

Contracting Process on Construction Cost Overruns in Real Estate Projects in Nairobi and Kisumu Counties, Kenya

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Abstract Cost overruns have provided a significant challenge in the construction industries of both developed and developing countries. The purpose of this study was to investigate the influence of Contracting Process on Construction Cost Overruns of real estate projects in Nairobi and Kisumu Counties. The study was guided by an objective, to establish the extent to which contracting process influence construction cost overruns in real estate projects. The study was based on pragmatic paradigm which provides for the use of both qualitative and quantitative research methodologies. The research adopted descriptive survey and correlational research designs. The study targeted a population of 4000 project professionals that constituted 7 professionals from active real estates in Nairobi and Kisumu Counties and 10 key informants from the real estate industry. Using the Krejcie and Morgan table of sample size determination, the sample size for this study was 351. The study then adopted stratified, simple random and purposive sampling methods to select appropriate sample sizes from the study population strata. Structured questionnaire was the main instrument for data collection, supported by interview guide. Hypothesis was tested at $\alpha=0.05$ level of significance and the results were: H₀: There is no significant relationship between contracting process and Construction Cost Overruns in real estate projects was rejected since $P=0.000<0.05$. Considering the study findings and conclusions, the following recommendations were made: Project professionals and other relevant real estate project stakeholders should encourage comprehensive contracting process as critical concerns in assembling pertinent information and creating avenues that could be utilized to reduce construction cost overruns in real estate projects.

Keywords Contracting process, Construction cost overrun, Real estate projects

1. Introduction

Cost overruns is a significant challenge in construction projects. The significance and linkage of construction industry to economic growth and development of all sectors in a country cannot be underrated ((Durdyev, Omarov, and Ismail, 2017). Constraints of cost, time and quality contribute to performance of projects, the construction industry focuses its lenses on cost constraint as a result of past performances of various studied projects. Overruns in cost and quality have attracted a wide range of research to an extent that it has become a global phenomenon and therefore proper reduction of construction cost is a recommendation by scholars as an aggregate for the successful completion of projects (Ahady, Gupta, and Malik, 2017). Reduction of construction cost overrun is key to project performance despite the fact that it has proved to be laborious in the construction industry (Alias, Zawawi, Yusof, and Aris,

2014).

Successful projects are supposedly the ones which meet the triple constraint standard where time, cost and quality are adequately achieved. Project success is subject to efficacy in management of the cost element. The main objective of project owners is to have their projects executed within their approved budgets and this leads them to engage professionals such as quantity surveyors to specifically manage financial aspects of the construction on their behalf; they consider cost certainty very highly. Nevertheless, cost overruns are commonplace on construction projects (Cunningham, 2017).

Contracting processes are underpinned by various approaches that are well understood by the executors. One very important role of contracting process is demonstrated through the number of problems identified by the response obtained from internal reviews of contracts carried out by various departments. For instance, out of 60 contracts which were tested for overbilling in Northern Ireland, 34 had issues in the amount billed, and 73 contracts were tested against 8 areas; planning and governance, people, administration, payment and incentives, managing performance, risk, contract development and managing relationships also

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referred to as ‘Good practice contract management framework’ and management issues were found in all eight areas (Contract Management Principles and Procedures, 2019). This study sets out to confirm the influence of contracting process on construction cost overruns in real estate projects.

1.1. Research Objective

The objective of the study was to establish the extent to which Contracting process influence Construction Cost Overruns in real estate projects.

1.2. Research Hypothesis

Ho: There is no significant relationship between contracting process and Construction Cost Overruns in real estate projects.

2. Literature Review

2.1. Construction Cost Overruns in Real Estate Projects

This study adopted the definition of Construction Cost Overruns as a structured multidisciplinary analysis of control process aiming to reduce excess of actual construction cost over budget in real estate projects (Khodeir and Ghandour, 2018). Construction Cost Overruns refer to processes that include accurate estimates, complete designs, correct scheduling, planning for scope changes and efficient administration. Different scholars have conducted studies to assess the causes of cost overruns in construction projects (Khodier and Ghandour, 2018; Niazi and Painting, 2017; Lind and Brunes, 2015; Doloi, 2013 and Rosenfed, 2013).

