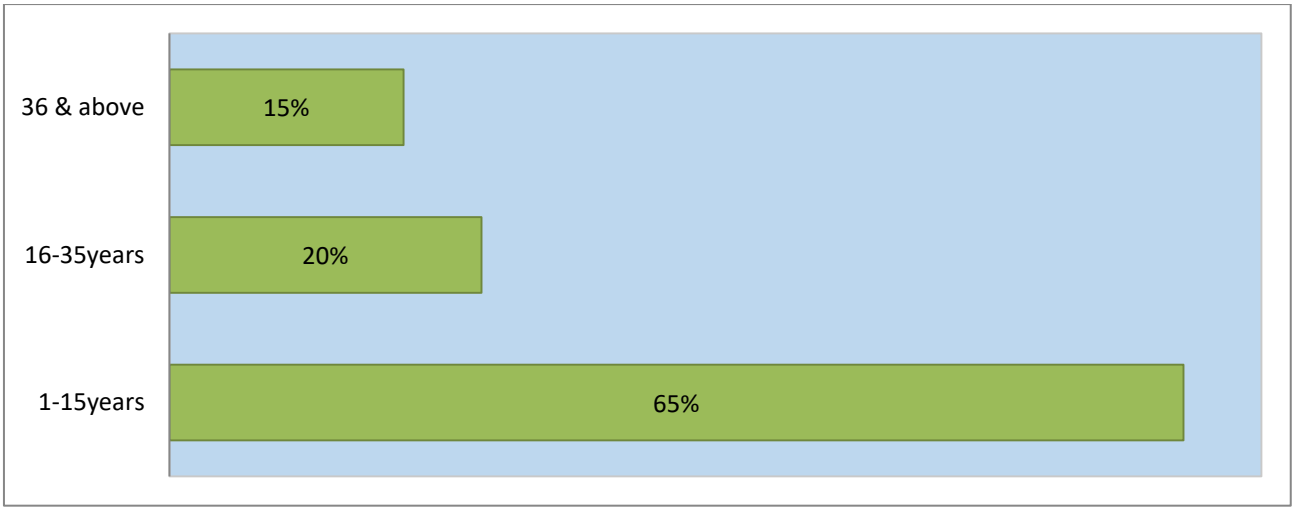
Fig 4.3 Qualifications and level of education



4.3 Work experience

The researcher sought to find out the years of service for those who took part in the study. Findings below show that those who had worked between 1 and 15 years accounted for 65% and were the majority. Those who worked between 16 and 35 years recorded 20% while those who worked 36 years and above accounted for 15%.

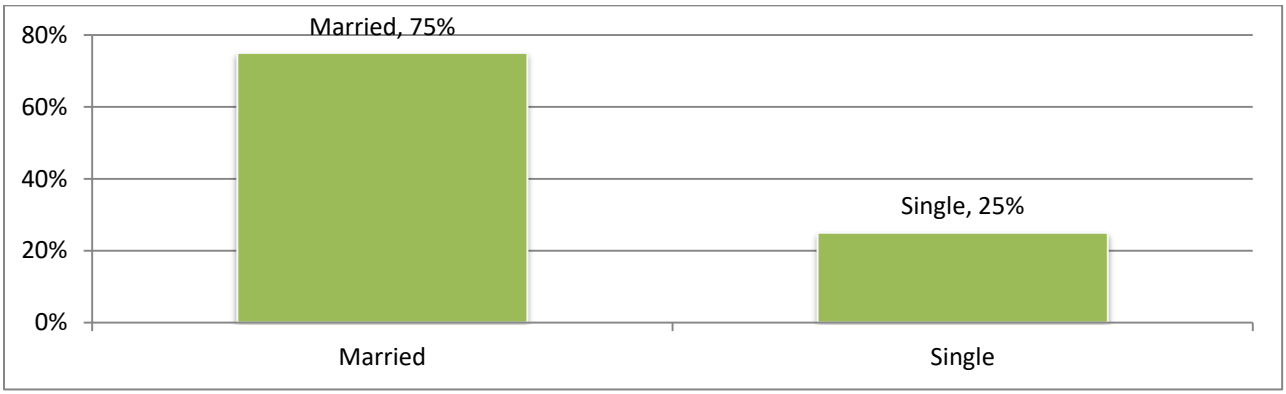
Fig 4.1 Work experience



Marital status

The researcher sought to find out the marital status for all those who participated in the survey. Findings below show that those who were single accounted for 25% while those who indicated married accounted for 75% and were majority.

