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Examining Effectiveness of Cost Control Measures in Road Construction Projects: A Case Study of Road Constructions Projects in Lusaka

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Abstract

Construction practice has undergone a great deal of development in response to the dynamic nature of human needs and infrastructure. The main aim of the study is to examine effectiveness of cost control techniques used in construction projects. A case study of road construction projects in Lusaka. Specific Objectives included; establishing cost control technique used by contractors in construction projects, examining effectiveness of cost control technique used by contractors in construction projects, evaluating relationship between cost control and project completion and identifying limitations encountered by contractors in managing construction project cost. Research design is defined as the general plan of how the researcher goes about answering the research questions (Saunders *et al,* 2007). A descriptive case study approach was adopted to match the nature of the topic. The study used closd ended questionnaires and guided oral interviews. The sample size refers to the number of elements or units that the researcher draws from the population of respondents for research exercise. In this study, the sample size of 100 respondents were picked. And all 100 questionnaires were distributed. The main instruments used were questionnaires and personal interviews. The questionnaires comprised closed and open-ended questions. Questionnaires were administered or handed out to the respondents depending on their business operating schedules. Qualitative and quantitative data analysis was done. Quantitative data was used because it is easier to present using tables and qualitative data helped express the data collected. Data analysis is the process of editing and reducing accumulated data to a manageable size, developing summaries, looking for patterns and applying statistical techniques The data collected was analyzed using tables, figures. The researcher used both qualitative and quantitative method. For the qualitative data, the researcher used descriptive method, while for quantitative data will be analyzed using Microsoft Word and Excel to generate tables and other graphic illustrations. The data show that 41.7% of respondents find cost estimation "very effective," demonstrating strong confidence in its ability to accurately predict project costs and manage budgets. Another 33.3% rate it as "effective," indicating that a significant portion of contractors acknowledges its substantial benefits. Meanwhile, 16.7% consider it "somewhat effective," suggesting there is room for improvement or better implementation practices. Only 8.3% find it "not effective," highlighting that a minority faces challenges with current cost estimation methods. The study found that project teams do not effectively monitor and track project expenditures against the budget. To address this issue, it is recommended to implement a robust financial monitoring system that provides real-time tracking of project expenditures. This system should include automated alerts for budget variances, detailed expenditure reports, and regular reconciliation processes. Establishing a dedicated financial oversight team to review expenditures and ensure alignment with the budget can also help in maintaining financial control and preventing cost overruns.

Keywords: Cost, Management, Project, Overrun

1. Introduction

1.1 Background

It is a known fact that the Zambian construction industry continues to occupy an important position in the nation's economy even though it contributes less than the manufacturing or other service industries, the contribution of the construction industry to national economic growth necessitates improved efficiency in the industry by means of cost-effectiveness and timeliness, and would certainly contribute to cost savings for the country as a whole. It is also common knowledge that the

implementation of the construction project in the industry is usually accompanied with time delay and cost increase as well as owner dissatisfaction.

Contract management, financing and payment of completed works, change in site conditions, shortages of materials, design changes, subcontractors and nominated suppliers, other factors were price fluctuation inaccurate estimates, delays and additional works as factors responsible for project delays and cost overrun. A comprehensive classification of causes of construction delays has also been determined by Henesy (2023). The classification system included materials, labour, equipment and financial constraints, as the main contributory variable to causes of construction time overrun. The list of major factors causing construction delay in Zambia included the inadequacy of resources supplies, client and consultant shortcomings and incompetence. Koushki and Kartan (2014) studied the impact of construction materials on project time and cost in Kuwait and identified the project related variable affecting the on time delivery of materials as material selection, time, type of materials and their availability in the local market. Time impacts are inevitable on construction projects, primarily because of the uniqueness of each project and the limited resources of time and money that can be spent on planning, executing and delivering the project. Time factors are inherent in all of project construction's undertakings. Construction projects have long been recognized as particularly cost, time and risk-laden. Some of the time and cost factors associated with the construction process are fairly predictable or identifiable; others may be totally unforeseen. The constructed project may not perform as anticipated because the owner may have unrealistic expectations regarding the delivery time of construction forcing contractors into unrealistic gambles, corner-cutting or commitments that may not be realistic. Project success can be defined as meeting goals and objectives as prescribed in the project plan.

A successful project means that the project has accomplished its technical performance, maintained its schedule, and remained within budgetary costs. Project management tools and techniques play an important role in the effective management of a project. Therefore, a good project management lies in the management tools and techniques used to manage the project. Project management involves managing the resources—workers, machines, money, materials and methods used. Some projects are effectively and efficiently managed while others are mismanaged, incurring much delay and cost overruns and negatively affecting the economy.

According to the Central Statics Office (2014), the construction sector has exhibited steady growth since independence of Zambia. In 2014 the sector recorded an 8.5% growth rate translating into 1% percentage point contribution towards real GDP growth. The transport, storage and communications sector accounted for 1.2 % percentage points in terms of contribution to real GDP growth in 2014. The road construction, rehabilitation and maintenance projects where cited among the factors that increased traffic volumes in the country and thereby positively contributing to the economic growth (BOZ, 2015). Transportation and Communications play a very significant role in growing and developing the economy of Zambia. The sector promotes agriculture, trade, commerce, mining, tourism and delivery of basic social services. In 2002, transportation costs accounted for over 60% of the cost of production of goods and commodities in Zambia which contributed to the high cost of living and increased poverty levels amongst the citizens. Therefore maintaining a safe and reliable road transport system works the effort to down turn the situation by reducing transportation costs and consequently the prices for essential goods and services (WTO, 2022). In line with this, the Government of the Republic of Zambia is undertaking various road construction, maintenance and rehabilitation projects. The projects are managed by the Road Development Agency (RDA) as the main mandated body and delegated roads authorities comprising of Ministry of Local Government and Housing (MLGH), Rural Roads Unit (RRU) and Zambia Wildlife Authority (ZAWA).

The RDA (2015) reported that road construction projects had suffered cost and schedule overrun due to inadequate project preparation at planning stage. The report revealed that for the period 2011 to 2015 the road sector had incurred overrun costs in excess of K 1.9 billion representing 9% of the total projects value administered in this period. It was identified that road sector implemented works based on government directives with pressure thereby resulting into tendering and procuring works without proper planning, scope definition, cost estimates and designs. Most of the projects were initiated expeditiously outside the road sector work plan (Kalaluka, 2015).

Cost control in construction is the difference between making a profit and absorbing a loss in many cases. This guide breaks down what cost control is and how to improve your own processes. Construction projects are notorious for exceeding their budgets, but it's still eye-popping to see the actual figures. A recent study found that just 25% of projects came within 10% of the budget in the preceding three years. That means that three out of four projects will not only exceed the budget, but do so by double digits in terms of percentage.

1.2 Statement of the Problem

The Construction can be considered as a dynamic industry which is constantly facing uncertainties. These uncertainties and the many stakeholders in these kinds of projects, make the management of costs difficult which consequently causes cost overruns. Therefore, cost overruns are considered one of the most critical issues during the execution of construction projects (Chan, *et al*., 2014 [4]; Doloi, 2017). As mentioned by Van Der Westhuizen and Fitzgerald (2015), the presence of cost overruns can be a reason for project delays or possible project failures. However this idea has been refuted by many authors who considered that project success depends on many other factors that should be assessed to conclude the success or failure of a project (Chan, *et al*., 2014) [4]. Moreover, there have been many studies that suggest that the success of a project depends on the presence of certain critical factors which can also change depending on the objective to be met (Iyer and Jha, 2015). In other words, some authors ascertained that there are some critical success factors that help to improve cost performance and prevent cost overruns.

1.3 Objective

1.3.1 General Objective

The main aim of the study is to examine effectiveness of cost control techniques used in construction projects. A case study of road construction projects in Lusaka.

1.3.2 Specific Objectives

1. To establish cost control technique used by contractors in construction projects.
2. To examine effectiveness of cost control technique used by contractors in construction projects.
3. To evaluate relationship between cost control and project completion.
4. To identify limitations encountered by contractors in managing construction project cost.

1.4 Significance of the Study

This study will be of importance to building professionals and the general public because it would not only clarify but also create awareness of the extent to which inadequacies in cost control techniques can adversely affect project performance. The study will also help contractors, clients, consultants and all parties involved in construction projects about ways of improving their current method of cost management and control. The study will also be of great benefit for other student researchers' who may want to venture into the same subject matter. Having gotten results-both empirically and theoretically, the study will serve as a foundation for future research studies.

1.5 Scope of the study

The study will cover some selected quantity surveyors from Owerri. All findings and recommendations from the study may not reflect the true view of the traditional roles and changing roles of quantity surveyors as the researcher could not cover a wider area due to financial and time constraints.

2. Literature Review

Cost control in construction is the process by which managers keep expenses under control by managing labor, material, and overhead costs to ensure that the project finishes on budget. Cost control relies on sound estimates and constant monitoring over the course of a project. Without cost control, a project quickly burns through its budget and leaves the construction firm with very little profit or even a loss. As a result, good cost control is a must for any construction business that wants to be successful. In this chapter, the paper will cover the discuss themes developed from the objectives discuss each thematic area from Global, Asian, African, Sub Saharan, and Zambia perspectives on each theme.

2.1 Cost control technique used by contractors in construction projects.

The term 'Cost' is defined as the price paid to acquire, produce, accomplish, or maintain anything. Whereas the term 'Control' is defined as the act or power of controlling; regulation; domination or command, for construction industry, the term 'Cost' should be referred to the amount paid by a party; either a person or a corporation, to another party; normally a contractor, either to construct a complete building or a particular section of a building. And for the term 'Control' in construction industry, it should be referred to an official mean of regulation or restraint in the management of the project (Aibinu, 2002).

According to Marchesan and Formoso (2008) [15], the combination of the term 'Cost' and 'Control' should be defined as the application of procedures that result in early illumination of potential changes in resource requirements and in the timely surveillance of the usage of funds to permit action that will keep cost within a predetermined range.

While for the other definition of Cost Control, we can refer to Ashworth (2004), he defined Cost Control as a process of planning, checking and verifying project expenditure based on established standards and taking the necessary corrective action to ensure that the total project expenditure is approximately to the estimated budget.

While according to Ritz (1994), he stated that Cost Control gives a different meaning to a different people. Some people engage it with engineering costs; some states that it is a cost report, value engineering, cost management etc. Cost Control involves all the activities above in different time by different parties and all the parties involved in a project will have their own responsibilities and roles in cost minimization and Cost Control.

Other than that, Royal Institute of Chartered Surveyor Committee defined Cost Control as the total proves which ensures that the contract sum is within the client's approved budget or cost limit. Further definition can refer to Mueller (1986), he stated that the cost control is the ability to influence the final cost of project positively with modifying negative performance trends. In addition, Kwayke (1997) defined Cost Control as a process where construction cost of a project is manage with the best method and systematic approach in order that the contractor would not suffer losses during the execution of the activities of the project and the cost of construction of a project would not be over-estimated by the developer.

By concluding all the definition mentioned above, Cost Control in construction industry should be the application of procedures or regulation during the construction project life cycle to plan, check and verify the construction project expenditure based on the established procedures or regulations to ensure that the construction project expenditure is within the project budget, within given timeframe with quality specified and also to ensure that resources are used to best advantages or maximization of the profit for the construction project.

2.2 Effectiveness of cost control technique used by contractors in construction projects

Timely completion is working at the appropriate time that is completion of the work or designated portion thereof on or before the date required.