Out of the studies that were reviewed; Lind and Brunes (2015) and Khodeir and Ghandour, (2018) focused on the importance of competence, skills and value management in the management of cost overruns, Doloi (2013) on the other hand focused on the responsibilities of key stakeholders including clients, consultants, and contractors. On the same note, Niazi and Painting (2017) established that cost overruns were caused by: corruption; delays in progress payment by clients; difficulties by contractors to financing projects; insecurity; decision by the owners to change order during construction; market inflation; mistakes and discrepancies in design documents; and the type of project bidding awards. Also, Rosenfed (2013) found that premature tender documents, numerous changes in the owners’ requirements and unrealistically low tender-winning prices caused construction cost overrun.

Construction Cost Overruns in this study was viewed from the perspective of: accurate project estimates; correct plan; complete project designs; planning for changes in project scope; and efficient administration of projects. The findings of this study concurred with the findings of studies by (Khodier and Ghandour, 2018; Niazi and Painting, 2017; Lind and Brunes, 2015; Doloi, 2013 and Rosenfed, 2013). This study’s focus was that low priced projects cost more

than expected at the end, project costs are controlled through accepting minimal claims during implementation, strict adherence to comprehensive designs at tendering stage minimize project claim, whenever there is proper coordination at the design level unexpected outcomes during implementation are minimized, escalations are experienced due to errors in project activity scheduling, incorporating scheduling techniques help to save project cost, planning for scope changes is a requisite to minimize project cost, regulation of project cost becomes harder due to wrong initial scope definition, proper coordination of projects minimize project cost and that precisely organized project activities ensure control of un-anticipated expenses. Therefore, this study established key indicators of reduction of cost overruns on real estate projects in Kenya’s Nairobi and Kisumu Counties.

2.2. Contracting Process and Construction Cost Overruns in Real Estate Projects

Contracting process entails contract need assessment, contract selection and writing, contract execution, contract monitoring and contract closing. Contracting process is an important component in the management of cost overruns in construction projects. In view of this, Suprpto, Bakker, Mooi and Hertogh, (2015) conducted a study on a sample of 450 respondents drawn from the Dutch Process Industry Competence Network to determine how contract types and incentives influence project performance. The study revealed that contracts that were based on incentives were indirectly associated with improved project performance. On the contrary, contracts that did not have incentives had a positive effect on relational attitudes which in turn led to enhanced team work. The study further noted that relationships in projects with lump-sum contracts tended to be more adversarial in nature, as compared to those with reimbursable contracts. However, the response rate was 26.4% with 119 completed responses which fell far below Mugenda and Mugenda (2003) recommendation that a response rate of over 50 percent is adequate. It also failed to meet Kothari (2011) 30 percent threshold for questionnaire return rate.

In a different quantitative study that was conducted on a sample of 1,500 respondents drawn from 46 countries, Zou, Brax and Rajala (2018) evaluated how contract structure, contracting process and service complexity influenced supplier performance. The researchers opined that potential benefits of a well-managed service procurement and the inter-organizational exchanges related to business-to-business (B2B) services inevitably involve complexities that make it difficult to align service procurement with the exchange parties’ objectives.

In view of the fact that contractors play an important role in the performance of construction projects, Khoso and Yusof (2019) conducted a study titled “Extended Review on contractor selection process”. The study identified: adequacy of equipment available to contractor; general experience of

firm; specific experience with respect to type and size of a project; prior working relationship of contractor with the owner and consultant; number of change orders in past contracts, disputes and claims in past projects; and past record of time and budget as factors that were critical in the selection of contractors for project success.

Factor analysis of cost and time overruns cited poor construction methods, delays in procuring materials and equipment, contractor’s cash flow problems and unrealistic client budget as components of contractor’s inability. Four of the studies by Suprpto *et al.*, (2015), Zou, et al. (2018), Kagiri, and Wainaina (2013), Odoema and Horita (2017) took quantitative approaches while the studies by Khosu and Yosof (2019) and Alzahrani and Emsley (2013) were qualitative in nature and based on literature review.

A close scrutiny of the components used in the studies seem to suggest that these are important constructs of contract processing and project success: contract types (Suprpto *et al.*, 2015), contract structure, contracting process and service complexity (Zou, et al., 2018); cooperative procurement procedures (Eriksson and Westerberg, 2011); contractor selection process (Khosu and Yosof, 2019); contractors inability (Kagiri, and Wainaina, 2013); and contractors attributes (Alzahrani and Emsley, 2013). According to this study, it was concluded that clear contract need assessment should be established before construction work, contract should be properly drafted, administration of up to date contractual agreements is crucial, proper execution of contracts is essential for project success,

failure to direct contract implementation leads to more cost than expected, there is need to use logical framework to monitor project progress, use of work plans to achieve project goals, consideration of procedural contract termination in the work and that avoidance of haphazard contract termination of projects positively influence Construction Cost Overruns in Real Estate Projects Kenya’s Nairobi and Kisumu Counties.