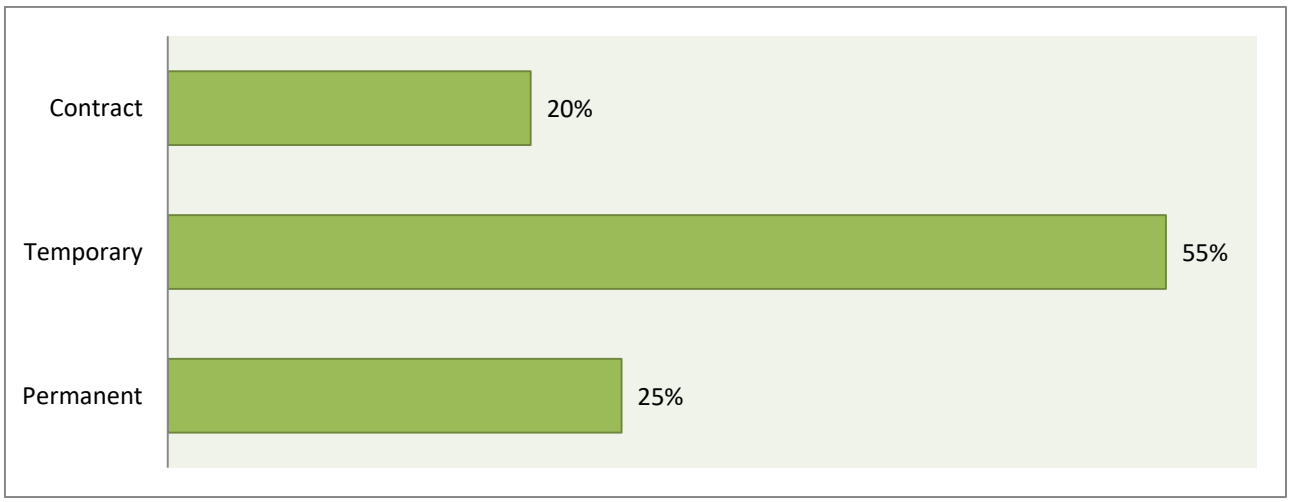
Fig 4.2 Marital status



Status of engagement

The researcher sought to find out the terms of employment of those who took part in the survey. Findings below show that those who were on permanent accounted for 25%. Those who indicated temporary recorded 55% and were the majority while those who were on contract accounted for 20%.

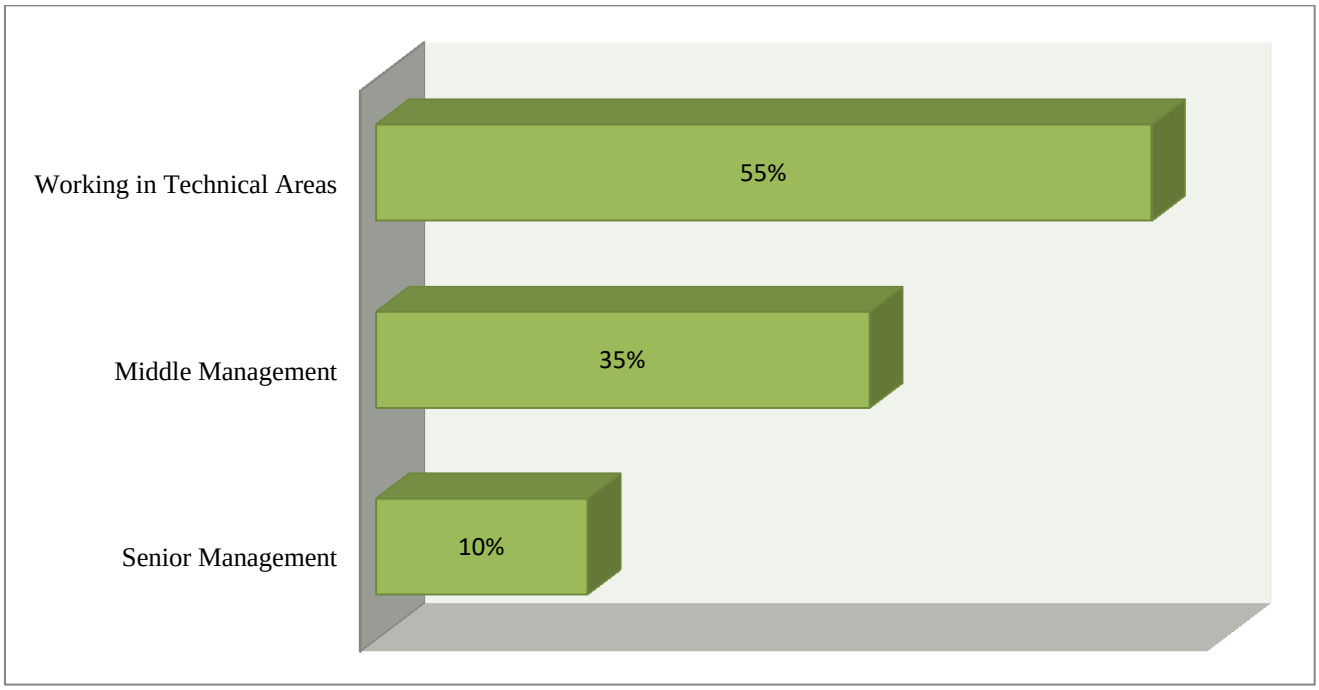
Fig 4.3 status of engagement



Level of engagement

The researcher sought to find out the level of position in the institution of those who took part in the survey. Findings below show that those who were in senior management accounted for 10%. Those who indicated middle management recorded 35% while those who were working under technical areas accounted for 55% and were the majority.

