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PROJECT COST ESTIMATION AND PERFORMANCE OF SPORTS STADIA CONSTRUCTION PROJECTS IN KENYA

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Abstract

Globally, implementing projects not only in the sporting sector has been theoretically, empirically and practically been seen to significantly turn things positively around for the betterment of the social and economic welfare of the citizens. Governments have opted to invest and finance refurbishment and building of the infrastructure necessary aiming to win the bid to host the events. The study sought to study Project Cost Estimation and on performance of sports stadia construction projects in Kenya. This study was anchored on the Planning fallacy theory. The current study adopted a cross sectional survey design targeting sports stadia in Kenya. The study targeted the 17 stadia projects as the unit of analysis and the unit of observation was the project consultants, county project administrators and Sports Kenya representatives involved in the 17 stadia projects. The study found strong positive correlation ($r = .662$, $p = .000$) with performance of sports stadia project in Kenya. The study also found project cost estimation explained .439 performance of sports stadia projects. The regression model established that .648 of project cost estimation is needed for a unit of performance in sports stadia projects in Kenya. The study also found that Project Cost estimation influence performance of by .662. The regression analysis also found a direct positive relationship between Project Cost Estimation and performance of sports stadia projects in Kenya. The study recommended that a thorough and periodic project cost estimation of the sports stadia projects. The study will be useful to scholars, both County and National Government, policy makers and project practitioners.

Key Words: *Project Cost Estimation, Project Performance, Sports Stadia projects*

INTRODUCTION

The FIFA world cup, Olympic Games, World Rally championship, World Athletics Championships, and International Athletics Amateur Federation (IAAF) are some of the examples of mega sports events that provide opportunities to sportsmen and sportswomen to show case their talents and skills, not forgetting the opportunities for the hosting countries do develop their infrastructure and also a source of revenue. Thus, governments have opted to invest

and finance refurbishment and building of the infrastructure necessary aiming to win the bid to host the events (Omondi, 2010). Sports development in its infrastructure has made a milestone in China with its sports industry spanning from sports stadiums and major event management to personal fitness. In the past 60 years, China has constructed over 1400 buildings in the developing world, and many of them are stadiums. Among all construction building types, sports facilities make up a significant proportion of China-aided constructions, and they can be regarded as parts of sports aids, with sports equipment and facilities and technical assistance (coaches, sports experts, referees, and competition management staff) (Chang & Xue, 2019). Sport stadia are some of the most complex and intricate buildings constructed throughout the world. These buildings can be extremely high energy users and take up many acres of city or countryside space. It is imperative that sustainable concepts and strategies, in design, construction, and operations, are used to help protect our environment, and contribute to the communities who house them (International Trade Administration, 2020).

Project cost management can be defined as application of tools, techniques and knowledge in planning, estimating and controlling project costs as well as analyzing the possible of risks that may potentially lead to cost overruns (Ronald & Agung, 2018). Project costs management entails other processes which include: plan cost management, estimate costs, determine budget, and control costs. Depending on the nature and size of the project, cost estimating and cost budgeting are often viewed as a single process especially in smaller scope projects (PMI, 2017). For effective project cost management, project managers must undertake cost management planning, cost estimation, budgeting and cost control. (Dusan & Jugoslav, 2019).

Statement of the Problem

The Kenyan government in the Vision 2030 plan in 2008 sought to undertake a number of programs to promote sports development as a source of employment for the youth. The development included professionalization of local sporting leagues across the major sporting disciplines, the establishment of facilities for sports, and the building of five new national sports stadia various county such as Kisumu, Mombasa, Nakuru, Eldoret and Garissa. The parliamentary committee on sports (National Assembly, 2020) reported that the estimated cost for the stadium projects was Ksh 4.4 billion and the project commenced in July 2016 and the completion date was 2019. However, the stadium projects faced delays due to fund issues, stakeholder conflicts between County governments and land owners. Some of the projects included Wote stadium in Makueni county, Kirubia stadium in Chuka Meru County, are just some of the examples that stalled, omission of certain requirement in the projects. The Parliamentary committee on Sports complained of mismanagement of funds as the projects were not completed on time. Despite 59% of their budget cost being paid the projects completion status were about 49.5%. There are cost overruns on the sports stadia projects due delays (Mombasa Stadium, Homabay stadium) mostly attributed to inflation costs, budgeting errors, variations in scope of works, exchange rate, cost of equipment and tools, design changes, rework cost, and other risks such as Covid-19 (Greenberg & MacMillan, 2018). Consequently, the country lacks enough stadia to host international matches across the country.