2.3. Theoretical Framework

This study was guided by the Microeconomic Production Theory proposed by Lerner (1968) and focused on the concept of cost function in that theory. This is a build-up of the works of Cantarelli *et al.* (2010), and adopted from Lind and Brunes (2015). The theory studied the behaviour of individual firms in regards to fixation of price and output and their reaction to changes in the demand and supply conditions; thus it seeks to determine the mechanism by which the different economic units attain the position of equilibrium proceeding from individual units to an industry or a market: in our case being the construction industry and specifically real estate projects.

2.4. Conceptual Framework

This study has adopted a conceptual framework outlined in figure 1 indicating the relationship of independent variable and dependent variable.

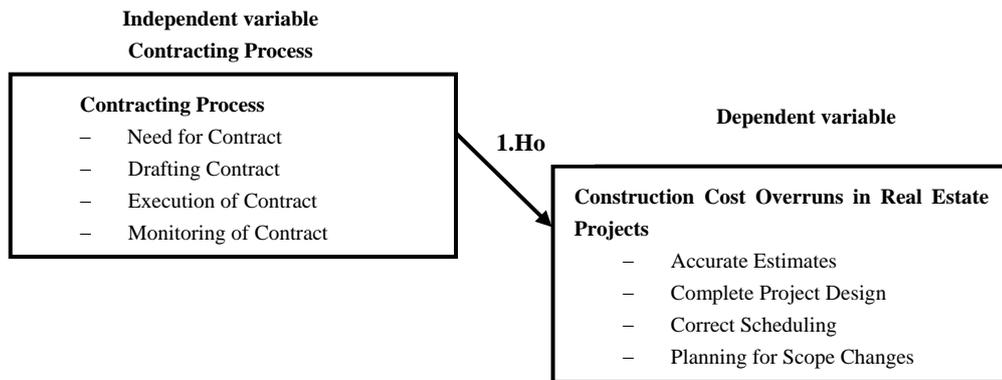


Figure 1. Conceptual Framework for Contracting Process on and Construction Cost Overruns in Real Estate Project

3. Research Methodology

Data was analyzed using descriptive statistics and inferential statistics. Descriptive statistics used measures of central tendency such as frequency, percentage, mean, standard deviations, composite mean and composite standard deviation. Whereas inferential statistics used spearman correlation and regression analyses. The descriptive research design used in this study helped to explore the link between the variables and report the way it is (Brook, 2013). Target

population was based on the register of real estate projects between 2018 and 2019 held by the National construction Authority (NCA) which had 570 active real estate projects comprising of 95 in Kisumu and 475 in Nairobi Counties. In general, a typical real estate project structure comprises Project professionals such as Construction manager, clerk of works, Quantity Surveyor, Architect, Mechanical and Electrical engineer, structural Engineer, Contractor and Subcontractors. The 570 active real estate projects in Kisumu and Nairobi Counties each have at least one of the

project professional. Thus a minimum of 7 project professional per real estate project constituted a target population of 4000 = (570×7) project professional as well as 10 key informants.

A sample size of 351 was drawn from a target population of 4000 project professional and key informants in Nairobi and Kisumu Counties. The sample size for the study was determined using Krejcie and Morgan table (Krejcie and Morgan, 1970). Based on the table, for a given population of 4000, a sample size of 351 was obtained and was further confirmed through hyper-geometric formula for a sample size as follows;

$$n = \frac{Z^2 N P (1-P)}{e^2 (N-1) + Z^2 P (1-P)}$$

Proportionate stratified and simple random sampling technique was used to select sample sizes from different strata (project professionals) out of the 570 active real estate projects registered and operating in Nairobi and Kisumu Counties; Purposive sampling was used to select key informants from a targeted population of ten having prerequisite experience in real estate development. Data for this study was collected in phases; pre-field work phase, field work phase and post-field work phase. The data collection was done by using survey questionnaire and interview guide.

4. Results and Discussions

4.1. Questionnaire Return Rate

Out of a sample size of 351 from the target population, 8 key informants were interviewed whereas 343 participants from the seven active real estates licensed to operate within Kisumu and Nairobi Counties by National Construction Authority were issued with questionnaires of which 336 dully filled and returned the questionnaires giving a return rate of 98%. Table 1 shows the Questionnaire Return Rate for the Project professionals from the seven active real estates licensed to operate within Kisumu and Nairobi Counties by National Construction Authority that were responded to and returned.