Fig 4.7 Level of engagement

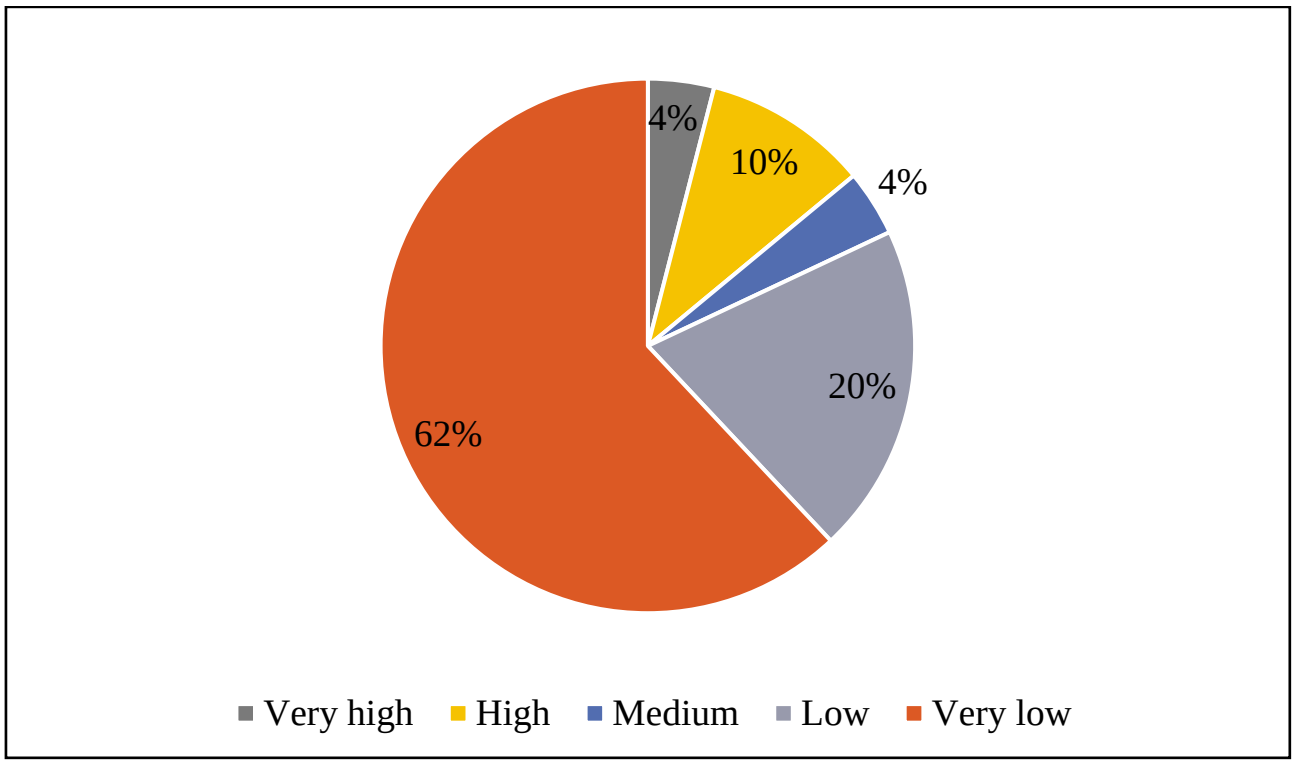


4.4 Cost management practices performed in the road construction sector

Occurrence of cost overruns

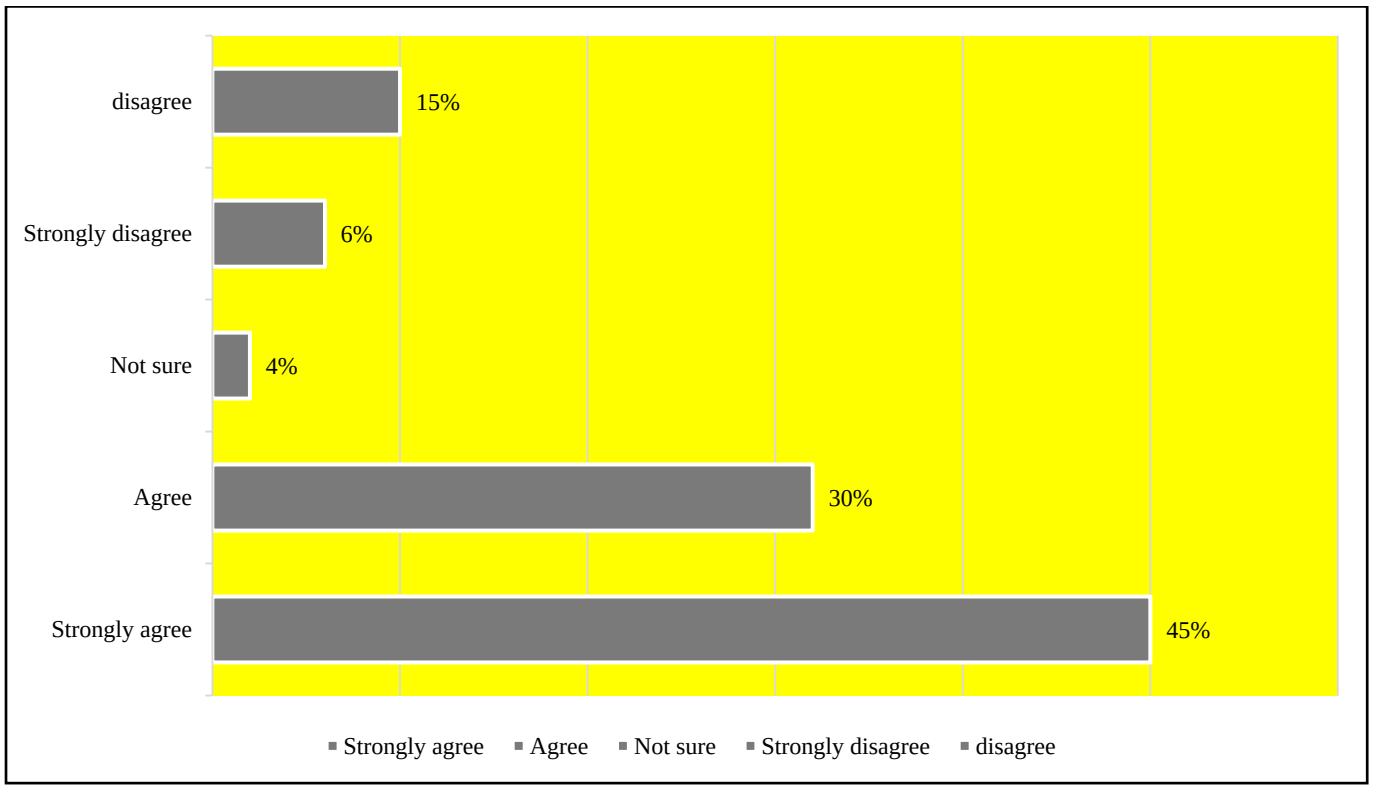
The researcher sought to find out occurrence of cost overruns. 62% said it was very low, 4% said it was low and another 4% said it was very low, 20 % said very high, while 10% said it was medium.