According to Elinwa & Joshua (2001), time on construction projects is concerned with (i) planning of the work over the anticipated duration (programme) in relation to its requirements with full appreciation of the resources needed and resources available; planning for utilization sets the basis or yardstick (plan) against which progress can be monitored and assessed; (ii) progressing which follows the programming of the work and compares the work undertaken against the plan allowing the redistribution of resources, if necessary, to hurry up the work if it's falling behind the plan.

Kaming *et al* (1997) defined time overrun as the delay beyond planned completion dates traceable to the contractors. The construction industry plays a serious role within the development of the many countries. At the macro level, delay will cause a negative rate of national economic process and monetary loss. Kaming, *et al*. (1997) noted that at the micro level, a delayed project can lead to time and cost overruns, disputes, arbitration, and even total abandonment. Elinwa & Joshua (2001) confesses that delays in construction projects are global phenomena and the sub-Saharan region is no exception. This trend has become the norm instead of the exception, especially in developing countries. This scenario, thus, constitutes a 20

2.3 Relationship between cost control and project completion

Although many researchers have studied the effect of construction delivery and lead time on the performance of local contractors in general there is still need to further assess this effect on the road sector industry to be specific. In Africa, research on the performance on the local contractors is limited to a few countries. There is however need to understand why local 27

contractors participation in the road sector is still low as compared to foreign contractors. The problems, experiences, effects and solutions of the performance of the road local contractors in the road sector are yet to be captured in empirical literature. The performance of road local contractors has a remarkable impact on the general performance of a country's economy. This study fills the void by providing some specific knowledge on the performance of these road local contractors.

Prioritising of roads for development It has been observed in past studies in Africa that poor prioritisation of developmental projects is one of the problems affecting planning. Several times either none important or urgent projects are fronted instead of crucial ones which might address the outstanding problems. Worse off it was recorded that sometimes a same project might have parallel implementing structures resulting in duplication and this has mainly been the case with donor funded projects (Byakika, 2012). The common professional practice in project selection is to prioritise economic investment based on road deterioration and traffic demand. According to the case study on the RDA it was revealed that Zambian road project selection is mostly based on population density and poverty levels. Areas with low population density were prioritised between 2008 and 2011 and also areas with higher poverty rating were considered priority this led to low road infrastructure development in areas with higher economic activities such as Copperbelt (Raballand, 2013). 21 Oppong's (2014) study on infrastructure development in Africa concluded that most governments do not set the right priorities in project selection. It further went to state that most projects were ad hoc and misplaced. Good project planning efforts entail that selected projects meet intended objectives and expectations of the general public rather than being white elephants. An increase in rehabilitation projects is an indication enough that extra efforts are required in maintenance of infrastructure. It is generally observed in Sub-Saharan region that maintenance projects have little perceived benefits and therefore they don't receive adequate support for funding by both executives and parliaments. The general conclusion is that in environments of weak governance practices and politically dominated budgeting processes, maintenance of infrastructure is not prioritised. Zambia is ranked amongst the three countries with high spending on road infrastructure rehabilitation along with the Democratic Republic of Congo and Ethiopia whose amounts are about 15 times higher than those of middle income countries (Briceño-Garmendia *et al*., 2008). The SADC infrastructure report of 2011 listed Zambia amongst the countries which have allowed 30 to 60 percent of their infrastructure stocks to drop into the poor condition category. The report alluded his to funding deficiencies as well as implementation of maintenance works (Ranganathan & Forster, 2011) [21].

2.4 Limitations encountered by contractors in managing construction project cost

Cost Control in construction industry should be the application of procedures or regulation during the construction project life cycle to plan, check and verify the construction project expenditure based on the established procedures or regulations to ensure that the construction project expenditure is within the project budget, within given timeframe with quality specified and also to ensure that resources are used to best advantages or maximization of the profit for the construction project.

Cost Control need to serves the purposes like to provide the relevant feedback, to provide the client with a value-for-money project, to provide data to assist in the valuation, to provide immediate warning of uneconomic operations, to limit the client's expenditure, to achieve balanced design expenditure, to summarize progress and to promote cost consciousness.

Difficulties of Cost Control during construction stage are failed to estimate the project exactly, the compilation of project budget has poor reliability, working drawing budget is unpractical, do not follow basic construction procedures and can not control costs, contract is not managed well, irregular management and many changes for project, rise of cost due to unreasonable financing structure and system is imperfect ().

Factors that contribute to those difficulties are control of labour cost; site Condition, location of site, materials and overheads and profit. It is necessary for management to study the difficulties involved and the factors contributing to these difficulties so that they will design a cost control system that more efficient for a particular project ().

3. Methods and Procedures

3.1 Research Design

Research design is defined as the general plan of how the researcher goes about answering the research questions (Saunders *et al* (2007). A descriptive case study approach will be adopted to match the nature of the topic. The study will use closed ended questionnaires and guided oral interviews. A sample will be drawn from project workers to generate inferences about the target population. This helps in saving time and resources it would otherwise have taken to meet every individual in the entire population.

3.2 Target Population
According to Shajahan (2004) the term population refers to the set of all elements of interest in a particular study. Target population in this research comprises of all those potential participants that could make up the study group. In this research, the target population was 200.

3.3 Sampling Design
Random sampling of respondents will be carried out. The respondents will be picked from project sites. This will be done in order to extract correct and accurate information because the problem at hand required such consideration.

3.4 Sample Size Determination
The basic idea of sampling is by selecting some of the elements in a population, we may draw conclusions about the entire population [Cooper and Schindler (2001)]. The reason why sampling is necessary is because of lower costs, greater accuracy of results, and greater speed of data collection and availability of population elements.
The sample size refers to the number of elements or units that the researcher draws from the population of respondents for research exercise. In this study, the sample size of 100 respondents were picked. And all 100 questionnaires were distributed.

3.5 Data Collection Methods
The main instruments used were questionnaires and personal interviews. The questionnaires comprised closed and open-ended questions. Questionnaires were administered or handed out to the respondents depending on their business operating schedules. Qualitative and quantitative data analysis was done. Quantitative data was used because it is easier to present using tables and qualitative data helped express the data collected.
Data collection consisted of interviews from the selected respondents both male and female. This method was appropriate, although the sampled population comprised literate respondents.

3.6 Data Analysis
Data analysis is the process of editing and reducing accumulated data to a manageable size, developing summaries, looking for patterns and applying statistical techniques [Cooper and Schindler (2008). The data collected was analyzed using tables, figures. The researcher used both qualitative and quantitative method.
For the qualitative data, the researcher used descriptive method, while for quantitative data will be analyzed using Microsoft Word and Excel to generate tables and other graphic illustrations.

3.7 Ethical Considerations
The researcher ensured that no respondents are forced to give information concerning the subject matter but allowed them to give information out of their own convenience and free will. The researcher also ensured the information obtained from respondents remain confidential, and that information obtained is purely for academic purposes. Anonymity was taken into account by not disclosing names of the respondents. The research did not use arm twisting tactics such as embarrassing questions or threats when collecting data. The study got informed consent from all the respondents.

4. Presentation of Data and Discusions
4.1 Demographics
4.1.1 Gender Distribution

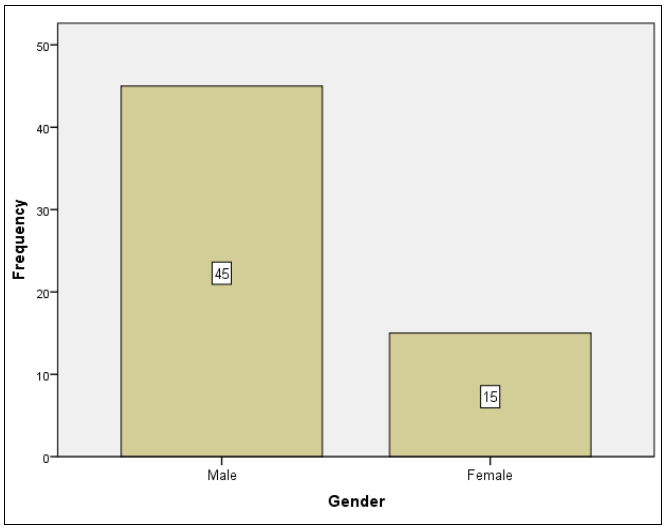

Fig 4.1.1: Gender Distribution

Table 4.1.1 and Figure 4.1.1 present the gender distribution of the study's participants. Out of the 60 respondents, 45 are male, representing 75% of the sample, while 15 are female, accounting for 25%. The cumulative percentage shows that including the female participants brings the total to 100%. This distribution highlights a higher representation of male respondents within the sample, providing insight into the demographic makeup of the study population.

4.1.2 Age Distribution

Table 4.1.2: Age Distribution

Age Group					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30 Years	15	25.0	25.0	25.0
	31-40 Years	25	41.7	41.7	66.7
	41-50 Years	12	20.0	20.0	86.7
	51 Years and above	8	13.3	13.3	100.0
	Total	60	100.0	100.0	

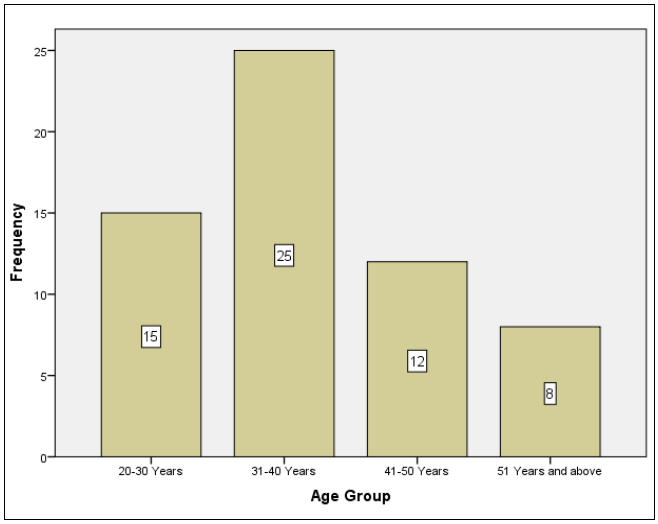

Fig 4.1.2: Age Distribution

Table 4.1.2 and Figure 4.1.2 illustrate the age distribution of the study's participants. Out of the 60 respondents, 15 are aged between 20-30 years, representing 25% of the sample. The largest age group is 31-40 years, with 25 respondents (41.7%), followed by the 41-50 years group with 12 respondents (20%). The age group of 51 years and above includes 8 respondents, accounting for 13.3%. The cumulative percentage indicates that each successive age group adds to the total, reaching 100% with the inclusion of the oldest age group.