Table 1. Questionnaire Return Rate

County	Sampled	Returned	Return Rate%
Nairobi	287	281	81.92
Kisumu	56	55	16.04
Total	343	336	97.96

The high return rate was attained because the researcher consistently followed up all the sampled respondents during data collection. The high return rate of 98% facilitated gathering of sufficient data that could be generalized to determine the influence of Financial and Contract Management on Construction Cost Overruns in Real Estate Projects in Kisumu and Nairobi Counties. The Questionnaire return rate was considered adequate as per Mugenda and Mugenda (2003) and Kothari (2004) who recommended that

a Questionnaire return rate beyond 50% is acceptable in research and subsequently satisfactory and contributes towards gathering of sufficient data that could be generalized to represent the opinions of participants.

4.2. Demographic Characteristics' of the Respondents

In order to understand characteristics of participants the researcher was dealing with in the study, their background information was necessary. The study sought information from the participants on distribution by, position category in real estate projects, duration of profession in the organization and kind of construction projects conducted in real estate projects. The participants were asked to provide these demographic information. The results are presented in the following sub-thematic areas:

Distribution of Respondent's by Position Category

It was imperative to investigate the respondents' position category to establish how financial and contract management of real estate projects were related with cadre of the project professional whose information were considered to be significance to the construction agencies for policy decision making. The respondents were therefore asked to state their position category and the results are presented in Table 2.

Table 2. Distribution of Respondents by position category

Position category	Frequency	Cumulative frequency	Valid Percent	Cumulative percentage
Quantity Surveyor	41	41	12.20	12.20
Construction Manager/Clerk of works	66	107	19.60	31.80
Structural Engineer	49	156	14.60	46.40
Contractor	81	237	24.10	70.50
Architect	35	272	10.40	80.90
Mechanical and Electrical Engineer	40	312	11.90	92.80
Other Staff	24	336	7.20	100
Total	336		100.00	

Table 2, shows that 81(24.10%) were categorized as contractor project professionals, 66(19.60%) were categorized as Construction Manager/Clerk of work project professionals, 49(14.6%) were categorized as structural Engineers project professionals, 40(11.9%) were categorized as Mechanical and Electrical Engineer project professionals, 41(12.2%) were categorized as quantity surveyors, 35 (10.4%) were categorized as architects project professionals project professionals and 24(7.2%) were categorized as other staff by project professionals. The findings on position category indicates that real estate projects are undertaken by qualified project professionals capable of responding to information sought on financial and contract management, project environment, organization capacity and construction

cost overruns in real estate projects. Doloji (2012) established that position category by project professional is a contributing factor on the relationship between financial contract management and construction cost overruns in real estate projects.

4.3. Basic Tests for Statistical Assumptions of Regression Analysis

The study was based on a set of assumptions of regression analysis that must be met to ensure data collected is appropriate for the statistical analysis. When these assumptions are violated the results of the analysis can be erroneous. The assumptions tested include normality, linearity, multi-collinearity and independence of errors.

Assumptions of Normality

An assessment of the normality of data is a prerequisite for many statistical tests because normal data is an underlying assumption in parametric testing. The test for normality of data distribution was conducted on all the predictor variables, moderating variables using Kolmogorov-Smirnov test statistics (KS-test) and Shapiro-Wilk test (SW-test).

4.4. Contracting Process and Construction Cost Overruns in Real Estate Projects

Contracting process in this study is defined as a process that entail contract need assessment, contract selection and writing, contract execution, contract monitoring and contract closing. The participants were requested to give their opinions on their level of agreements or disagreements with the ten statements of Contracting process on a Likert scale of 1-5 where Strongly agree(SA)=5, Agree(A)=4 Neutral(N)=3, Disagree(D)=2 and Strongly disagree. (SD)=1. The results were analyzed and presented using frequencies, percentage,

means and standard deviation for each response in each item. The item mean as well as the standard deviation were also computed and presented alongside as provided in Table 3.

The results in Table 3 indicates that the composite mean and composite standard deviation for the Contracting process were 4.30 and 0.656 respectively; implying that using the Likert scale a majority of participants at least agreed (mean=4.30) that contracting process influences Construction Cost Overruns in Real Estate Projects. Similarly ten statements were developed to measure the extent to which contracting process influences Construction Cost Overruns in Real Estate Projects.