Fig 4.1 Occurrence of cost overruns



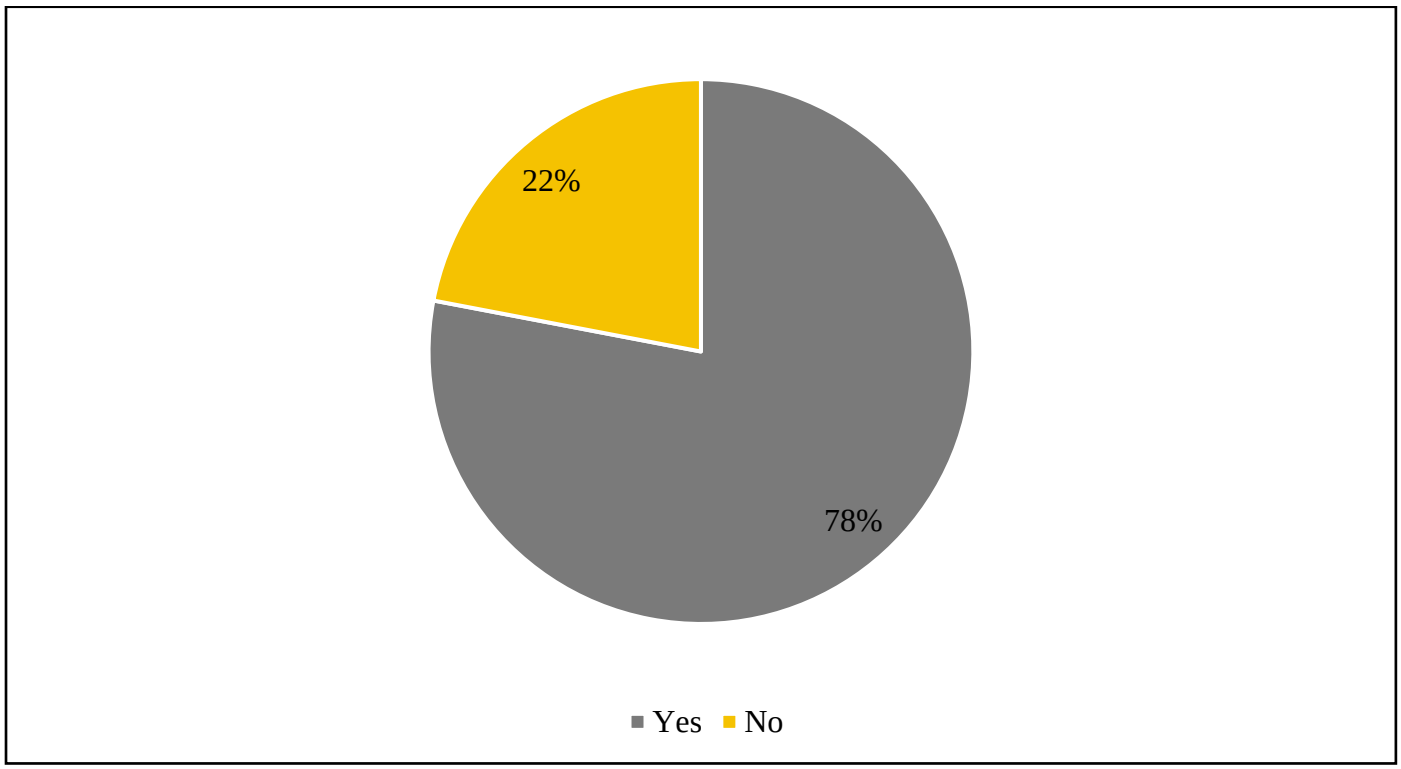
Effectiveness of cost management practices performed in the road construction sector

Fig 4.2 Effectiveness of cost management practices performed in the road construction sector



The researcher sought to find out on effectiveness of cost management practices performed in the road construction sector. 45% strongly agreed that it was effective, 30% agreed, 15% disagreed, 4% were not sure and 6% strongly disagreed.