4.1.3 Education Level

Table 4.1.3: Education Level

Education Level					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelor's Degree	30	50.0	50.0	50.0
	Master's Degree	21	35.0	35.0	85.0
	PhD	5	8.3	8.3	93.3
	Professional Certifications	4	6.7	6.7	100.0
	Total	60	100.0	100.0	

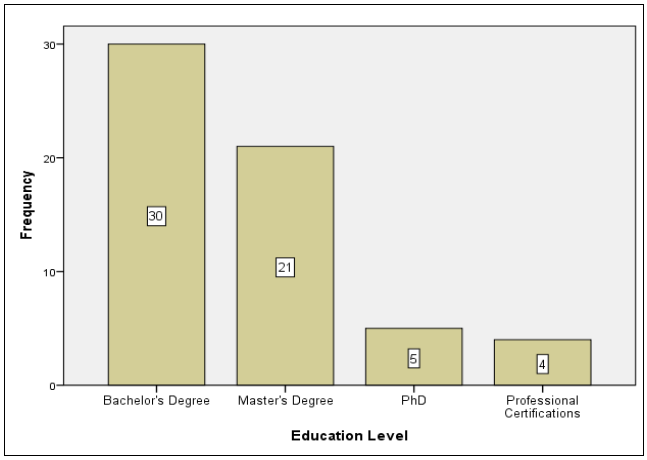

Fig 4.1.3: Education Level

Table 4.1.3 and Figure 4.1.3 present the education levels of the study's participants. Out of the 60 respondents, half hold a Bachelor's Degree, accounting for 50% of the sample. A significant portion of the respondents, 21 individuals (35%), possess a Master's Degree. There are 5 respondents with a PhD, representing 8.3% of the sample. Additionally, 4 respondents hold Professional Certifications, making up 6.7% of the participants. The cumulative percentage shows a progressive increase, reaching 100% with the inclusion of those with Professional Certifications. This distribution highlights a diverse range of educational backgrounds among the respondents, providing valuable context for understanding their perspectives and experiences in managing construction project costs.

4.1.4 Years of Experience in Construction

Table 4.1.4: Years of Experience in Construction

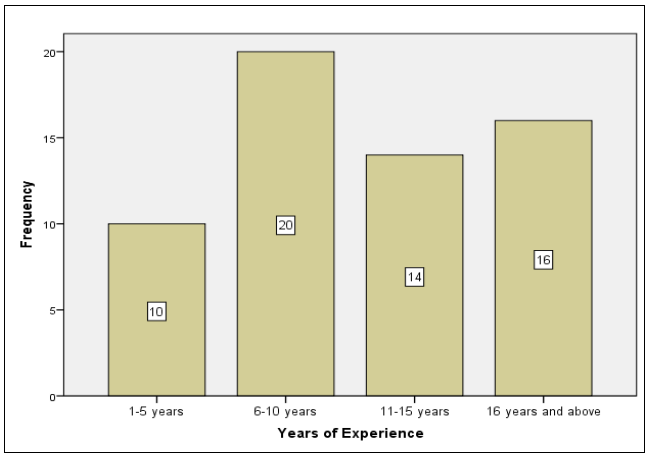

Fig 4.1.4: Years of Experience in Construction

Table 4.1.4 and Figure 4.1.4 display the years of experience in construction among the study's participants. Out of the 60 respondents, 10 have 1-5 years of experience, making up 16.7% of the sample. The largest group, with 20 respondents, has 6-10 years of experience, accounting for 33.3%. Those with 11-15 years of experience total 14 respondents (23.3%). The group with the most extensive experience, 16 years and above consists of 16 respondents, representing 26.7% of the sample.

This distribution highlights a diverse range of experience among the respondents, offering valuable insights into their varying levels of expertise in managing construction project costs.

I. To Identify Cost Control Technique Used By Contractors In Construction Projects.

Table 4.2.1: Cost Control Techniques Used

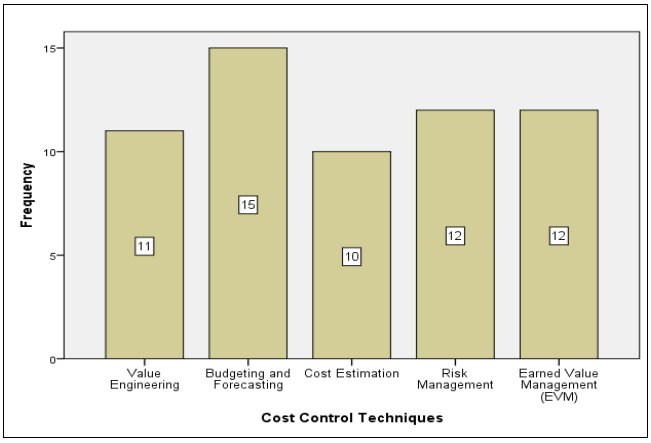

Fig 4.2.1: Cost Control Techniques Used

Table 4.2.1 and Figure 4.2.1 depict the frequency and usage of various cost control techniques among contractors, aligned with the objective to identify frequently used methods in construction projects. Budgeting and forecasting are the most utilized techniques, employed by 25% of respondents, highlighting their critical role in maintaining financial control. This is followed by risk management and earned value management (EVM), each used by 20% of respondents, demonstrating the importance of proactive risk mitigation and performance measurement. Value engineering and cost estimation are also significant, with 18.3% and 16.7% usage respectively, underscoring the need for optimizing project designs and accurate financial planning. The cumulative data show that all respondents use these techniques to various extents, reflecting a comprehensive approach to managing and controlling project costs effectively.

Effectiveness of Budgeting and Forecasting

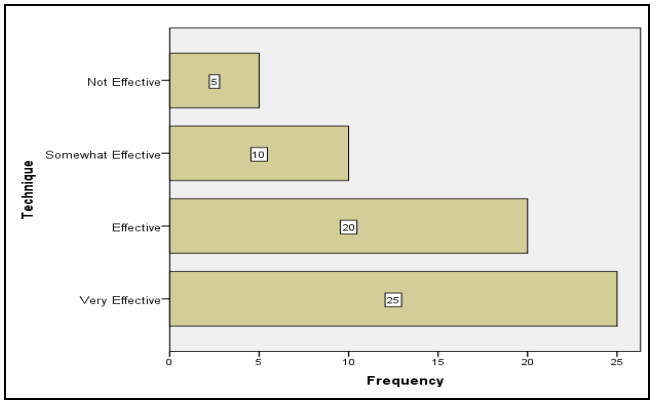

Fig 4.2.3: Effectiveness of Cost Estimation

Table 4.2.4 and Figure 4.2.3 present the perceived effectiveness of cost estimation techniques among contractors. The data show that 41.7% of respondents find cost estimation "very effective," demonstrating strong confidence in its ability to accurately predict project costs and manage budgets. Another 33.3% rate it as "effective," indicating that a significant portion of contractors acknowledges its substantial benefits. Meanwhile, 16.7% consider it "somewhat effective," suggesting there is room for improvement or better implementation practices. Only 8.3% find it "not effective," highlighting that a minority faces challenges with current cost estimation methods.

Effectiveness of Earned Value Management (EVM)

Table 4.2.6: Effectiveness of Earned Value Management (EVM)

Technique					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Effective	15	25.0	25.0	25.0
	Effective	20	33.3	33.3	58.3
	Somewhat Effective	15	25.0	25.0	83.3
	Not Effective	10	16.7	16.7	100.0
	Total	60	100.0	100.0	

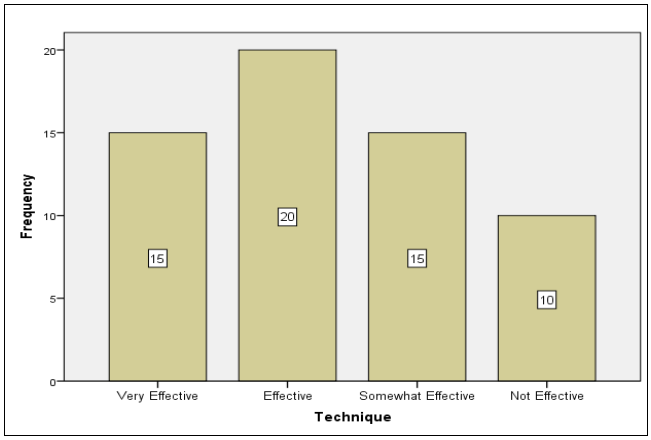

Fig 4.2.5: Effectiveness of Earned Value Management (EVM)

Table 4.2.6 and Figure 4.2.5 illustrate the perceived effectiveness of Earned Value Management (EVM) among contractors. The data reveals that 25% of the respondents consider EVM to be "very effective," while 33.3% find it "effective," indicating a strong endorsement of its utility in managing project performance and costs. Another 25% rate it as "somewhat effective," suggesting that while EVM is beneficial, there may be challenges in its application or implementation. Notably, 16.7% of respondents believe EVM is "not effective," highlighting that a minority of contractors encounter significant difficulties with this technique.

Impact on On-Time Delivery

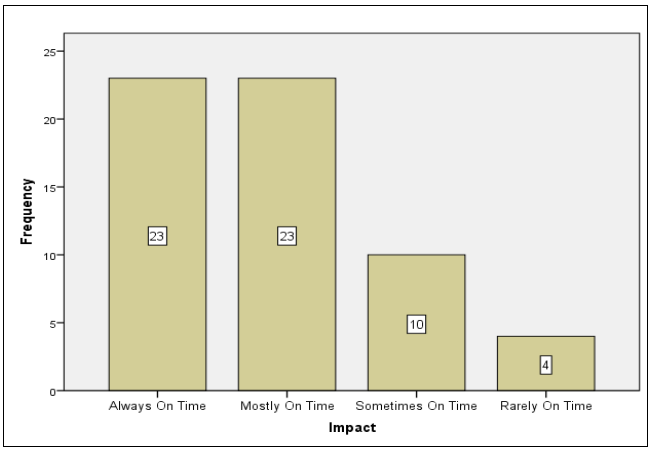

Table 4.2.7 and Figure 4.2.6 present the frequency and percentage of on-time delivery for construction projects as perceived by contractors. The data reveals that 38.3% of projects are always delivered on time, while another 38.3% are mostly on time, indicating that the majority of projects (76.6%) are completed within or close to the scheduled timeline. Additionally, 16.7% of projects are sometimes on time, and a smaller portion, 6.7%, are rarely delivered on time. These findings highlight that while most projects maintain a commendable adherence to timelines, there is still a notable proportion that faces challenges in ensuring punctual completion.

Impact on Budget Compliance

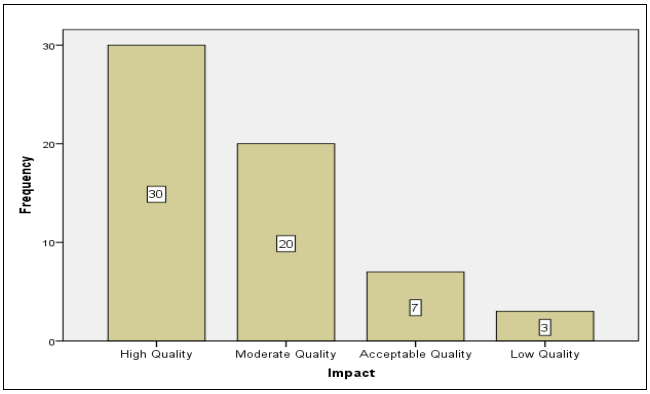

Table 4.2.9 and Figure 4.2.8 illustrate the impact on the quality of work among construction projects. The data reveals that half of the projects (50%) achieve high quality, indicating a strong emphasis on maintaining superior standards. Another 33.3% of the projects are rated as moderate quality, reflecting a substantial portion that meets satisfactory levels. Meanwhile, 11.7% of projects deliver acceptable quality, suggesting occasional deviations from optimal standards. Only 5% of the projects are considered low quality, highlighting a minority that faces significant challenges in maintaining quality.

What Cost Control Techniques Are Frequently Used By Contractors In Construction Projects?