Statement (1) that 'Clear contract need assessment should be established before construction work' had a mean of 4.33 and a standard deviation of 0.750. This results indicate that out of 336 study participants, 168(50.0%) strongly agreed, 113(33.6%) agreed, 54(16.1%) were neutral and 1(0.3%) disagreed that clear contract need assessment should be established before construction work. This results shows that the line statement mean score of 4.33 was higher than the composite mean of 4.30. The implication of this result to the study is that clear contract need assessment established before construction work positively influence management Construction of Cost Overruns in Real Estate Projects. The higher line item standard deviation of 0.750 than the composite standard deviation of 0.656 indicate that there was a divergence view in opinion among the study participants. The study results contradicts finding by Lee (2018) who found out that although conducting a needs assessment has been accepted as the first step in solving performance problems, the salient features of needs assessment model utilizes hypothetical interventions at an earlier stage in the process and gaining a commitment from the client across the entire process is more important for performance.

Table 3. Contracting process and construction cost overruns in real estate projects

STATEMENTS	SA	A	N	D	SD	Mean	Std. dev
1. Clear contract need assessment should be established before construction work	168(50.0%)	113(33.6%)	54(16.1%)	1(0.3%)	0(0.00%)	4.33	0.750
2. Assessment of development needs for projects is a top priority	136(40.5%)	155(46.1%)	45(13.4%)	0(0.00%)	0(0.00%)	4.27	0.683
3. Properly drafted contract is a critical factor	157(46.7%)	142(42.3%)	37(11%)	0(0.00%)	0(0.00%)	4.36	0.672
4. Administration of up to date contractual agreements is crucial	148(44%)	159(47.4%)	28(8.3%)	1(0.3%)	0(0.00%)	4.35	0.643
5. Proper execution of contracts is essential for project success	147(43.8%)	163(48.5%)	26(7.7%)	0(0.00%)	0(0.00%)	4.36	0.622
6. Failure to direct contract implementation leads to more cost than expected	109(32.4%)	180(53.6%)	44(13.1%)	2(0.6%)	1(0.3%)	4.17	0.691
7. I use logical framework to monitor my project progress	114(33.9%)	181(53.9%)	32(9.5%)	9(2.7%)	0(0.00%)	4.19	0.712
8. I use work plans to achieve my project goals	138(41.1%)	168(50.0%)	28(8.3%)	2(0.6%)	0(0.00%)	4.32	0.648
9. I consider procedural contract termination in my work	145(43.2%)	163(48.5%)	27(8.0%)	1(0.3%)	0(0.00%)	4.35	0.637
10. I avoid haphazard contract termination in my projects	143(42.6%)	170(50.6%)	23(6.8%)	0(0.00%)	0(0.00%)	4.36	0.606
Composite mean & Composite standard deviation						4.30	0.656

Statement (2) that *'Assessment of development needs for projects is a top priority'* had a mean of 4.27 and a standard deviation of 0.683. This results indicate that out of 336 study participants, 136(40.5%) strongly agreed, 155(46.1%) agreed, and 45(13.4%) were neutral that assessment of development needs for projects is a top priority. This results shows that the line statement mean score of 4.27 was lower than the composite mean of 4.30. The implication of this result to the study is that clear assessment of development needs for projects as a top priority has not been effective enough in order to positively influence management of Construction Cost Overruns in Real Estate Projects. The higher line item standard deviation of 0.683 than the composite standard deviation of 0.656 indicate that there was a divergence view in opinion among the study participants. The study results support finding by Almahmoud and Doloi (2015) who found out that the degree of satisfying the needs of diverse stakeholders is highly significant in achieving social sustainability performance of projects; this does not directly point to reduction of construction cost overruns but sustainability is a pointer to project performance.

Statement (3) that *'Properly drafted contract is a critical factor'* had a mean of 4.36 and a standard deviation of 0.672. This results indicate that out of 336 study participants, 157(46.7%) strongly agreed, 142(42.3%) agreed and 37(11%) were neutral that properly drafted contract is a critical factor. This results shows that the line statement mean score of 4.36 was higher than the composite mean of 4.30. The implication of this result to the study is that properly drafted contract is a critical factor that positively influence management of Construction Cost Overruns in Real Estate Projects. The higher line item standard deviation of 0.672 than the composite standard deviation of 0.656 indicate that there was a divergence view in opinion among the study participants. The study results supports finding by Chong and Oon (2016) who found out that legal drafting is one of the root causes for interpretation errors and misunderstandings in construction contracts; most construction personnel do not have legal training therefore properly drafted contract is a critical factor in reducing Construction Cost Overruns in Real Estate Projects.