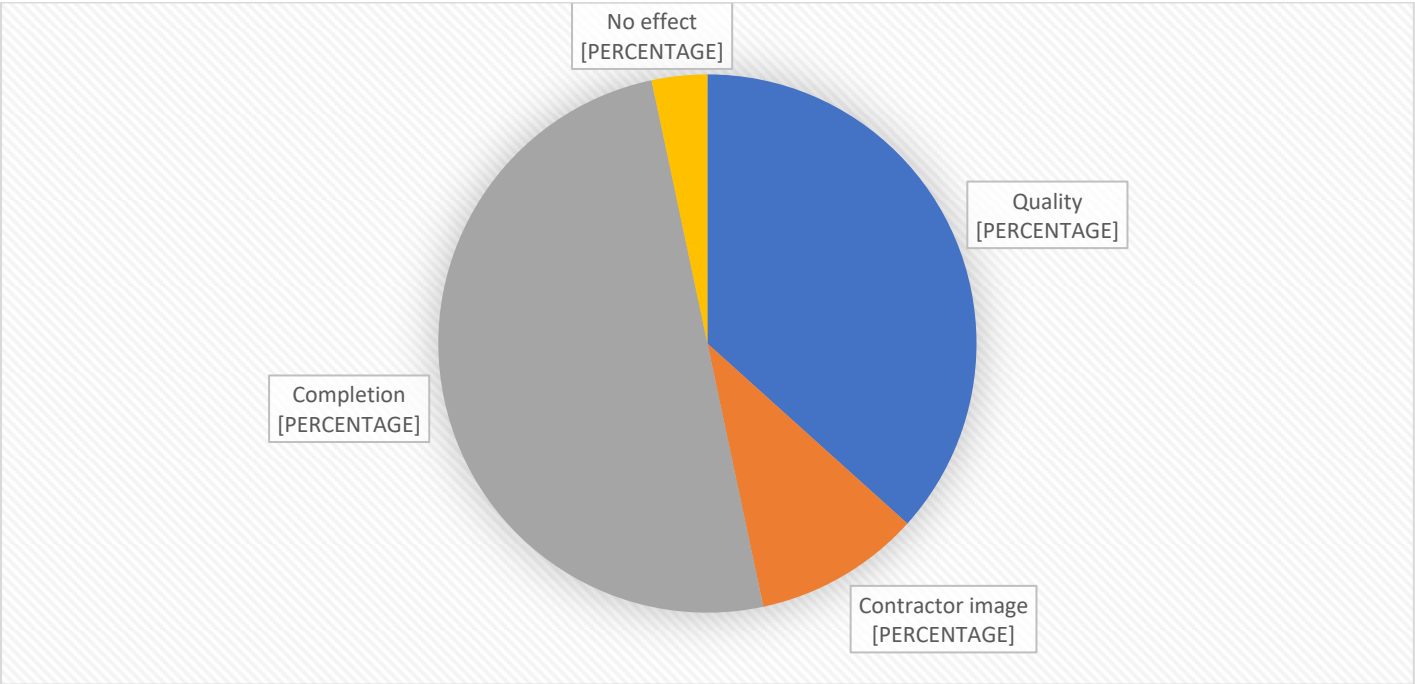
Fig 4.3 Project cost practices management affect project performance.



The researcher sought to find out whether cost practices management affect project performance. 78% said yes and 22 % said no.

How cost overrun affects projects

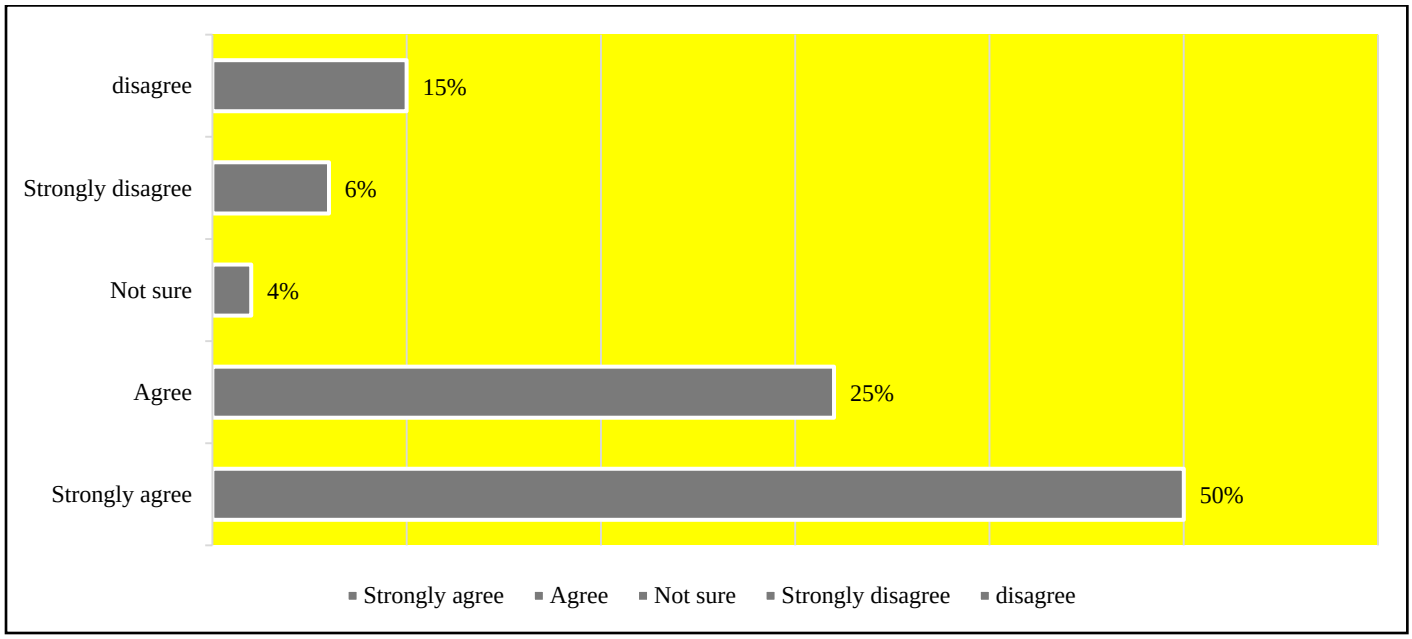
Fig 4.4 How cost overrun affects projects