Table 4.3.1: Cost Control Techniques Frequently Used

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Budgeting and Forecasting	60	0	1	.53	.503
Earned Value Management	60	0	1	.50	.504
Risk Management	60	0	1	.77	.427
Resource Management	60	0	1	.62	.490
Project Scheduling Monitoring	60	0	1	.53	.503
Procurement Management	60	0	1	.40	.494
Cost Benefit Analysis	60	0	1	.23	.427
Change Order Control	60	0	1	.18	.390
Valid N (listwise)	60				

The descriptive statistics provided for the cost control techniques frequently used by contractors in construction projects reveal several insights. The mean values indicate the proportion of respondents using each technique. Risk Management stands out as the most commonly used technique with a mean of 0.77, suggesting it is utilized by 77% of the respondents. Resource Management follows with a mean of 0.62, reflecting its significant adoption in managing project resources effectively. Budgeting and Forecasting and Project Scheduling Monitoring both have a mean of 0.53, indicating they are employed by around 53% of the respondents, emphasizing their importance in financial planning and project timeline management. Earned Value Management (EVM) also shows notable usage with a mean of 0.50. Techniques like Procurement Management (mean = 0.40), Cost Benefit Analysis (mean = 0.23), and Change Order Control (mean = 0.18) are less frequently used but still play critical roles in specific project scenarios. The standard deviations indicate variability in the usage of these techniques, with Risk Management having the lowest variability (std. dev. = 0.427), signifying consistent usage across the sample, while Procurement Management shows higher variability (std. dev. = 0.494), indicating more diverse application among respondents. Overall, these findings highlight the diverse approaches contractors take in managing construction project costs, with a focus on risk and resource management as key strategies.

Table 4.3.2: Correlations between Budgeting and Forecasting and Effectiveness Budgeting

Correlations				
			Budgeting and Forecasting	Effectiveness Budgeting
Spearman's rho	Budgeting and Forecasting	Correlation Coefficient	1.000	.108
		Sig. (2-tailed)	.	.409
		N	60	60
	Effectiveness Budgeting	Correlation Coefficient	.108	1.000
		Sig. (2-tailed)	.409	.
		N	60	60

Tables 4.3.2 indicate the relationship between budgeting and forecasting and its perceived effectiveness. The correlation coefficient between budgeting and forecasting and its effectiveness is 0.108, suggesting a very weak positive correlation. The significance value (Sig. 2-tailed) of 0.409 is greater than 0.05, indicating that the correlation is not statistically significant. Therefore, there is no strong evidence to suggest a meaningful relationship between the use of budgeting and forecasting techniques and their perceived effectiveness among the respondents.

Table 4.3.3: Correlations between Earned Value Management and Effectiveness EVM

Correlations				
			Earned Value Management	Effectiveness EVM
Spearman's rho	Earned Value Management	Correlation Coefficient	1.000	-.033
		Sig. (2-tailed)	.	.800
		N	60	60
	Effectiveness EVM	Correlation Coefficient	-.033	1.000
		Sig. (2-tailed)	.800	.
		N	60	60

The Spearman's Rank Correlation test results indicate the relationship between the use of Earned Value Management (EVM) and its perceived effectiveness. The correlation coefficient between EVM usage and its effectiveness is -0.033, suggesting a very weak negative correlation. The significance value (Sig. 2-tailed) of 0.800 is much greater than 0.05, indicating that the correlation is not statistically significant. Therefore, there is no strong evidence to suggest a meaningful relationship between the application of EVM and its perceived effectiveness among the respondents.

Table 4.3.4: Correlations between Cost Benefit Analysis and Effectiveness CBA

Correlations				
			Cost Benefit Analysis	Effectiveness CBA
Spearman's rho	Cost Benefit Analysis	Correlation Coefficient	1.000	-.010
		Sig. (2-tailed)	.	.937
		N	60	60
	Effectiveness CBA	Correlation Coefficient	-.010	1.000
		Sig. (2-tailed)	.937	.
		N	60	60

The Spearman's Rank Correlation test results for Cost Benefit Analysis (CBA) and its perceived effectiveness indicate a very weak negative correlation, with a correlation coefficient of -0.010. The significance value (Sig. 2-tailed) is 0.937, which is significantly higher than 0.05, indicating that the correlation is not statistically significant. Therefore, there is no strong evidence to suggest a meaningful relationship between the use of Cost Benefit Analysis techniques and their perceived effectiveness among the respondents.

Table 4.3.5: Correlations between Change Order Control and Effectiveness CO

Correlations				
			Change Order Control	Effectiveness CO
Spearman's rho	Change Order Control	Correlation Coefficient	1.000	.011
		Sig. (2-tailed)	.	.931
		N	60	60
	Effectiveness CO	Correlation Coefficient	.011	1.000
		Sig. (2-tailed)	.931	.
		N	60	60

The Spearman's Rank Correlation test results for Change Order Control and its perceived effectiveness show a very weak positive correlation, with a correlation coefficient of 0.011. The significance value (Sig. 2-tailed) is 0.931, which is much higher than 0.05, indicating that the correlation is not statistically significant. Therefore, there is no strong evidence to suggest a meaningful relationship between the use of Change Order Control techniques and their perceived effectiveness among the respondents.

Table 4.3.6: Correlations between Risk Management and Effectiveness

Correlations				
			Risk Management	Effectiveness RM
Spearman's rho	Risk Management	Correlation Coefficient	1.000	.110
		Sig. (2-tailed)	.	.401
		N	60	60
	Effectiveness RM	Correlation Coefficient	.110	1.000
		Sig. (2-tailed)	.401	.
		N	60	60

The Spearman's Rank Correlation test results for Risk Management and its perceived effectiveness show a very weak positive correlation, with a correlation coefficient of 0.110. The significance value (Sig. 2-tailed) is 0.401, which is much higher than 0.05, indicating that the correlation is not statistically significant. Therefore, there is no strong evidence to suggest a meaningful relationship between the use of Risk Management techniques and their perceived effectiveness among the respondents.

Table 4.3.7: Correlations between Resource Management and Effectiveness

Correlations				
			Resource Management	Effectiveness RM Resource
Spearman's rho	Resource Management	Correlation Coefficient	1.000	-.140
		Sig. (2-tailed)	.	.287
		N	60	60
	Effectiveness RM Resource	Correlation Coefficient	-.140	1.000
		Sig. (2-tailed)	.287	.
		N	60	60

The Spearman's Rank Correlation test results for Resource Management and its perceived effectiveness show a weak negative correlation, with a correlation coefficient of -0.140. The significance value (Sig. 2-tailed) is 0.287, which is higher than 0.05, indicating that the correlation is not statistically significant. Therefore, there is no strong evidence to suggest a meaningful relationship between the use of Resource Management techniques and their perceived effectiveness among the respondents.

Table 4.3.8: Correlations between Project Scheduling Monitoring and Effectiveness

Correlations				
			Project Scheduling Monitoring	Effectiveness PSM
Spearman's rho	Project Scheduling Monitoring	Correlation Coefficient	1.000	.171
		Sig. (2-tailed)	.	.192
		N	60	60
	Effectiveness PSM	Correlation Coefficient	.171	1.000
		Sig. (2-tailed)	.192	.
		N	60	60

The Spearman's Rank Correlation test results for Project Scheduling Monitoring and its perceived effectiveness show a weak positive correlation, with a correlation coefficient of 0.171. The significance value (Sig. 2-tailed) is 0.192, which is higher than 0.05, indicating that the correlation is not statistically significant. Therefore, there is no strong evidence to suggest a meaningful relationship between the use of Project Scheduling Monitoring techniques and their perceived effectiveness among the respondents.

Table 4.3.9: Correlations between Procurement Management and Effectiveness

Correlations				
			Procurement Management	Effectiveness PM
Spearman's rho	Procurement Management	Correlation Coefficient	1.000	.261*
		Sig. (2-tailed)	.	.044
		N	60	60
	Effectiveness PM	Correlation Coefficient	.261*	1.000
		Sig. (2-tailed)	.044	.
		N	60	60
*. Correlation is significant at the 0.05 level (2-tailed).				

The Spearman's Rank Correlation test results for Procurement Management and its perceived effectiveness show a weak positive correlation, with a correlation coefficient of 0.261. The significance value (Sig. 2-tailed) is 0.044, which is less than 0.05, indicating that the correlation is statistically significant. This suggests that there is a meaningful relationship between the use of Procurement Management techniques and their perceived effectiveness among the respondents. Although the correlation is not very strong, it indicates that as the use of Procurement Management techniques increases, the perceived effectiveness also tends to increase, highlighting the importance of proper procurement practices in enhancing project outcomes.

II. Relationship between Controlling Cost In The Construction Project Process and performance

Table 4.4.1: Key Cost-Control Problems

Descriptive Statistics					
	N	Minimum	Maximum	Sum	Std. Deviation
Material Price Fluctuations	60	2	5	221	.948
Delayed Payments	60	2	5	218	1.008
Poor Project Planning	60	2	5	224	.954
Inaccurate Cost Estimation	60	2	5	224	1.006
Labor Shortages	60	2	5	229	.948
Regulatory Issues	60	2	5	219	1.022
Valid N (listwise)	60				

The descriptive statistics provided for the key cost-control problems encountered by contractors in construction projects reveal significant insights. **Labor shortages** emerge as the most frequent issue, with a sum of 229 and a standard deviation of 0.948, indicating consistent reports of this problem. **Poor project planning** and **inaccurate cost estimation** both have a sum of 224, highlighting their substantial impact on cost control. **Material price fluctuations** and **delayed payments** also present notable challenges, with sums of 221 and 218 respectively. **Regulatory issues** are another significant problem, reflected by a sum of 219 and the highest standard deviation (1.022), suggesting variability in the extent of this issue among respondents. Overall, these findings underscore the diverse and pervasive challenges contractors face in managing construction project costs, emphasizing the need for targeted strategies to address these critical issues effectively.

Table 4.4.2: Material Price Fluctuations

Material Price Fluctuations					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Minor Problem	8	13.3	13.3	13.3
	Moderate Problem	15	25.0	25.0	38.3
	Serious Problem	25	41.7	41.7	80.0
	Very Serious Problem	12	20.0	20.0	100.0
	Total	60	100.0	100.0	

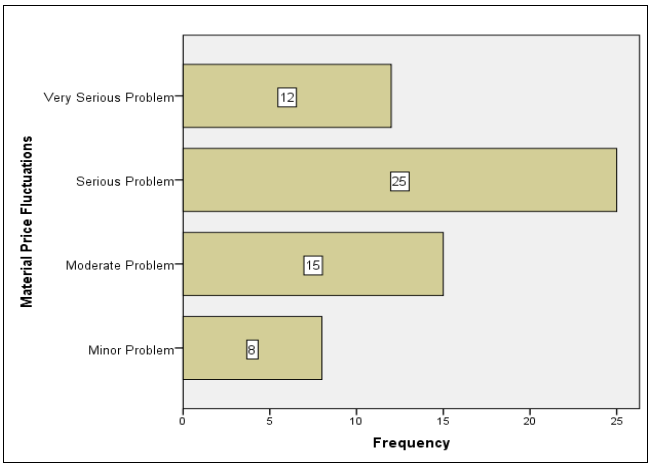

Fig 4.4.2: Material Price Fluctuations

Table 4.4.2 and Figure 4.4.2 illustrate the severity of material price fluctuations in construction projects. The data reveals that a significant portion of respondents, 41.7%, and regard these fluctuations as a "serious problem," while 20% consider them a "very serious problem." Together, this indicates that 61.7% of contractors face substantial challenges due to varying material costs. Additionally, 25% of respondents view it as a "moderate problem," and 13.3% see it as a "minor problem," showing that the issue is widespread, albeit with varying degrees of impact.