Statement (4) that *'Administration of up to date contractual agreements is crucial'* had a mean of 4.35 and a standard deviation of 0.643. This results indicate that out of 336 study participants, 148(44%) strongly agreed, 159(47.4%) agreed, 28(8.3%) were neutral and 1(0.3%) disagreed that administration of up to date contractual agreements is crucial. This results shows that the line statement mean score of 4.35 was higher than the composite mean of 4.30. The implication of this result to the study is that administration of up to date contractual agreements positively influence management of Construction Cost Overruns in Real Estate Projects. The lower line item standard deviation of 0.643 than the composite standard deviation of 0.656 indicate that there was a convergence view in opinion among the study participants. The study

results supports finding by Shehu, Holt, Endut and Akitonye (2015) found that negotiated tendering, which forms part of up-to-date contractual agreements perform better than selective/open tendering, respectively in Malaysian construction projects.

Statement (5) that *'Proper execution of contracts is essential for project success'* had a mean of 4.36 and a standard deviation of 0.622. This results indicate that out of 336 study participants, 147(43.8%) strongly agreed, 163(48.5%) agreed and 26(7.7%) were neutral that proper execution of contracts is essential for project success. This results shows that the line statement mean score of 4.36 was higher than the composite mean of 4.30. The implication of this result to the study is that proper execution of contracts is essential for project success and hence positively influence management of construction cost overruns in real estate projects. The lower line item standard deviation of 0.622 than the composite standard deviation of 0.656 indicate that there was a convergence view in opinion among the study participants. The study results supports finding by Asiedu and Adaku (2019) found out that one of the four major causes of construction cost overruns in Ghana was poor contract planning and supervision; contract execution is a component of the two elements.

Statement (6) that *'Failure to direct contract implementation leads to more cost than expected'* had a mean of 4.17 and a standard deviation of 0.691. This results indicate that out of 336 study participants, 109(32.4%) strongly agreed, 180(53.6%) agreed, 49(13.1%) were neutral, 2(0.6%) disagreed and 1 (0.3%) strongly disagreed that failure to direct contract implementation leads to more cost than expected. This results shows that the line statement mean score of 4.17 was lower than the composite mean of 4.30. The implication of this result to the study is that there is need to direct contract implementation in order to positively influence management of Construction Cost Overruns in Real Estate Projects. The higher line item standard deviation of 0.691 than the composite standard deviation of 0.656 indicate that there was a divergence view in opinion among the study participants. The study results further supports finding by Asiedu and Adaku (2019) who found out that failure to direct contract implementation leads to more cost than expected and hence negatively influence management of Construction Cost Overruns.

Statement (7) that *'I use logical framework to monitor my project progress'* had a mean of 4.19 and a standard deviation of 0.712. This results indicate that out of 336 study participants, 114(33.9%) strongly agreed, 181(53.9%) agreed, 32(9.5%) were neutral and 9(2.7%) disagreed that they use logical framework to monitor their project progress. This results shows that the line statement mean score of 4.19 was lower than the composite mean of 4.30. The implication of this result to the study is that there is need to use logical framework to monitor project progress order to positively influence management of Construction Cost Overruns in Real Estate Projects. The higher line item standard deviation

of 0.712 than the composite standard deviation of 0.656 indicate that there was a divergence view in opinion among the study participants. The study results supports finding by Blyth, Lewis and Kaka (2004) who found that a logical sequence of activities or use of logical framework can lead to standardization of construction activities that would enable the automation of project planning processes and hence would result in reduced administration and management costs.

Statement (8) that *'I use work plans to achieve my project goals'* had a mean of 4.32 and a standard deviation of 0.648. This results indicate that out of 336 study participants, 138(41.1%) strongly agreed, 168(50.0%) agreed, 28(8.3%) were neutral, and 2(0.6%) disagreed that they use work plans to achieve their project goals. This results shows that the line statement mean score of 4.32 was higher than the composite mean of 4.30. The implication of this result to the study is that using work plans to achieve project goals positively influence management of Construction Cost Overruns in Real Estate Projects. The lower line item standard deviation of 0.648 than the composite standard deviation of 0.656 indicate that there was a convergence view in opinion among the study participants. The study results supports finding by Leblanc, Thompson, Cameron and Nitithamyong (2013) who found that planned works is the first step for process management improvement for housing associations therefore an indirect contributor to reduction of construction cost overruns.