The researcher sought to find out how cost overrun affects projects. 50% said it affected completion time, 37% said it affected quality and 10% said it dented the contractor image while 3% said it had no effect at all.

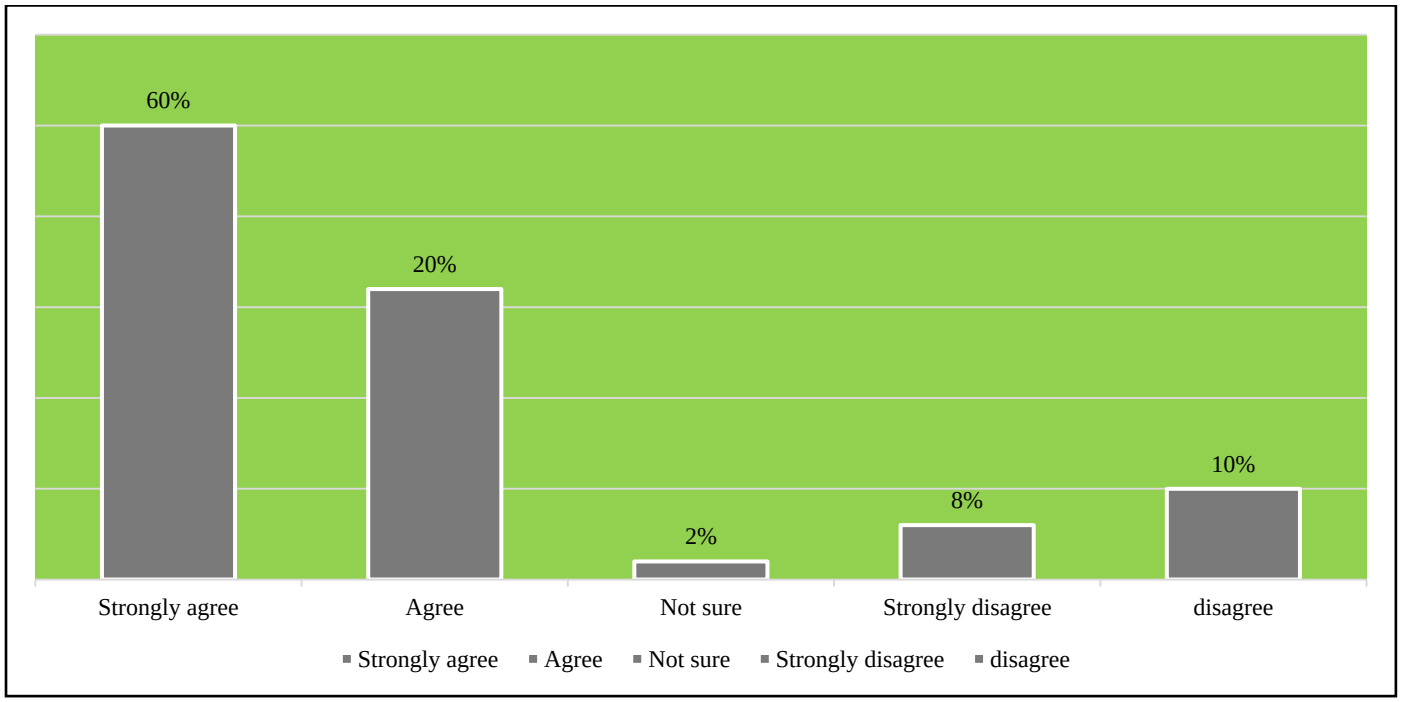
To establish mitigation measures that can enhance cost performance in road construction

Fig 4.5 Mitigation measures that can enhance cost performance in road construction-Strong management skills