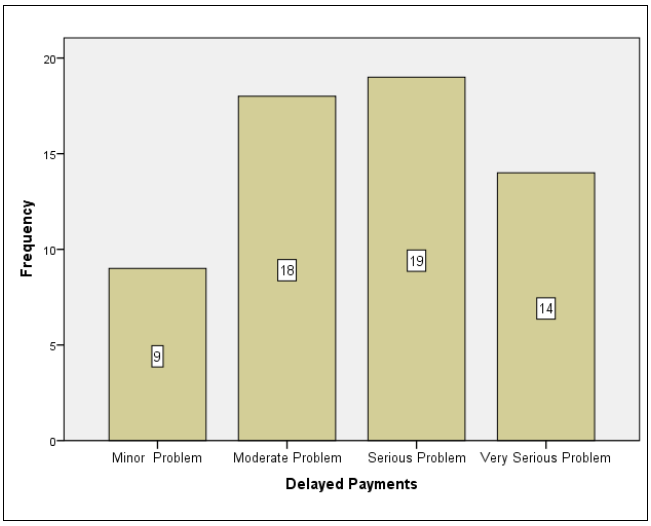

Fig 4.4.3: Delayed Payments

Table 4.4.3 and Figure 4.4.3 illustrate the severity of delayed payments in construction projects. The data reveals that a significant portion of respondents, 31.7%, consider delayed payments to be a "serious problem," while 23.3% regard it as a "very serious problem." Together, this indicates that over half of the contractors (55%) face substantial challenges due to delayed payments. Additionally, 30% perceive delayed payments as a "moderate problem," and 15% view it as a "minor problem," showing that the issue is pervasive across different levels of severity.

Table 4.4.4: Poor Project Planning

Poor Project Planning					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Minor Problem	7	11.7	11.7	11.7
	Moderate Problem	16	26.7	26.7	38.3
	Serious Problem	23	38.3	38.3	76.7
	Very Serious Problem	14	23.3	23.3	100.0
	Total	60	100.0	100.0	

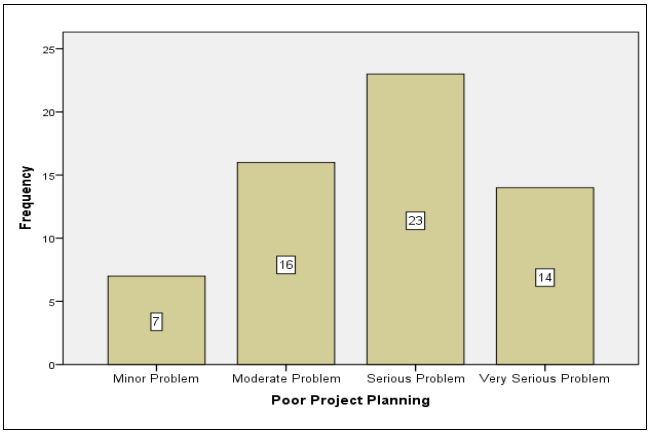

Fig 4.4.4: Poor Project Planning

Table 4.4.4 and Figure 4.4.4 depict the severity of poor project planning in construction projects. The data reveals that 38.3% of respondents consider poor project planning a "serious problem," while 23.3% view it as a "very serious problem," indicating that over 61.6% of contractors face significant challenges due to inadequate planning. Additionally, 26.7% of respondents perceive it as a "moderate problem," and 11.7% regard it as a "minor problem."

Table 4.4.5: Inaccurate Cost Estimation

Inaccurate Cost Estimation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Minor Problem	8	13.3	13.3	13.3
	Moderate Problem	16	26.7	26.7	40.0
	Serious Problem	20	33.3	33.3	73.3
	Very Serious Problem	16	26.7	26.7	100.0
	Total	60	100.0	100.0	

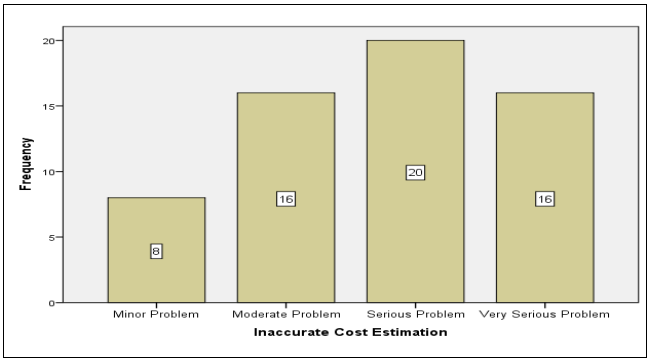

Fig 4.4.5: Inaccurate Cost Estimation

Table 4.4.5 and Figure 4.4.5 illustrate the severity of inaccurate cost estimation in construction projects. The data reveals that 33.3% of respondents consider inaccurate cost estimation a "serious problem," while 26.7% view it as a "very serious problem," indicating that nearly 60% of contractors face significant challenges due to inaccurate cost estimations. Additionally, 26.7% of respondents perceive it as a "moderate problem," and 13.3% regard it as a "minor problem."

Table 4.4.6: Labor Shortages

Labor Shortages					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Minor Problem	6	10.0	10.0	10.0
	Moderate Problem	15	25.0	25.0	35.0
	Serious Problem	23	38.3	38.3	73.3
	Very Serious Problem	16	26.7	26.7	100.0
	Total	60	100.0	100.0	

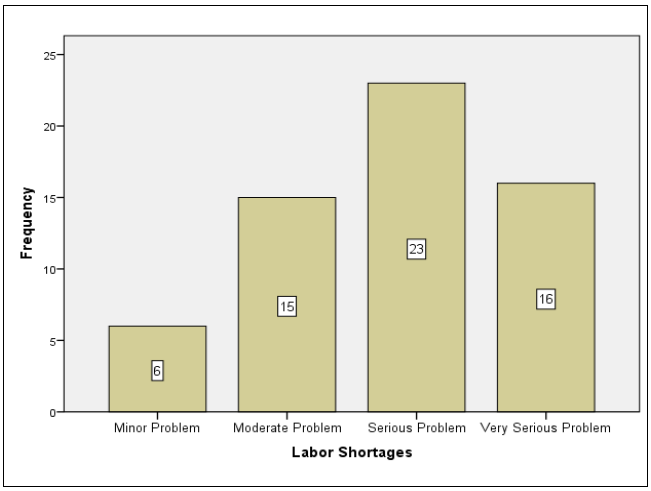

Fig 4.4.6: Labor Shortages

Table 4.4.6 and Figure 4.4.6 highlight the severity of labor shortages in construction projects. The data reveals that 38.3% of respondents consider labor shortages a "serious problem," while 26.7% view it as a "very serious problem," indicating that 65% of contractors face significant challenges due to labor shortages. Additionally, 25% of respondents perceive it as a "moderate problem," and 10% regard it as a "minor problem," showing that labor shortages are a widespread concern with varying degrees of impact.

Table 4.4.7: Regulatory Issues

Regulatory Issues					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Minor Problem	9	15.0	15.0	15.0
	Moderate Problem	18	30.0	30.0	45.0
	Serious Problem	18	30.0	30.0	75.0
	Very Serious Problem	15	25.0	25.0	100.0
	Total	60	100.0	100.0	

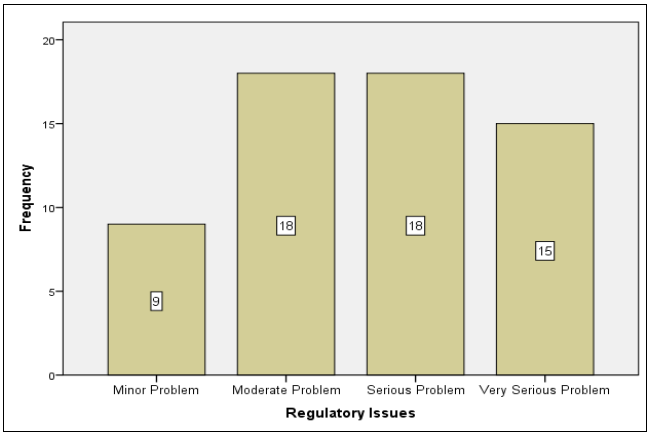

Fig 4.4.7: Regulatory Issues

Table 4.4.7 and Figure 4.4.7 highlight the severity of regulatory issues in construction projects. The data reveals that 30% of respondents consider regulatory issues a "serious problem," while 25% regard them as a "very serious problem." Combined, this indicates that 55% of contractors face significant challenges due to regulatory compliance. Additionally, 30% of respondents perceive it as a "moderate problem," and 15% view it as a "minor problem," showing that regulatory issues are a widespread concern with varying degrees of impact.

Table 4.4.8: Material Price Fluctuations and Severity Impact

Material Price Fluctuations and Did you face this problem Crosstabulation					
			Did you face this problem		Total
			No	Yes	
Material Price Fluctuations	Minor Problem	Count	3	5	8
		Expected Count	3.5	4.5	8.0
	Moderate Problem	Count	8	7	15
		Expected Count	6.5	8.5	15.0
	Serious Problem	Count	11	14	25
		Expected Count	10.8	14.2	25.0
	Very Serious Problem	Count	4	8	12
		Expected Count	5.2	6.8	12.0
Total		Count	26	34	60
		Expected Count	26.0	34.0	60.0

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.215[a]	3	.749
Likelihood Ratio	1.222	3	.748
Linear-by-Linear Association	.236	1	.627
N of Valid Cases	60		
a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 3.47.			

Table 4.4.8 shows a crosstabulation and Chi-Square test results for material price fluctuations and whether contractors faced this problem reveal interesting insights. The majority of respondents who faced material price fluctuations identified it as a serious or very serious problem, with counts of 14 and 8 respectively. The Chi-Square test, however, indicates no statistically significant association between the severity of material price fluctuations and whether contractors faced this problem ($\chi^2 = 1.215$, $p = 0.749$). This suggests that the frequency of encountering material price fluctuations is fairly distributed across different levels of severity. Despite this, the data highlights that material price fluctuations remain a notable issue for many contractors, emphasizing the importance of effective cost control strategies.

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.117[a]	3	.773
Likelihood Ratio	1.133	3	.769
Linear-by-Linear Association	.429	1	.513
N of Valid Cases	60		
a. 1 cells (12.5%) have expected count less than 5. The minimum expected count is 3.90.			

Table 4.4.9 shows a crosstabulation and Chi-Square test results for delayed payments and whether contractors faced this problem reveal interesting insights. Among the respondents who faced delayed payments, the issue was most frequently identified as a serious problem (31.7%), followed by very serious problem (23.3%), moderate problem (30%), and minor problem (15%). The Chi-Square test results indicate no statistically significant association between the severity of delayed payments and whether contractors faced this problem ($\chi^2 = 1.117$, $p = 0.773$). This suggests that delayed payments are consistently reported across different severity levels, underscoring the widespread nature of this issue in construction projects. Despite the lack of statistical significance, the data highlights the persistent challenge of delayed payments and its impact on project timelines and financial management.

Table 4.4.10: Poor Project Planning and Severity Impact

Poor Project Planning and Did you face this problem Crosstabulation					
			Did you face this problem		Total
			No	Yes	
Poor Project Planning	Minor Problem	Count	1	6	7
		Expected Count	3.0	4.0	7.0
	Moderate Problem	Count	11	5	16
		Expected Count	6.9	9.1	16.0
	Serious Problem	Count	10	13	23
		Expected Count	10.0	13.0	23.0
	Very Serious Problem	Count	4	10	14
		Expected Count	6.1	7.9	14.0
Total		Count	26	34	60
		Expected Count	26.0	34.0	60.0

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.857[a]	3	.049
Likelihood Ratio	8.248	3	.041
Linear-by-Linear Association	.318	1	.573
N of Valid Cases	60		
a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 3.03.			