Statement (9) that *'I consider procedural contract termination in my work'* had a mean of 4.35 and a standard deviation of 0.637. This results indicate that out of 336 study participants, 145(43.2%) strongly agreed, 163(48.5%) agreed, 27(8.0%) were neutral, and 1(0.3%) disagreed that they consider procedural contract termination in their work. This results shows that the line statement mean score of 4.35 was higher than the composite mean of 4.30. The implication of this result to the study is that consideration of procedural contract termination in the work positively influence management of Construction Cost Overruns in Real Estate Projects. The lower line item standard deviation of 0.637 than the composite standard deviation of 0.656 indicate that there was a convergence view in opinion among the study participants. The study results support findings by Udofia, Hadikusumo and Santoso (2015) who found out that stakeholders in construction should seek relevant information on project procurement even to understand issues of planning, implementation and termination from experts prior to commitment to contractual obligations to reduce Construction Cost Overruns in Real Estate Projects.

Statement (10) that *'I avoid haphazard contract termination in my projects'* had a mean of 4.36 and a standard deviation of 0.606. This results indicate that out of 336 study participants, 143(42.6%) strongly agreed, 170(50.6%) agreed and 23(6.8%) were neutral that they avoid haphazard contract termination in their projects. This results shows that the line statement mean score of 4.36 was

higher than the composite mean of 4.30. The implication of this result to the study is that avoidance of haphazard contract termination of projects positively influence management of Construction Cost Overruns in Real Estate Projects. The lower line item standard deviation of 0.606 than the composite standard deviation of 0.656 indicate that there was a convergence view in opinion among the study participants. The study results support findings by Opawole (2018) who found that termination of the contracts was preferred against specific cases of "delayed execution", "abandonment of the project", "and bankruptcy of the concessionaire" and "non-compliance with design and specifications" and that avoidance of haphazard contract termination of projects reduce Construction Cost Overruns in Real Estate Projects.

4.5. Correlation Analysis of Contracting Process and Construction Cost Overruns in Real Estate Projects

The study sought to examine the relationship between contracting process and construction cost overruns in real estate projects. Pearson correlation coefficient was used to test the relationship between contracting process and construction cost overruns in real estate projects at 95% level of confidence. The correlations results obtained are shown in Table 4.

To test the extent of the relationship between Contracting process and construction cost overruns in real estate projects; several characteristics of Contracting process and construction cost overruns in real estate projects were analyzed based on the following hypothesis; H_0 : There is no significant relationship between Contracting process and construction cost overruns in real estate projects. The corresponding mathematical model for the hypothesis was identified as follows: construction cost overruns in real estate projects = f (Contracting process).

The correlation results presented in Table 4 indicated that all the P-values under significant 2-tailed were found to be significant since the P-values <0.05 : (Statement 1; clear contract need assessment should be established before construction work; $r=0.180$, P-value= $0.000 < 0.05$, Statement 2; assessment of development needs for projects is a top priority; $r=0.367$, P-value= $0.000 < 0.05$, Statement 3; properly drafted contract is a critical factor; $r=0.252$, P-value= $0.000 < 0.05$, Statement 4; administration of up to date contractual agreements is crucial; $r=0.326$, P-value= $0.000 < 0.05$, Statement 5; proper execution of contracts is essential for project success; $r=0.188$, P-value= $0.000 < 0.05$, Statement 6; failure to direct contract implementation leads to more cost than expected; $r=0.316$, P-value= $0.000 < 0.05$, Statement 7; use logical framework to monitor their project progress; $r=0.380$, P-value= $0.000 < 0.05$, Statement 8; use work plans to achieve their project goals; $r=0.152$, P-value= $0.000 < 0.05$, Statement 9; considering procedural contract termination in their work; $r=0.338$, P-value= $0.000 < 0.05$ and Statement 10; avoidance of haphazard contract termination in my projects; $r=0.272$,

P-value=0.000<0.05).

In order to determine the correlation between contracting process and construction cost overruns, Pearson correlation coefficient was run on the scores of each scale. The total scores of the scales were computed as a summation of the individual scores on each item by the respondent at 95% level of confidence. The study found a positive overall correlation($r=0.431$) which was statistically significant as $P<0.05$ ($p=0.000$) between Contracting process as a financial and contract management strategy and construction cost overruns. This implies that there is a significant relationship between Contracting process and construction cost overruns in real estate projects leading to rejection of the null

hypothesis (H_0 : There is no significant relationship Contracting process and construction cost overruns in real estate projects) and acceptance of the alternative hypothesis, and hence the research findings conclude that there is a significant relationship between Contracting process and construction cost overruns in real estate projects. This finding is in agreement with findings by Irfan, Malik and Khel (2020) found that procurement procedure contracting process is one of the most significant factor influencing time and cost overruns in construction projects of developing countries therefore there is a significant relationship between Contracting process and construction cost overruns in real estate projects.