Objectives

The objective of the study was to assess the effect of Project Cost Estimation on Performance of Sports Stadia Construction Projects in Kenya.

LITERATURE REVIEW

Theoretical Review

The Planning Fallacy Theory

The planning fallacy theory was first proposed by Daniel K. Kahneman and Amos Tversky in 1979. The theory is about optimism biasness achieved when there is prediction on the time needed to complete a future task. In 2003, the explanation of the theory was expanded to individuals who exhibit the behaviour of underestimating costs, risks of future actions, and time while being optimistic on the gains of those actions. Kahneman and Tversky (1979) opine that this phenomenon occurs whether knowledge of similar past tasks took longer than expected to be completed. Thus, bias affects only forecasts or estimates of one own's tasks; when observers predict the completion, times indicate overestimating the needed time which shows a pessimistic bias.

Optimism bias has been attributed to predictors' cognitive biases such as scenario thinking, anchoring of projections, and extrapolation of current trends (Cantarelli, van Wee, Molin, & Flyvbjerg, 2012). While this approach can make a reasonably accurate estimate, it relies heavily on past events giving little importance to other factors. This can lead to misguided choices, especially in a situation where the market place changes rapidly resulting in cost underestimation and ultimately cost escalation. Thus, planning misconceptions result not only in excess time, but also with increased costs as well as less benefits. This theory can be used to explain the phenomenon of cost escalation in that the contract value, which is compared with the actual cost, to determine the increase in cost, is a function of the engineers' estimates. Engineers estimate on the other hand is a product of estimation and is largely derived from historical data. If the engineer relies heavily on historical information without including other determinants affecting the cost of the project, the cost is likely to increase (Corrie, 2016).

Conceptual Framework

Independent Variable **Dependent Variable**

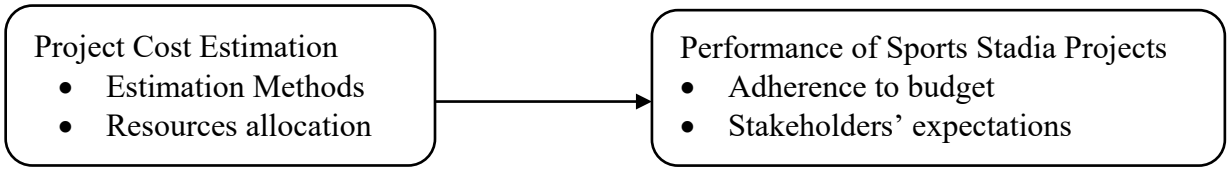

Figure 1: Conceptual framework

Project Cost Estimation

The PMBOK (PMI, 2017) identifies Project Cost estimation as that process of project cost management for developing approximations of the resources cost needed for completion of the project work. The process is essential in determining the monetary resources that are needed for the project and is periodically performed throughout the project as needed. Thus, a cost estimate is a prediction of the likely costs for the resources needed for the completion of project activities. Cost estimates also include the alternative cost that is identified to start and complete the project. To achieve optimal costs in project, it is important to consider the risks and cost trade-offs e.g. whether to buy or make, and also the opportunity of sharing resources. Cost estimates are usually expressed in units of currency or sometimes units of measure e.g., hours or days so as to eliminate the effect of currency fluctuations. Throughout the project life cycle, the accuracy of the project estimate increases as the project progresses. All the resources to be charged for the

project, their costs have to be estimated which may include: equipment, labour, material, contingency costs, and services. (PMI, 2017; Rad, 2015).

A project can employ different estimation techniques for different work packages through the guidance of opportunities derived from expertise, and historical data (Pica & Archibald, 2015). One-point estimate is an approach that takes estimate per activity. Though this approach is useful for simple activities and projects especial where a reliable plan is not necessary, this approach can result in an estimation that is difficult to believe in thus, decreasing the buy in of the project management process by the project team. Analogous estimating uses a past project that is similar to estimate the duration or the cost of the current project. it is often referred to as top-down estimating. It is a useful approach especial where limited information regarding a project is available. It is also less costly technique however, it less accurate (PMI, 2017; Pica & Archibald, 2015). Parametric estimating uses a statistical relationship between the historical data and other variables in calculating the cost estimate of the project. parametric cost estimates can be applicable to the whole project or a segment of a project though with combining with other estimating methods. The three-point estimate used for accurate single point cost estimates by considering estimation of risks and uncertainty, it uses the most likely, optimistic, pessimistic cost-based analysis to define the cost estimates of a project (Rad, 2015; PMI, 2017; Pica & Archibald, 2015).