Table 4.4.10 shows a crosstabulation and Chi-Square test results for poor project planning and whether contractors faced this problem reveal notable insights. The data shows that poor project planning is often identified as a "serious problem" (38.3%) and a "very serious problem" (23.3%). The Chi-Square test result ($\chi^2 = 7.857$, $p = 0.049$) indicates a statistically significant association between the severity of poor project planning and whether contractors faced this problem. This suggests that contractors who encountered issues with poor project planning are likely to rate it as a serious or very serious problem.

Table 4.4.11: Inaccurate Cost Estimation and Severity Impact

Inaccurate Cost Estimation and Did you face this problem Crosstabulation					
			Did you face this problem		Total
			No	Yes	
Inaccurate Cost Estimation	Minor Problem	Count	4	4	8
		Expected Count	3.5	4.5	8.0
	Moderate Problem	Count	8	8	16
		Expected Count	6.9	9.1	16.0
	Serious Problem	Count	9	11	20
		Expected Count	8.7	11.3	20.0
	Very Serious Problem	Count	5	11	16
		Expected Count	6.9	9.1	16.0
Total		Count	26	34	60
		Expected Count	26.0	34.0	60.0

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.408[a]	3	.704
Likelihood Ratio	1.436	3	.697
Linear-by-Linear Association	1.109	1	.292
N of Valid Cases	60		
a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 3.47.			

Table 4.4.11 shows a crosstabulation and Chi-Square test results for inaccurate cost estimation and whether contractors faced this problem provide valuable insights. Among the respondents who faced inaccurate cost estimations, the issue is most frequently identified as a "serious problem" (33.3%), followed by "very serious problem" (26.7%), and "moderate problem" (26.7%). The Chi-Square test result ($\chi^2 = 1.408$, $p = 0.704$) indicates no statistically significant association between the severity of inaccurate cost estimation and whether contractors faced this problem. This suggests that the frequency of encountering inaccurate cost estimations is fairly distributed across different levels of severity. Despite the lack of statistical significance, the data underscores that inaccurate cost estimations are a common challenge for contractors, emphasizing the need for improved estimation techniques to enhance project cost management.

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.860[a]	3	.602
Likelihood Ratio	1.884	3	.597
Linear-by-Linear Association	.377	1	.539
N of Valid Cases	60		
a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 2.60.			

Table 4.4.12 shows a crosstabulation and Chi-Square test results for labor shortages and whether contractors faced this problem provide significant insights. The data shows that labor shortages are often identified as a "serious problem" (38.3%) and a "very serious problem" (26.7%). The Chi-Square test result ($\chi^2 = 1.860$, $p = 0.602$) indicates no statistically significant association between the severity of labor shortages and whether contractors faced this problem. This suggests that the occurrence of labor shortages is fairly distributed across different severity levels. Despite the lack of statistical significance, the data highlights that labor shortages are a common challenge for contractors, emphasizing the need for effective strategies to ensure adequate workforce availability and maintain project timelines and quality.

Table 4.4.13: Regulatory Issues and Severity Impact

Regulatory Issues and Did you face this problem Crosstabulation					
			Did you face this problem		Total
			No	Yes	
Regulatory Issues	Minor Problem	Count	9	0	9
		Expected Count	3.9	5.1	9.0
	Moderate Problem	Count	17	1	18
		Expected Count	7.8	10.2	18.0
	Serious Problem	Count	0	18	18
		Expected Count	7.8	10.2	18.0
	Very Serious Problem	Count	0	15	15
		Expected Count	6.5	8.5	15.0
Total		Count	26	34	60
		Expected Count	26.0	34.0	60.0

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	56.154[a]	3	.000
Likelihood Ratio	74.384	3	.000
Linear-by-Linear Association	43.573	1	.000
N of Valid Cases	60		
a. 1 cells (12.5%) have expected count less than 5. The minimum expected count is 3.90.			

Table 4.4.13 shows a crosstabulation and Chi-Square test results for regulatory issues and whether contractors faced this problem provide significant insights. Among the respondents who faced regulatory issues, the problem is frequently identified as "serious" (30%) and "very serious" (25%). Notably, no respondents who considered regulatory issues as a minor or moderate problem faced this issue. The Chi-Square test result ($\chi^2 = 56.154$, $p < 0.001$) indicates a statistically significant association between the severity of regulatory issues and whether contractors faced this problem. This suggests that those who encountered regulatory issues are likely to perceive it as a serious or very serious problem. These findings underscore the critical impact of regulatory compliance on construction projects and the necessity for effective strategies to navigate these challenges.

III. To Examine Problems Encountered By Contractors In Managing Construction Project Cost.

Managing construction project costs is a critical aspect of project delivery that significantly influences the success and profitability of construction projects. This section examines the problems encountered by contractors in managing construction project costs.

Key Problems Identified

Table 4.3.1: Problems Encountered

Problems Identified					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Budget Overruns	10	16.7	16.7	16.7
	Delays and Schedule Overruns	20	33.3	33.3	50.0
	Inaccurate Cost Estimation	8	13.3	13.3	63.3
	Material Price Fluctuations	11	18.3	18.3	81.7
	Compliance and Regulatory Issues	11	18.3	18.3	100.0
	Total	60	100.0	100.0	

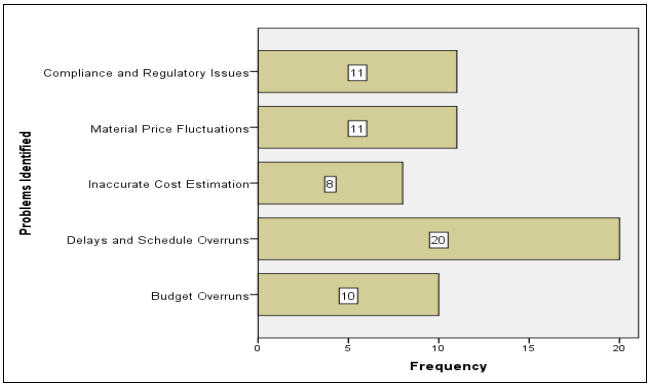

Fig 4.3.1: Problems Encountered

Table 4.3.2 and Figure 4.3.1 highlight the problems encountered by contractors in managing construction project costs, in line with the objective to examine these challenges. The most frequently reported issue is delays and schedule overruns, affecting 33.3% of the projects, followed by material price fluctuations and compliance and regulatory issues, each impacting 18.3% of the projects. Budget overruns are also significant, affecting 16.7% of the projects, while inaccurate cost estimation is encountered by 13.3% of the projects.

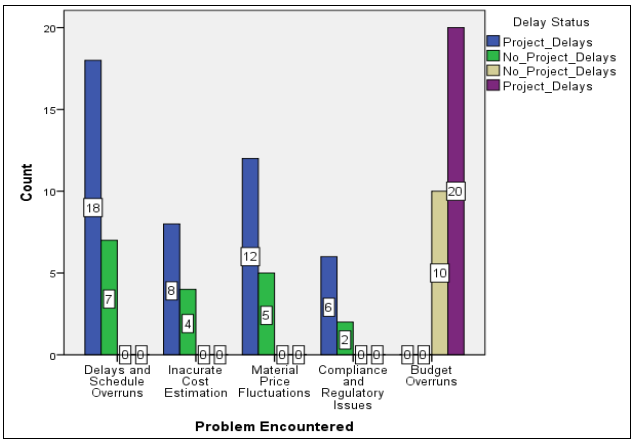

Fig 4.3.2: Problems Encountered in Managing Construction Project Costs

Figure 4.3.2 highlights the problems encountered by contractors in managing construction project costs, in line with the objective to examine these challenges. The most frequently reported issue is delays and schedule overruns, affecting 33.3% of the projects, followed by material price fluctuations and compliance and regulatory issues, each impacting 18.3% of the projects. Budget overruns are also significant, affecting 16.7% of the projects, while inaccurate cost estimation is encountered by 13.3% of the projects.

Problem Encountered and Delay Status

A chi square test was conducted to show the relationship between various problems encountered by contractors and their impact on project delays.

Table 4.3.3: Problem Encountered and Delay Status Crosstabulation

Problem Encountered and Delay Status Crosstabulation							
			Delay Status				Total
			Project Delays	No Project Delays	No Project Delays	Project Delays	
Problem Encountered	Delays and Schedule Overruns	Count	18	7	0	0	25
		Expected Count	12.0	4.9	2.7	5.4	25.0
	Inaccurate Cost Estimation	Count	8	4	0	0	12
		Expected Count	5.7	2.3	1.3	2.6	12.0
	Material Price Fluctuations	Count	12	5	0	0	17
		Expected Count	8.1	3.3	1.8	3.7	17.0
	Compliance and Regulatory Issues	Count	6	2	0	0	8
		Expected Count	3.8	1.6	.9	1.7	8.0
	Budget Overruns	Count	0	0	10	20	30
		Expected Count	14.3	5.9	3.3	6.5	30.0
Total		Count	44	18	10	20	92
		Expected Count	44.0	18.0	10.0	20.0	92.0

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	92.275[a]	12	.000
Likelihood Ratio	116.357	12	.000
N of Valid Cases	92		
a. 13 cells (65.0%) have expected count less than 5. The minimum expected count is .87.			

There were 18 projects with delays and 7 without. The expected counts were 12.0 and 4.9, respectively. This indicates that delays and schedule overruns are more frequent than expected among projects with delays. There were 8 projects with delays and 4 without, compared to expected counts of 5.7 and 2.3. This suggests inaccurate cost estimation also contributes to delays. With 12 projects experiencing delays and 5 without, against expected counts of 8.1 and 3.3, material price fluctuations significantly impact project delays. There were 6 projects with delays and 2 without, compared to expected counts of 3.8 and 1.6. Compliance issues, although less frequent, still show a higher-than-expected contribution to delays. This category had no projects experiencing delays and 30 without, which deviates significantly from the expected counts of 14.3 and 5.9. This suggests that budget overruns are less likely to cause project delays compared to other issues.

Given the p-value (.000) is less than the significance level of 0.05, we reject the null hypothesis. This indicates a statistically significant relationship between the problems encountered by contractors and project delays.

Implications

The significant chi-square value implies that the problems contractors face in managing construction project costs are strongly associated with project delays. **Delays and Schedule Overruns, Inaccurate Cost Estimation, Material Price Fluctuations, and Compliance Issues**: These problems show higher-than-expected counts of project delays, highlighting their critical role in causing delays. Interestingly, budget overruns appear less associated with delays, suggesting that while prevalent, they may not directly impact project timelines as much as the other issues.

Discussions

Demographics

Table 4.1.1 and Figure 4.1.1 present the gender distribution of the study's participants. Out of the 60 respondents, 45 are male, representing 75% of the sample, while 15 are female, accounting for 25%. The cumulative percentage shows that including the female participants brings the total to 100%. This distribution highlights a higher representation of male respondents within the sample, providing insight into the demographic makeup of the study population.