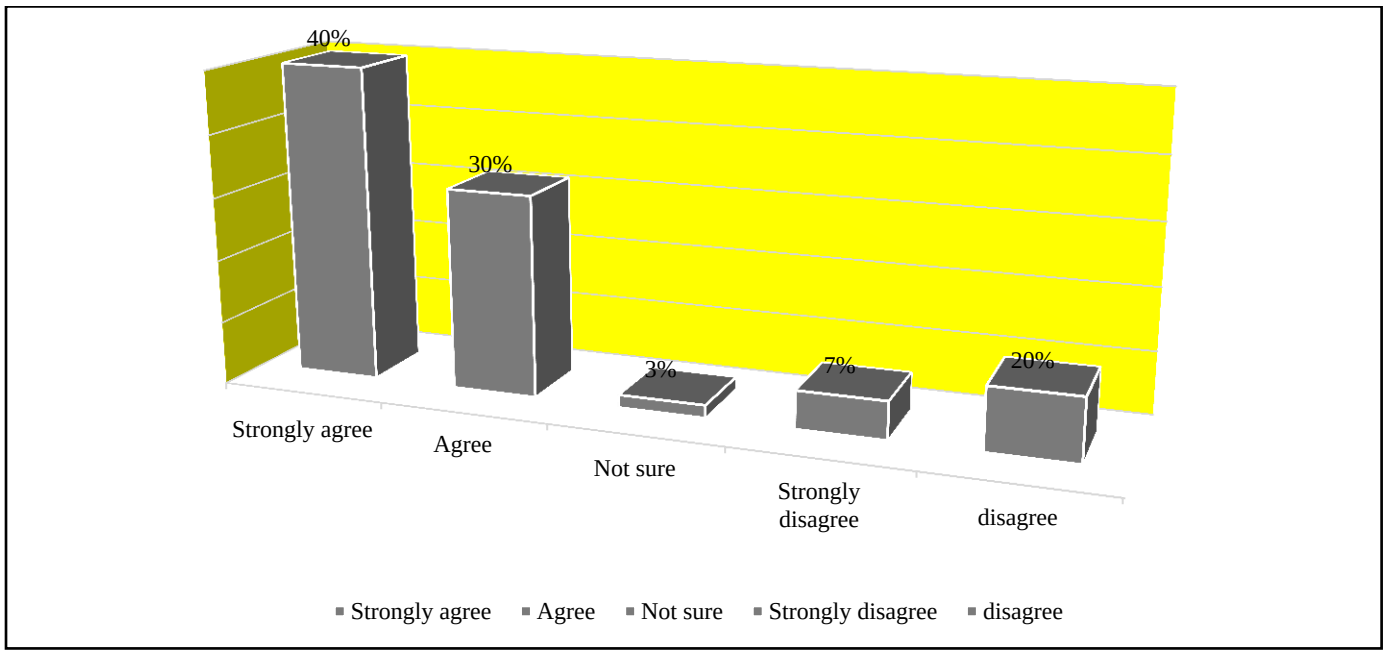
The researcher sought to find out how mitigation measures that can enhance cost performance in road construction. The scenario was based on introducing strong management skills. 50% strongly agreed that these are needed, whilst 25% agreed, 6% strongly disagreed, 15% disagreed and 4% were not sure.

Fig 4.6 Setting clear goals



The researcher sought to find out how mitigation measures that can enhance cost performance in road construction. The scenario was based on setting clear goals. 60% strongly agreed that these are needed, whilst 20% agreed, 8% strongly disagreed, 10% disagreed and 2% were not sure.

Fig 4.7 Well-developed and well communicated budgets



The researcher sought to find out how mitigation measures that can enhance cost performance in road construction. The scenario was based on Well-developed and well communicated budget**.** 40% strongly agreed that these are needed, whilst 30% agreed, 20% disagreed, 7% strongly disagreed and 3% were not sure.

Discussions:

Gender

The study sought to find out the gender of those who participated in the study. The figure below shows that 25% respondents were females, while 75% were males.

Age

The researcher sought to find out the age groups of the participants who took part in the survey. The results below shows that those aged between 20 and 35 accounted for 45% and were majority. Those aged between 36 and 45 recorded 20% while those who were 46 and above accounted for 35%.

Marital status

The researcher sought to find out the marital status for all those who participated in the survey. Findings below show that those who were single accounted for 25% while those who indicated married accounted for 75% and were majority.

Qualifications and level of education

The researcher sought to find out the qualifications and level of education of those who took part in the survey. Findings below show that those who had certificates/diplomas accounted for 55% and were the majority. Those who obtained bachelors recorded 35% while those who obtained masters accounted for 10%.

Work experience

The researcher sought to find out the years of service for those who took part in the study. Findings below show that those who had worked between 1 and 15 years accounted for 65% and were the majority. Those who worked between 16 and 35 years recorded 20% while those who worked 36 years and above accounted for 15%.

Status of engagement

The researcher sought to find out the terms of employment of those who took part in the survey. Findings below show that those who were on permanent accounted for 25%. Those who indicated temporary recorded 55% and were the majority while those who were on contract accounted for 20%.

Level of engagement

The researcher sought to find out the level of position in the institution of those who took part in the survey. Findings below show that those who were in senior management accounted for 10%. Those who indicated middle management recorded 35% while those who were working under technical areas accounted for 55% and were the majority.

4.5 Cost management practices in road construction sector.

Globally, the construction sector has proven to be a critical sector that should not be ignored in the life of the economy of any nation (Abiodun and Nwaogu, 2021). This is because the construction industry is the economic backbone of nations, as the industry provides jobs and propels growth in other sectors of the economy. (Onyejeakor et al., 2020; Onyeagam et al., 2019). In spite, of the impact of the sector on the life of nations, construction projects suffer from delayed completion, cost overruns, poor quality, and material shortages, among others. These problems occur due to an incorrect management approach to project resources (Ronald & Agung, 2018). In addition, construction projects' risk levels and complexity increase with poor cost management strategies. Developmental projects have failed to meet client needs and project requirements, as a result of poor cost management strategies by construction organizations. Poor cost management leads to poor cost performance. This is a situation in which the project exceeds its initial planned schedule and cost budgets. This has remained a recurring issue affecting a lot of construction projects both in developed and developing economies (Obi et al., 2017; Odediran and Windapo, 2014). Construction firms are the major actors whose management experiences impact the project and customer satisfaction.