Despite the method of estimation used, it is vital to compare the estimate against the subjective knowledge of managerial professionals and also against the experimental data. It is important to note that poor overall estimates are due to inadvertent omissions of elements that are key in both the Work Breakdown Structure (WBS) and Resource breakdown structure (RBS). It is very important to treat project planning documents as well as the estimate as living documents. Continuous updating of the RBS, estimates, WBS, and schedule should be a routine whenever new information is available rather than administrative milestones and deadlines for budget. WBS and RBS should be the basis to refine the elemental estimates (Rad, 2015). Further, Rad (2015) argued that an accurate, clearly defined, consistent, and updated RBS and WBS significantly improves the likelihood of project success since it facilitates clear plans not forgetting good communication. Shiner (2013) argued that there are three essential elements that contractors fail to calculate when coming up with actual cost of projects and they are job costs, risks, and overhead. A successful project estimator has to gauge the contingency risks. Construction companies are guilty of just padding costs all over an estimate instead of categorizing everything based on risk and adding contingencies accordingly (Shiner, 2013) resulting to 76% of project being over estimated (Al-Hazim, Salem, & Ahmad, 2017)

Performance of Projects

According to PMI (2017), Kerzner (2017), and the APM (2018) the measure of performance is based on budget, scope, time, and quality and the projects aims to ensure those measures satisfied (Takim & Adnan, 2018). The triple constraints is the most used criteria for measuring project performance (Parker, Parsons, & Isharyanto, 2015; Sridarran, Keraminiyage, & Herszon, 2017), though some scholars include other measures such as customer satisfaction (Joslin & Müller, 2016; Franklin & Cristina, 2015). Other group scholar believed that the triple constraints isn't a measure of project performance but rather an approach of project to measure efficiency of the project and the project management process. They argued that the measure of project performance is based on the outcomes or the desired objectives, benefits, and meeting business needs (Scheuchner, 2017; Turner & Xue, 2018).

Completion of projects within schedule is a major contribution towards the competitive edge in organizations (Enshassi, Ayash & Mohamed, 2018). This is based on the realization that the achievement of the targeted objectives is determined by the ability to deliver the targeted output within the stipulated time. Although timely completion of the project is one of the determinants of its success, it is important to manage each project based on its uniqueness (Khan & Al Maktoumi, 2020). Barasa (2014) measured project completion in terms of the actual level of project completion according to the strategic plan of the project. Langat (2015) operationalized project completion using incomplete classroom, incomplete toilet and incomplete gate. Kahiga (2015) utilized duration of completion (days, weeks, months or years) before and after the scheduled time as proxy for project completion. According to International Program in Management of Engineering and Construction (IMEC) out of 60 mega engineering and construction projects with a capital value of $ 1b undertaken between 1980 and 2000, 18% had intensive cost overruns (Baloyi & Bekker, 2011).

According to Riddell (2016) only 30% of projects are delivered within the budget while 15% are completed on time thus, project managers suffer major challenges in construction projects. An accurate and unbiased cost estimates made early form an important component of project estimation. Over optimistic estimators aim at attracting clients with low estimates means the average cost overruns rise up to 30% where the variation of the actual cost and estimated cost is assumed to be an average of 15% thus, as a result of an over optimistic estimation, the final cost of the project is doubled. Proper estimation practices, education and training are some of the mitigations to project estimation problems (Al-Hazim, Salem, & Ahmad, 2017).

Empirical Review

Hatamleh et al (2018) opined that cost estimation to be amongst the significant processes of project cost management. Project cost estimate as used in the development process of the project, consists of all the capital expenditures, including constructing and landscaping but does not usually consist of capital support expenditures. Cost estimating is employed as one of the fundamental tools in order for the management to be successful. It is significant to analyse the cost assumptions in estimating through using a series of expertise of gaining precise cost estimating that corresponds with the construction and design details once a cost base line budget is established (Hatamleh, Hiyassat, Sweis, & & Sweis, 2018).