Age Distribution

Table 4.1.2 and Figure 4.1.2 illustrate the age distribution of the study's participants. Out of the 60 respondents, 15 are aged between 20-30 years, representing 25% of the sample. The largest age group is 31-40 years, with 25 respondents (41.7%), followed by the 41-50 years group with 12 respondents (20%). The age group of 51 years and above includes 8 respondents, accounting for 13.3%. The cumulative percentage indicates that each successive age group adds to the total, reaching 100% with the inclusion of the oldest age group.

Education Level

Figure 4.1.3: Education Level

Table 4.1.3 and Figure 4.1.3 present the education levels of the study's participants. Out of the 60 respondents, half hold a Bachelor's Degree, accounting for 50% of the sample. A significant portion of the respondents, 21 individuals (35%), possess a Master's Degree. There are 5 respondents with a PhD, representing 8.3% of the sample. Additionally, 4 respondents hold Professional Certifications, making up 6.7% of the participants. The cumulative percentage shows a progressive increase, reaching 100% with the inclusion of those with Professional Certifications. This distribution highlights a diverse range of educational backgrounds among the respondents, providing valuable context for understanding their perspectives and experiences in managing construction project costs.

Years of Experience in Construction

Table 4.1.4 and Figure 4.1.4 display the years of experience in construction among the study's participants. Out of the 60 respondents, 10 have 1-5 years of experience, making up 16.7% of the sample. The largest group, with 20 respondents, has 6-10 years of experience, accounting for 33.3%. Those with 11-15 years of experience total 14 respondents (23.3%). The group with the most extensive experience, 16 years and above consists of 16 respondents, representing 26.7% of the sample.

Cost Control Techniques

This distribution highlights a diverse range of experience among the respondents, offering valuable insights into their varying levels of expertise in managing construction project costs.

1.) Cost Control Technique Used by Contractors in Construction Projects.

Table 4.2.1 and Figure 4.2.1 depict the frequency and usage of various cost control techniques among contractors, aligned with the objective to identify frequently used methods in construction projects. Budgeting and forecasting are the most utilized techniques, employed by 25% of respondents, highlighting their critical role in maintaining financial control. This is followed by risk management and earned value management (EVM), each used by 20% of respondents, demonstrating the importance of proactive risk mitigation and performance measurement. Value engineering and cost estimation are also significant, with 18.3% and 16.7% usage respectively, underscoring the need for optimizing project designs and accurate financial planning. The cumulative data show that all respondents use these techniques to various extents, reflecting a comprehensive approach to managing and controlling project costs effectively.

Effectiveness of Budgeting and Forecasting

Table 4.2.3 summarizes the effectiveness of cost control techniques as perceived by the contractors. The majority, 41.7%, rated the techniques as "very effective," indicating strong confidence in their utility for managing project costs. Another 33.3% found them "effective," showing that a significant portion of contractors also sees substantial benefits. A smaller group, 16.7%, considered them "somewhat effective," suggesting room for improvement in implementation or suitability. Only 8.3% deemed them "not effective," indicating that a minority faces challenges with current methods.

Effectiveness of Cost Estimation

Figure 4.2.3: Effectiveness of Cost Estimation

Table 4.2.4 and Figure 4.2.3 present the perceived effectiveness of cost estimation techniques among contractors. The data show that 41.7% of respondents find

cost estimation "very effective," demonstrating strong confidence in its ability to accurately predict project costs and manage budgets. Another 33.3% rate it as "effective," indicating that a significant portion of contractors acknowledges its substantial benefits. Meanwhile, 16.7% consider it "somewhat effective," suggesting there is room for improvement or better implementation practices. Only 8.3% find it "not effective," highlighting that a minority faces challenges with current cost estimation methods.

Effectiveness of Earned Value Management (EVM)

Table 4.2.6 and Figure 4.2.5 illustrate the perceived effectiveness of Earned Value Management (EVM) among contractors. The data reveals that 25% of the respondents consider EVM to be "very effective," while 33.3% find it "effective," indicating a strong endorsement of its utility in managing project performance and costs. Another 25% rate it as "somewhat effective," suggesting that while EVM is beneficial, there may be challenges in its application or implementation. Notably, 16.7% of respondents believe EVM is "not effective," highlighting that a minority of contractors encounter significant difficulties with this technique.

Effect on On-Time Delivery

Table 4.2.7 and Figure 4.2.6 present the frequency and percentage of on-time delivery for construction projects as perceived by contractors. The data reveals that 38.3% of projects are always delivered on time, while another 38.3% are mostly on time, indicating that the majority of projects (76.6%) are completed within or close to the scheduled timeline. Additionally, 16.7% of projects are sometimes on time, and a smaller portion, 6.7%, are rarely delivered on time. These findings highlight that while most projects maintain a commendable adherence to timelines, there is still a notable proportion that faces challenges in ensuring punctual completion.

Table 4.2.8: Effect on Budget Compliance

Table 4.2.8 and Figure 4.2.7 illustrate the impact on budget compliance among construction projects. The data reveals that 26.7% of the projects are always within budget, while 40% are mostly within budget, suggesting that a majority of the projects (66.7%) manage to adhere closely to their budgetary constraints. Another 25% of the projects are sometimes within budget, indicating occasional budget deviations. Only 8.3% of the projects are rarely within budget, highlighting a small proportion of projects facing significant budgetary challenges.

Effect on Quality of Work

Table 4.2.9 and Figure 4.2.8 illustrate the impact on the quality of work among construction projects. The data reveals that half of the projects (50%) achieve high quality, indicating a strong emphasis on maintaining superior standards. Another 33.3% of the projects are rated as moderate quality, reflecting a substantial portion that meets satisfactory levels. Meanwhile, 11.7% of projects deliver acceptable quality, suggesting occasional deviations from optimal standards. Only 5% of the projects are considered low quality, highlighting a minority that faces significant challenges in maintaining quality.

Cost Control Techniques are Frequently Used by Contractors in Construction Projects?

The descriptive statistics provided for the cost control techniques frequently used by contractors in construction projects reveal several insights. The mean values indicate the proportion of respondents using each technique. Risk Management stands out as the most commonly used technique with a mean of 0.77, suggesting it is utilized by 77% of the respondents. Resource Management follows with a mean of 0.62, reflecting its significant adoption in managing project resources effectively. Budgeting and Forecasting and Project Scheduling Monitoring both have a mean of 0.53, indicating they are employed by around 53% of the respondents, emphasizing their importance in financial planning and project timeline management. Earned Value Management (EVM) also shows notable usage with a mean of 0.50. Techniques like Procurement Management (mean = 0.40), Cost Benefit Analysis (mean = 0.23), and Change Order Control (mean = 0.18) are less frequently used but still play critical roles in specific project scenarios. The standard deviations indicate variability in the usage of these techniques, with Risk Management having the lowest variability (std. dev. = 0.427), signifying consistent usage across the sample, while Procurement Management shows higher variability (std. dev. = 0.494), indicating more diverse application among respondents. Overall, these findings highlight the diverse approaches contractors take in managing construction project costs, with a focus on risk and resource management as key strategies.

Tables 4.3.2 indicate the relationship between budgeting and forecasting and its perceived effectiveness.

The correlation coefficient between budgeting and forecasting and its effectiveness is 0.108, suggesting a very weak positive correlation. The significance value (Sig. 2-tailed) of 0.409 is greater than 0.05, indicating that the correlation is not statistically significant. Therefore, there is no strong evidence to suggest a meaningful relationship between the use of budgeting and forecasting techniques and their perceived effectiveness among the respondents.

The Spearman's Rank Correlation test results indicate the relationship between the use of Earned Value Management (EVM) and its perceived effectiveness. The correlation coefficient between EVM usage and its effectiveness is -0.033, suggesting a very weak negative correlation. The significance value (Sig. 2-tailed) of 0.800 is much greater than 0.05, indicating that the correlation is not statistically significant. Therefore, there is no strong evidence to suggest a meaningful relationship between the application of EVM and its perceived effectiveness among the respondents.

The Spearman's Rank Correlation test results for Cost Benefit Analysis (CBA) and its perceived effectiveness indicate a very weak negative correlation, with a correlation coefficient of -0.010. The significance value (Sig. 2-tailed) is 0.937, which is significantly higher than 0.05, indicating that the correlation is not statistically significant. Therefore, there is no strong evidence to suggest a meaningful relationship between the use of Cost Benefit Analysis techniques and their perceived effectiveness among the respondents.

Table 4.3.5: Correlations between Change Order Control and Effectiveness CO

The Spearman's Rank Correlation test results for Change Order Control and its perceived effectiveness show a very weak positive correlation, with a correlation coefficient of 0.011. The significance value (Sig. 2-tailed) is 0.931, which is much higher than 0.05, indicating that the correlation is not statistically significant. Therefore, there is no strong evidence to suggest a meaningful relationship between the use of Change Order Control techniques and their perceived effectiveness among the respondents.

Table 4.3.6: Correlations between Risk Management and Effectiveness

The Spearman's Rank Correlation test results for Risk Management and its perceived effectiveness show a very weak positive correlation, with a correlation coefficient of 0.110. The significance value (Sig. 2-tailed) is 0.401, which is much higher than 0.05, indicating that the correlation is not statistically significant. Therefore, there is no strong evidence to suggest a meaningful relationship between the use of Risk Management techniques and their perceived effectiveness among the respondents.

Table 4.3.7: Correlations between Resource Management and Effectiveness

The Spearman's Rank Correlation test results for Resource Management and its perceived effectiveness show a weak negative correlation, with a correlation coefficient of -0.140. The significance value (Sig. 2-tailed) is 0.287, which is higher than 0.05, indicating that the correlation is not statistically significant. Therefore, there is no strong evidence to suggest a meaningful relationship between the use of Resource Management techniques and their perceived effectiveness among the respondents.

Table 4.3.8: Correlations between Project Scheduling Monitoring and Effectiveness

The Spearman's Rank Correlation test results for Project Scheduling Monitoring and its perceived effectiveness show a weak positive correlation, with a correlation coefficient of 0.171. The significance value (Sig. 2-tailed) is 0.192, which is higher than 0.05, indicating that the correlation is not statistically significant. Therefore, there is no strong evidence to suggest a meaningful relationship between the use of Project Scheduling Monitoring techniques and their perceived effectiveness among the respondents.

Table 4.3.9: Correlations between Procurement Management and Effectiveness

The Spearman's Rank Correlation test results for Procurement Management and its perceived effectiveness show a weak positive correlation, with a correlation coefficient of 0.261. The significance value (Sig. 2-tailed) is 0.044, which is less than 0.05, indicating that the correlation is statistically significant. This suggests that there is a meaningful relationship between the use of Procurement Management techniques and their perceived effectiveness among the respondents. Although the correlation is not very strong, it indicates that as the use of Procurement Management techniques increases, the perceived effectiveness also tends to increase, highlighting the importance of proper procurement practices in enhancing project outcomes.

Relationship between Controlling Cost In The Construction Project Process and performance

The descriptive statistics provided for the key cost-control problems encountered by contractors in construction projects reveal significant insights. Labor shortages emerge as the most frequent issue, with a sum of 229 and a standard deviation of 0.948, indicating consistent reports of this problem. Poor project planning and inaccurate cost estimation both have a sum of 224, highlighting their substantial impact on cost control. Material price fluctuations and delayed payments also present notable challenges, with sums of 221 and 218 respectively. Regulatory issues are another significant problem, reflected by a sum of 219 and the highest standard deviation (1.022), suggesting variability in the extent of this issue among respondents. Overall, these findings underscore the diverse and pervasive challenges contractors face in managing construction project costs, emphasizing the need for targeted strategies to address these critical issues effectively.