Occurrence of cost overruns

The researcher sought to find out occurrence of cost overruns. 62% said it was very low, 4% said it was low and another 4% said it was very low, 20 % said very high and 10% said it was medium. A key practice for staying competitive is effective cost management. Cost management involves all the processes for ensuring projects are delivered within the planned budget. The processes involved are planning, estimating, coordination, control and reporting of all cost-matters (Ashworth, 2010; Kern

and Formoso, 2006). Cost management involves getting a clear grasp of how and why costs are incurred on a project and taking critical measures to ensure that the planned project budget is not exceeded. The benefits of effective project cost management that have captured the attention of clients (public and private) are its ability to guarantee improved value for money and satisfaction of the clients (Gopalan and Venkataraman, 2015; Obi et al. 2017; Smith, 2014). In developed countries like the UK, concerted efforts have been made by the government to develop a detailed cost management guideline to help organizations involved in the delivery of public-funded projects to achieve effective project cost management (United Kingdom Office of Government Commerce, 2007). Similarly, efforts are being made in various countries to develop similar cost management guidelines to improve value for monies and ensure the satisfaction of parties to public projects (Obi et a., 2017). Effective cost management can be achieved through a functional system that allows for accurate estimation of cost, planning, monitoring and controlling to keep the cost within budget (Kern and Formoso, 2004). Tejas (2020) advocated for holistic management of materials, plant and equipment; to ensure the cost of projects are kept within budget. Cost management is not an easy task, as project managers would have to be confronted with a lot of issues that required proactive balancing to ensure that their impact on project success is minimized.

4.7 How project management cost practices affect project performance.

The researcher sought to find out whether cost practices management affect project performance. 78% said yes and 22 % said no. ivakar and Jebin (2018) assessed the factors influencing effective cost management process implementation in construction and found that the top 14 factors are; Unrealistic schedule imposed in the contract, poor scope definition, accuracy in the estimation of direct and indirect cost, inaccurate activity cost estimate, allocation of direct, indirect and joint cost, ineffective frequency of project budget updates, poor WBS definition, change in schedule, weak regulation and control, often changing subcontractors, lack of proper training and experience of project manager, low productivity of labour, poor updating of cost management information systems, and not implementing project management tools for monitoring and control. Olawale & Sun (2010) found that in the UK, the top factors influencing time and cost control are design changes, poor evaluation of project time and cost, uncertainties, the complexity of works, and poor contractors' performance.

4.8 How cost overrun affects projects

The researcher sought to find out how cost overrun affects projects. 50% said it affected completion time, 37% said it affected quality and 10% said it dented the contractor image while 3% said it had no effect at all. Cost management according to Andres (2021), ensures that project cost performance is monitored, changes are corrected and changes that will impact cost are announced to project stakeholders. Effective cost management ensures that the financial health status of businesses is known via cost monitoring. This helps companies to make an informed decision that will bring sustainable growth and progress. Help to optimize the financial planning of the company. This makes the estimation and planning of expenditure more effective and efficient.

4.9 To establish mitigation measures that can enhance cost performance in road construction

The researcher sought to find out how mitigation measures that can enhance cost performance in road construction. The scenario was based on introducing strong management skills. 50% strongly agreed that these are needed, whilst 25% agreed, 6% strongly disagreed, 15% disagreed and 4% were not sure. The results of this section are in line with the reports of (Enshassi et al., 2006; Akinsola et al., 1997; Iyer and Jha, 2005; Fagbenle et al., 2018). Iyer and Jha (2005) reported that poor leadership, management, experience and competencies of project managers play a critical role in achieving

effective cost management functions. If the leadership of an organization are weak or lack the appropriate cost management skills, the result will be losses and wastages and poor resources allocations and management.

Conclusions and Recommendations:

5.1 Conclusions:

The purpose of this study was to assess the role of cost management practice on construction firms' strategic performance in the road construction industry. This study used a well-structured questionnaire administered to construction professionals via electronic means and using snowball sampling techniques in the 6 states of the south-south geopolitical zone of Nigeria. Interesting findings were made and discussed. The study found that the top factors influencing construction cost management are; experience and competence of the project managers, weak management support and control, poor project communications, external economic environment, lack of use of project management tools (technology), poor leadership and coordinating skills, underutilization of plant and equipment, excessive materials wastages on-site, poorly developed project brief, and materials theft on sites. Also, the top benefits of cost management are; help reduce wastage and expenses, improve operational efficiency need, helps to predict future expenses, ensures procurement effectiveness, improve profit maximization, enables the correction of changes that will impact projects outcome, generates cost data for benchmarking of potential future projects, leads to client satisfaction, improve value for money for the parties and this can lead to repeat patronage, and help to reposition businesses for effectiveness. However, based on the average weight of the relative importance index scores of the assessed variables, it was concluded that all the assessed factors influence cost management and that cost management is highly beneficial to projects and organizations in the construction industry. Effective implementation of cost management practices has a very high impact on the survival and sustenance of construction firms. Cost management is a strategic tool for construction firms to attain a better competitive advantage in the construction industry.

5.2 Recommendations:

Project managers should continuously upgrade their skills for effective cost management to boost the strategic competitive position of their firms.

Project managers must present well outlined budgetary process which must be communicated to the project team

Acknowledgements

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