From the findings of Mutiso and Nyang'au (2021) in their study of project cost management and successful implementation of Machakos county government funded water projects in Kenya focused on cost control, cost contingencies, cost reporting, and methods of cost estimation. The study targeted 51 county government funded water projects in Machakos county. The study recommended that project cost management practices to embrace methods of cost estimation, cost contingencies and cost reporting to realize implementation success. An improvement of cost estimation methods improves on the implementation of projects. Further, provision of accurate and detailed construction cost estimates during the planning and designing phase creates a roadmap for successful project implementation. The methods of cost estimation help improve plans, cuts cost and help to make better bid estimation. The findings also concur with the findings of Hatamleh et al (2018) that cost estimation is one of the significant processes of project cost management processes.

Miri and Khaksefidi (2015) assessed the cost management in construction projects. One of the serious shortcomings of the management construction in the country, is absence of a specified system for recording the actual costs of various activities. Project cost management is an activity

which deals forecasting, planning, control, cost finding, analysis and assessment. When you realize cost management performance tangibly, as a result of mismanagement, lack of financial resources appears in all the components of project. In this situation, managers can be effective support to keep track of rework events and play an important role on the performance and efficiency of projects. Preparing quick and easy means for communication between contractor, owner and consultant and Contractor has previous experience of implementation similar projects (Miri & Khaksefidi, 2015).

METHODOLOGY

Positivism research philosophy was used in this study. The study also adopted a cross-sectional research design. A total of 17 sports stadia were targeted. The unit of observation was 255 respondents comprising of project consultants, project managers, and sub-contractors involved in the construction of 17 sport stadia in Kenya. These individuals had the relevant information relating to the subject of the study. A census survey was used. Purposive sampling was used as the individuals with the relevant information were selected during data collection. The study used a questionnaire to collect data.

FINDINGS AND DISCUSSIONS

The study had 90.98% response rate where 232 questionnaires out of the 255 were returned indicating the response rate to be excellent. The study conducted both descriptive and inferential analysis.

Descriptive Analysis

Project Cost Estimation

The objective of the study was to assess the effect of Project Cost Estimation on the performance of sports stadia construction projects in Kenya. The descriptive statistics from the responses are as presented in Table 1 below. The Composite Mean of 3.47 suggested that to some extent Project cost Estimation in Project Cost Management influence performance of Sport Stadia construction projects in Kenya. The standard deviation of 1.236 also means that there was no much variation in the responses. According to Mutiso and Paul (2021) improvement of project cost estimation ensured improvement on implementation of water projects undertaken by the county government of Machakos. Accurate and detailed construction cost estimates in the planning and design stages allows for creation of a roadmap for a successful implementation of project. The cost estimation methods allow better bid estimation, improves planning, and is cost saving (Mutiso & Paul, 2021).

According to PMI (2017) Project Cost estimation is that process of project cost management for developing approximations of the resources cost needed for completion of the project work. The process is essential in determining the monetary resources that are needed for the project and is periodically performed throughout the project as needed. A cost estimate is thus, a prediction of the likely costs for the resources needed for the completion of project activities. Cost estimates also include the alternative cost that is identified to start and complete the project. To achieve optimal costs in project, it is important to consider the risks and cost trade-offs e.g., whether to buy or make, and also the opportunity of sharing resources. Throughout the project life cycle, the accuracy of the project estimate increases as the project progresses. All the resources to be charged for the project, their costs have to be estimated which may include: equipment, labour, material, contingency costs, and services. (PMI, 2017; Rad, 2015).

Table 1: Project Cost Estimation

Project Cost Estimation	SD %	D %	N %	A %	SA %	Mean	Std Dev
An order of cost estimate is prepared using the current rates and prices during the cost estimation process.	27.2	9.9	21.1	21.6	20.3	3.92	.952
The legal costs are used to acquire the project estimate and schedule	21.6	9.9	19.8	28.4	20.3	3.16	1.428
The project estimating is based on the available information of the project	2.6	9.9	20.3	38.8	28.4	3.81	1.041
Estimating activity duration are used to create project timeline and a detailed project schedule and thus useful in predicting the project cost.	8.6	18.5	19.8	40.1	12.9	3.30	1.168
Activity duration estimation techniques were used such as analogous, parametric, expert judgement and group decision making to create the basis of estimates.	27.2	11.2	11.2	31.9	18.5	3.03	1.506
Inflation costs determine the technical and technological complexities of the project	3.9	9.9	18.5	30.2	37.5	3.88	1.138
Natural disasters such as weather, floods, earthquakes determine the cost contingency reserve	17.2	18.5	11.2	31.5	21.6	3.22	1.419
Composite Mean						**3.47**	**1.236**