Table 4.4.2 and Figure 4.4.2 illustrate the severity of material price fluctuations in construction projects. The data reveals that a significant portion of respondents, 41.7%, and regard these fluctuations as a "serious problem," while 20% consider them a "very serious problem." Together, this indicates that 61.7% of contractors face substantial challenges due to varying material costs. Additionally, 25% of respondents view it as a "moderate problem," and 13.3% see it as a "minor problem," showing that the issue is widespread, albeit with varying degrees of impact.

Table 4.4.3 and Figure 4.4.3 illustrate the severity of delayed payments in construction projects. The data reveals that a significant portion of respondents, 31.7%, consider delayed payments to be a "serious problem," while 23.3% regard it as a "very serious problem." Together, this indicates that over half of the contractors (55%) face substantial challenges due to delayed payments. Additionally, 30% perceive delayed payments as a "moderate problem," and 15% view it as a "minor problem," showing that the issue is pervasive across

Table 4.4.4 and Figure 4.4.4 depict the severity of poor project planning in construction projects. The data reveals that 38.3% of respondents consider poor project planning a "serious problem," while 23.3% view it as a "very serious problem," indicating that over 61.6% of contractors face significant challenges due to inadequate planning. Additionally, 26.7% of respondents perceive it as a "moderate problem," and 11.7% regard it as a "minor problem."

Table 4.4.5 and Figure 4.4.5 illustrate the severity of inaccurate cost estimation in construction projects. The data reveals that 33.3% of respondents consider inaccurate cost estimation a "serious problem," while 26.7% view it as a "very serious problem," indicating that nearly 60% of contractors face significant challenges due to inaccurate cost estimations. Additionally, 26.7% of respondents perceive it as a "moderate problem," and 13.3% regard it as a "minor problem."

Table 4.4.6: Labor Shortages

Table 4.4.6 and Figure 4.4.6 highlight the severity of labor shortages in construction projects. The data reveals that 38.3% of respondents consider labor shortages a "serious problem," while 26.7% view it as a "very serious problem," indicating that 65% of contractors face significant challenges due to labor shortages. Additionally, 25% of

respondents perceive it as a "moderate problem," and 10% regard it as a "minor problem," showing that labor shortages are a widespread concern with varying degrees of impact.

Table 4.4.7 and Figure 4.4.7 highlight the severity of regulatory issues in construction projects. The data reveals that 30% of respondents consider regulatory issues a "serious problem," while 25% regard them as a "very serious problem." Combined, this indicates that 55% of contractors face significant challenges due to regulatory compliance. Additionally, 30% of respondents perceive it as a "moderate problem," and 15% view it as a "minor problem," showing that regulatory issues are a widespread concern with varying degrees of impact.

Table 4.4.8 shows a crosstabulation and Chi-Square test results for material price fluctuations and whether contractors faced this problem reveal interesting insights. The majority of respondents who faced material price fluctuations identified it as a serious or very serious problem, with counts of 14 and 8 respectively. The Chi-Square test, however, indicates no statistically significant association between the severity of material price fluctuations and whether contractors faced this problem ($\chi^2 = 1.215$, $p = 0.749$). This suggests that the frequency of encountering material price fluctuations is fairly distributed across different levels of severity. Despite this, the data highlights that material price fluctuations remain a notable issue for many contractors, emphasizing the importance of effective cost control strategies.

Table 4.4.9 shows a crosstabulation and Chi-Square test results for delayed payments and whether contractors faced this problem reveal interesting insights. Among the respondents who faced delayed payments, the issue was most frequently identified as a serious problem (31.7%), followed by very serious problem (23.3%), moderate problem (30%), and minor problem (15%). The Chi-Square test results indicate no statistically significant association between the severity of delayed payments and whether contractors faced this problem ($\chi^2 = 1.117$, $p = 0.773$). This suggests that delayed payments are consistently reported across different severity levels, underscoring the widespread nature of this issue in construction projects. Despite the lack of statistical significance, the data highlights the persistent challenge of delayed payments and its impact on project timelines and financial management

Table 4.4.10 shows a crosstabulation and Chi-Square test results for poor project planning and whether contractors faced this problem reveal notable insights. The data shows that poor project planning is often identified as a "serious problem" (38.3%) and a "very serious problem" (23.3%). The Chi-Square test result ($\chi^2 = 7.857$, $p = 0.049$) indicates a statistically significant association between the severity of poor project planning and whether contractors faced this problem. This suggests that contractors who encountered issues with poor project planning are likely to rate it as a serious or very serious problem.

Table 4.4.11 shows a crosstabulation and Chi-Square test results for inaccurate cost estimation and whether contractors faced this problem provide valuable insights. Among the respondents who faced inaccurate cost estimations, the issue is most frequently identified as a "serious problem" (33.3%), followed by "very serious problem" (26.7%), and "moderate problem" (26.7%). The Chi-Square test result ($\chi^2 = 1.408$, $p = 0.704$) indicates no statistically significant association between the severity of inaccurate cost estimation and whether contractors faced this problem. This suggests that the frequency of encountering inaccurate cost estimations is fairly distributed across different levels of severity. Despite the lack of statistical significance, the data underscores that inaccurate cost estimations are a common challenge for contractors, emphasizing the need for improved estimation techniques to enhance project cost management.

Table 4.4.12 shows a crosstabulation and Chi-Square test results for labor shortages and whether contractors faced this problem provide significant insights. The data shows that labor shortages are often identified as a "serious problem" (38.3%) and a "very serious problem" (26.7%). The Chi-Square test result ($\chi^2 = 1.860$, $p = 0.602$) indicates no statistically significant association between the severity of labor shortages and whether contractors faced this problem. This suggests that the occurrence of labor shortages is fairly distributed across different severity levels. Despite the lack of statistical significance, the data highlights that labor shortages are a common challenge for contractors, emphasizing the need for effective strategies to ensure adequate workforce availability and maintain project timelines and quality.

Table 4.4.13 shows a crosstabulation and Chi-Square test results for regulatory issues and whether contractors faced this problem provide significant insights. Among the respondents who faced regulatory issues, the problem is frequently identified as "serious" (30%) and "very serious" (25%). Notably, no respondents who considered regulatory issues as a minor or moderate problem faced this issue. The Chi-Square test result ($\chi^2 = 56.154$, $p < 0.001$) indicates a statistically significant association between the severity of regulatory issues and whether contractors faced this problem. This suggests that those who encountered regulatory issues are likely to perceive it as a serious or very serious problem. These findings underscore the critical impact of regulatory compliance on construction projects and the necessity for effective strategies to navigate these challenges.

IV. To Examine Problems Encountered By Contractors In Managing Construction Project Cost.

Managing construction project costs is a critical aspect of project delivery that significantly influences the success and profitability of construction projects. This section examines the problems encountered by contractors in managing construction project costs.

Table 4.3.2 and Figure 4.3.1 highlight the problems encountered by contractors in managing construction project costs, in line with the objective to examine these challenges. The most frequently reported issue is delays and schedule overruns, affecting 33.3% of the projects, followed by material price fluctuations and compliance and regulatory issues, each impacting 18.3% of the projects. Budget overruns are also significant, affecting 16.7% of the projects, while inaccurate cost estimation is encountered by 13.3% of the projects.

Figure 4.3.2 highlights the problems encountered by contractors in managing construction project costs, in line with the objective to examine these challenges. The most frequently reported issue is delays and schedule overruns, affecting 33.3% of the projects, followed by material price fluctuations and compliance and regulatory issues, each impacting 18.3% of the projects. Budget overruns are also

significant, affecting 16.7% of the projects, while inaccurate cost estimation is encountered by 13.3% of the projects.

The expected counts were 12.0 and 4.9, respectively. This indicates that delays and schedule overruns are more frequent than expected among projects with delays. There were 8 projects with delays and 4 without, compared to expected counts of 5.7 and 2.3. This suggests inaccurate cost estimation also contributes to delays. With 12 projects experiencing delays and 5 without, against expected counts of 8.1 and 3.3, material price fluctuations significantly impact project delays. There were 6 projects with delays and 2 without, compared to expected counts of 3.8 and 1.6. Compliance issues, although less frequent, still show a higher-than-expected contribution to delays. This category had no projects experiencing delays and 30 without, which deviates significantly from the expected counts of 14.3 and 5.9. This suggests that budget overruns are less likely to cause project delays compared to other issues.

Given the p-value (.000) is less than the significance level of 0.05, we reject the null hypothesis. This indicates a statistically significant relationship between the problems encountered by contractors and project delays.

The significant chi-square value implies that the problems contractors face in managing construction project costs are strongly associated with project delays. Delays and Schedule Overruns, Inaccurate Cost Estimation, Material Price Fluctuations, and Compliance Issues: These problems show higher-than-expected counts of project delays, highlighting their critical role in causing delays. Interestingly, budget overruns appear less associated with delays, suggesting that while prevalent, they may not directly impact project timelines as much as the other issues.

5. Conclusions and Recommendations

5.1 Conclusions

Construction practice has undergone a great deal of development in response to the dynamic nature of human needs and infrastructure. This research endeavored to analyze project cost control mechanisms utilized in the road construction industry. A case study of road construction projects in Lusaka. It is a known fact that the Zambian construction industry continues to occupy an important position in the nation's economy even though it contributes less than the manufacturing or other service industries, The contribution of the construction industry to national economic growth necessitates improved efficiency in the industry by means of cost-effectiveness and timeliness, and would certainly contribute to cost savings for the country as a whole. It is also common knowledge that the implementation of the construction project in the industry is usually accompanied with time delay and cost increase as well as owner dissatisfaction.

Contract management, financing and payment of completed works, change in site conditions, shortages of materials, design changes, subcontractors and nominated suppliers, other factors were price fluctuation inaccurate estimates, delays and additional works as factors responsible for project delays and cost overrun. A comprehensive classification of causes of construction delays has also been determined by Henesy (2023). The classification system included materials, labour, equipment and financial constraints, as the main contributory variable to causes of construction time overrun. The list of major factors causing construction delay in Zambia included the inadequacy of resources supplies, client and consultant shortcomings and incompetence. Koushki and Kartan (2014) studied the impact of construction materials on project time and cost in Kuwait and identified the project related variable affecting the on time delivery of materials as material selection, time, type of materials and their availability in the local market. Time impacts are inevitable on construction projects, primarily because of the uniqueness of each project and the limited resources of time and money that can be spent on planning, executing and delivering the project. Time factors are inherent in all of project construction's undertakings. Construction projects have long been recognized as particularly cost, time and risk-laden. Some of the time and cost factors associated with the construction process are fairly predictable or identifiable; others may be totally unforeseen.

5.2 Recommendations

- The study found that project teams do not effectively monitor and track project expenditures against the budget. To address this issue, it is recommended to implement a robust financial monitoring system that provides real-time tracking of project expenditures. This system should include automated alerts for budget variances, detailed expenditure reports, and regular reconciliation processes. Establishing a dedicated financial oversight team to review expenditures and ensure alignment with the budget can also help in maintaining financial control and preventing cost overruns.
- The study revealed that project teams utilize the project budget and cost estimates to inform decision-making throughout the project. It is recommended to enhance this practice by integrating advanced budgeting and cost estimation tools that provide more accurate forecasts and scenario analysis. Regularly update cost estimates and budget projections based on project progress and any changes in scope or conditions. Ensuring that these updates are communicated effectively to all relevant stakeholders will support informed decision-making and better alignment with project

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