Statistics from Table 1 show that, majority of the respondents (41.9%) agreed that an order of cost estimate is prepared using the current rates and prices during the cost estimation process while 37.1% were of contrary opinion. About 21.1% of the respondents were undecided in the matter (M = 3.92, SD =.952). On whether the legal costs were used to acquire the project estimate and schedule, the 48.7% of the respondents agreed while 31.5% disagreed with only 19.8% of the respondents are undecided on the matter (M = 316, SD = 1.428). Majority of the respondents (57.2%) agreed that project estimating was based on the available information of the project while only 12.5% differed while 20.3% were undecided (M = 3.81, SD = 1.041). A total of 53% of the respondents agreed that activity duration estimates were used to create project timeline and a detailed project schedule and to enable predicting the project cost while 26.1% had contrary opinion. Only 19.8% were undecided on the statement (M = 3.30, SD = 1.168). Similarly, 50.4% of the respondents agreed that activity duration estimation techniques were used such as analogous, parametric, expert judgement and group decision making. However, 38.4% of the respondents had contrary opinion while 11.2% were undecided on the matter. Majority of the respondents (67.7%) agreed that inflation costs determined the technical and technological complexities of the project, while 13.8% had contrary opinion with only 18.5% being undecided on the statement (M = 3.88, SD = 1.138). Finally, 53.1% of the respondents agreed that natural disasters such as weather, floods and earthquakes determined the cost contingency reserve, while 35.7% had contrary opinion with only 11.2% undecided (M = 3.22, SD = 1.419).

Performance of Sports Stadia Construction Projects

The main objective of the study was to examine the effect of project cost management and the performance of sports stadia construction projects in Kenya. The composite Mean of 3.44 and a standard deviation of 1.281 suggested that the respondents neither agreed nor disagreed on whether sport stadia projects were successful implemented in Kenya. Further, the standard deviation of 1.281 further suggested that there are minimal variations in the responses. Project implementation can, be measured and evaluated on the scale and basis of its completion considering the achievement of its main goal and objectives. The project has also to be aware of such factors as time, cost, quality, community/stakeholder satisfaction, economic growth, etc. (Riddell, 2016). According to Lester (2017) the most familiar successful criteria are meeting performance, completion on time, and project costs within budget. However, additional criteria-based industries include: reliability, sustainability, safety, benefits to the business, and long-term performance. Success criteria can be subjective depending on the view of the observer.

Riddell (2016) argued that, only 30% of projects are delivered within the budget while 15% are completed on time thus, project managers suffer major challenges in construction projects. An accurate and unbiased cost estimates made early form an important component of project estimation. Over optimistic estimators aim at attracting clients with low estimates means the average cost overruns rise up to 30% where the variation of the actual cost and estimated cost is assumed to be an average of 15% thus, as a result of an over optimistic estimation, the final cost of the project is doubled. Proper estimation practices, education and training are some of the mitigations to project estimation problems (Al-Hazim, Salem, & Ahmad, 2017).

Table 2: Performance of Sports Stadia Construction Projects

Performance of Projects	**SD** %	**D** %	**N** %	**A** %	**SA** %	**Mean**	**Std. Dev**
The projects have been completed within time frame, at required standards and by achieving its set objectives	9.9	19.8	20.3	21.1	28.9	3.39	1.347
The projects are implemented within their estimated budgets.	9.9	19.8	19.8	28.9	21.6	3.32	1.284
The funds budgeted for the project have been utilized well	9.9	19.8	28.4	21.6	20.3	3.22	1.256
The project has adhered to the quality and standards	9.9	19.8	21.6	20.3	28.4	3.37	1.343
The implemented projects are according to the technical requirements	9.9	19.8	19.8	28.9	21.6	3.42	1.274
The project stakeholders are satisfied with the project implemented	9.9	19.8	19.8	21.6	28.9	3.40	1.348
The cost of rework is very minimal	1.3	11.2	19.8	37.5	30.2	3.84	1.022
Cost management in projects ensures there is an effective appraisal payment profiles of the actual cash outflows and their deviations	8.6	27.2	19.8	22.8	21.6	3.52	1.291
Systematic and accurate cost estimates can effectively support budgeting process	9.9	21.6	11.2	28.9	28.4	3.44	1.360
Composite Mean						**3.44**	**1.281**

The statistics from Table 2 show that respondents (50%) agreed that the projects have been completed within time frame, at required standards and by achieving its set objectives, while 28.7% disagreed with 20.3% neither agreeing nor disagreeing (M =3.39, SD = 1.347). About 50.5% of the respondents believed that the projects were implemented within their estimated budgets, 29.7% disagreed while 19.8% neither disagreed nor agreed (M =3.32, SD = 1.284). Respondents (41.9%) agreed that the funds budgeted for the project has been utilized well while 29.7% disagreed with 28.4% unable to agree or disagree on the opinion (M = 3.22, SD = 1.256). On whether the project adhered to the quality and standards, respondents (487%) agreed while 29.7% disagreed while 21.6% were neutral (M = 3.37, SD = 1.343). Similarly, on whether the implemented projects were according to the technical requirements, 50.5% of the respondents agreed while 29.7% disagreed (M = 3.42, SD = 1.274). About 50.5% of the respondents opined that the project stakeholders were satisfied with the project implemented, 29.7% were contrary while 19.8% undecided on their opinion (M= 3.40, SD = 1.348). However, a majority of the respondents (67.7%) agreed that the cost of rework was very minimal though 22.5% had contrary opinion while only 19.8% were neutral on the matter (M = 3.84, SD =1.022). On whether Cost management in projects ensured there was an effective appraisal payment profiles of the actual cash outflows and their deviations, 44.4% agreed while 35.8% disagreed with only 19.8% neutral (M =3.52, SD = 1.291). Finally, on whether Systematic and accurate cost estimates can effectively support budgeting process, 57.3% agreed while 31.5% disagreed with only 11.2% neutral (M = 3.44, SD= 1.360).

Correlation Analysis

Correlation analysis was used to establish the strength and direction of the relationship between dependent and the independent variables. The correlation strengths were interpreted using Cohen and Cleveland decision rules where 0.1 to 0.3 indicated weak correlation, 0.3 to 0.5 indicated moderate correlation strength and greater than 0.5 indicated a strong correlation between the variables. Table 3 below indicate that Project Cost Estimation had strong positive and significant relationship with Performance of Sports Stadia construction projects in Kenya (r=0.662, p=0.000). Significant relationship was considered since the p-value was less than selected level of significance (0.05). The findings are also supported by Alemseged and Mamo (2018) who found a positive strong correlation between Project Cost Estimation and success implementation of ERP project at Ethio Telecom in Ethiopia (r =.582, P = .000). Similarly, Mutiso and Paul (2021) in a study of project cost management and successful implementation of water projects funded by Machakos county Government in Kenya found a strong positive correlation between project cost estimation and project implementation (r = .562, p = .000).

Table 3: Correlation Analysis

		PSSP
Performance of Sports Construction Stadia Projects (PSSP)	Pearson Correlation	1
	Sig. (2-tailed)	
	N	232
Project Cost Estimation (PCE)	Pearson Correlation	.662**
	Sig. (2-tailed)	.000
	N	232

Regression Analysis Results

Linear regression was conducted to determine the relationship between the independent variables with the dependent variable.

Regression model of Project Performance and Project Cost Estimation

From the regression results the coefficient of determination (R^2) and the correlation coefficient (r) show the degree of association between Project Cost Estimation and Performance of Sports Stadia Construction Projects. From Table 4 below, r (.662) shows a strong correlation between the predictor variable of Project Cost Estimation and the dependent variable Performance of Sports Stadia construction projects. The coefficient of determination R^2 (.439) implies that Project Cost Estimation explains 43.9% change of Performance of Sports Stadia construction Projects in Kenya.

Table 4: Model Summary for Project Cost Estimation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.662[a]	.439	.436	.65741

a. Predictors: (Constant), Project Cost Estimation

b. Dependent Variable: Performance of Sports Stadia Construction Projects

The results from the ANOVA test reveal that Project Cost Estimation has a significant influence on the Performance of Sports Stadia construction Projects in Kenya since the P-value (0.000) is less than the significance value of 0.05. The F-Calculated (1, 230) = 179.906 which is greater the F-Critical (1, 230) =3.882. This implies that Project Cost Estimation to some extent is significant in explaining the change of Performance in Sports Stadia construction Projects in Kenya. Table 5 below shows the ANOVA results for the Project Cost Estimation. Cost estimating is a in important aspect in construction projects. The estimated costs highly influence the success of the project as well as the performance depending on how closely the actual cost compares to the estimated costs (Egboga, Daniel, & Abubakar, 2022).

Table 5: ANOVA for Project Cost Estimation

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	77.753	1	77.753	179.906	.000[b]
	Residual	99.404	230	.432		
	Total	177.157	231			

a. Dependent Variable: Performance of Sports Stadia Construction Projects

b. Predictors: (Constant), Project Cost Estimation

Having found Construction Project Financing to be significant in explain the change of performance in Sports Stadia Construction Projects in Kenya, the regression coefficients were as shown in Table 6 below. Project Cost Estimation significantly influences performance of Sports Stadia Construction Projects in Kenya P-value (.000< 0.05). Project Cost Estimation also influences Performance of Sports Stadia Construction Projects by 66.2% as affirmed by r (.662) in the model summary. The β (.648) indicates a positive and a direct relationship between Project Cost Estimation and Performance of Sports Stadia Construction Projects in Kenya i.e. a unit increase in Performance of Sports Stadia Construction Projects needs .648 of Project Cost Estimation. The findings are confirmed by Alemseged and Mamo (2018) who found a positive significant relationship between project cost estimation and project success of ERP project in Ethio Telecom in Ethiopia (β = .590, P-value = .003, standardized beta = .396). The findings also are in line with Nakhleh (2019) who found an insignificant positive linear relationship between cost estimation and performance of IT projects in Qatar (β = .041, B = .352, P-value = .746).

The model can be fitted as below

$$Y=\beta_0+ \beta_2X_2+ e \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(i)}$$

Performance of Sports Stadia Projects = 1.229 + .648 Project Cost Estimation …….. (ii)

Table 6: Regression Coefficients for Project Cost Estimation

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.229	.167		7.359	.000
	Project Cost Estimation	.648	.048	.662	13.413	.000

a. Dependent Variable: Performance of Sports Stadia Construction Projects in Kenya

Conclusion

The regression results at 95% level of confidence indicated that the F-Calculated (1, 230) = 179.906 was greater than F-Critical (1, 230) = 3.882 and the P-value (.000) < 0.05 clearly indicated that Project Cost Estimation is good and fit in explaining the change in Performance of Sports Stadia Projects in Kenya. The t-Calculated (9.571) was greater than the t-Critical (1.970) and the p-value < 0.05. Project Cost Estimation has a significant effect on the performance of Sports Stadia Construction Projects in Kenya. This was achieved through schedule planning, activities sequencing, cos management plan, and activity cost estimates. The findings are also supported by previous studies (Ike, et al, 2022; Mutiso and Paul, 2021; Alemseged and Mamo, 2018; Hatamleh et al, 2018) who found significant effect of project cost estimation on performance of projects.

Recommendations

The study found that Project Cost Estimation has a significant influence on Performance of Sports Stadia Projects in Kenya. Cost Estimation is essential in determining the monetary resources that are needed for the project and is periodically performed throughout the project as needed. Thus, a cost estimate is a prediction of the likely costs for the resources needed for the completion of project activities. The study recommends a thorough and periodic project cost estimation of the sports stadia projects. Due to the delays in implementation of the sports stadia. there has been a change in pricing due to inflation, exchange rate and other factors. Most of the sports stadia projects have stalled and to revive them new estimates are needed as a large % of the funds has been disbursed though they don't correspond with actual work done.

Authors Contributions

The study contributes to body of knowledge on Project Cost Management and in specific to project cost estimation. Project practitioners and other project stakeholders will get information on how project cost estimation affects the performance of projects. It will therefore help them in decision making process to be manage future projects. The National and the county Governments and policy makers will find important information I relation to project cost management and project cost estimation in specific on how they influence the performance of project to enable them come up with clear policies on how cost estimation should be done in public development projects. Last for the researchers and academicians will provide basis of future research and also contribute to body of knowledge on project cost estimation and performance of projects.

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Conflict Of Interest Declaration

The author ensured all the research ethics are adhered to in preparation of the manuscript and there is no conflict of interest the author is aware of.

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