Table 4. Correlation analysis of Contracting Process and Construction Cost Overruns in Real Estate Projects

Contracting Process statements		Construction Cost Overruns in Real Estate Projects
1. Clear contract need assessment should be established before construction work	Pearson correlation	0.180*
	sig. (2-tailed)	0.000
	n	336
2. Assessment of development needs for projects is a top priority	Pearson correlation	0.367*
	sig. (2-tailed)	0.000
	n	336
3. Properly drafted contract is a critical factor	Pearson correlation	0.252*
	sig. (2-tailed)	0.000
	n	336
4. Administration of up to date contractual agreements is crucial	Pearson correlation	0.326*
	sig. (2-tailed)	0.000
	n	336
5. Proper execution of contracts is essential for project success	Pearson correlation	0.188*
	sig. (2-tailed)	0.000
	n	336
6. Failure to direct contract implementation leads to more cost than expected	Pearson correlation	0.316*
	sig. (2-tailed)	0.000
	n	336
7. Use logical framework to monitor their project progress	Pearson correlation	0.380*
	sig. (2-tailed)	0.000
	n	336
8. Use work plans to achieve their project goals	Pearson correlation	0.152*
	sig. (2-tailed)	0.000
	n	336
9 Considering procedural contract termination in their work	Pearson correlation	0.338*
	sig. (2-tailed)	0.000
	n	336
10. Avoidance of haphazard contract termination in my projects	Pearson correlation	0.272*
	sig. (2-tailed)	0.000
	n	336
Contracting process (overall correlation)	Pearson correlation	0.431*
	Sig.(2-tailed)	0.000
	n	336

*Correlation is significant at 0.05 level (2-tailed)

4.6. Regression Analysis of Contracting Process on Construction Cost Overruns in Real Estate Projects

Simple linear regression was adopted to investigate how Contracting Process influence construction cost overruns in real estate projects. It was necessary to get the views of the participants on the influence of Contracting Process on construction cost overruns in real estate projects. The rationale of using the simple regression model was to establish how Contracting Process as a predictor significantly or insignificantly predicted construction cost overruns in real estate projects.

4.6.1. Model Summary of Contracting Process on Construction Cost Overruns in Real Estate Projects

The model summary sought to determine how Contracting Process is a predictor that significantly or insignificantly predicted construction cost overruns in real estate projects. The regression model summary results are presented in Table 5.

Table 5. Regression Model Summary table of Contracting Process on Construction Cost Overruns in Real Estate Projects

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.431 ^a	0.185	0.183	3.300

a. Predictors: (Constant), **Contracting Process**

The model summary Table 5 suggest that there is a positive correlation ($R=0.431$) between Contracting Process and construction cost overruns in real estate projects and those predicted by the regression model. In addition, 18.5% of the variation in the construction cost overruns in real estate projects is explained by Contracting Process. The

results are inconsistent with the findings of a study by Asiedu, Frempong and Alfen (2017) who found out that even when known parameters that permit timely prediction of cost overrun are used to provide the basis for such predictions and multiple linear regression analysis is adopted for the model development; the model, however, yields a fairly weak coefficient of determination with a mean absolute percentage error of 30.22 and 138 per cent, respectively.

4.6.2. ANOVA of Contracting Process and Construction Cost Overruns in Real Estate Projects

The study sought to establish if the regression model is best fit for predicting construction cost overruns in real estate projects after use of Contracting Process. The ANOVA results are presented in Table 6.

The ANOVA results from Table 6 indicated that (F -statistics (1,334) =76.012 is significant since the P -value $0.000 < 0.05$ implying that the predictor co-efficient is at least not equal to zero. and hence the regression model results in significantly better prediction of construction cost overruns in real estate projects. The results are consistent with the findings of a study by Perera, Tennakoon, Kulatunga, Jayasena and Wijewickrama (2020) who found out that Contracting Process significantly predict better Construction cost overruns in real estate projects.

4.6.3. Coefficients for Regression of Contracting Process and Construction Cost Overruns in Real Estate Projects

The study sought to establish whether there was influence of Contracting Process and Construction cost overruns in real estate projects. The regression coefficients results are presented in Table 7.

Table 6. An ANOVA of the Regression of Contracting Process and Construction Cost Overruns in Real Estate Projects

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	827.948	1	827.948	76.012	0.000 ^b
1 Residual	3638.041	334	10.892		
Total	4465.988	335			

a. Dependent Variable **Construction cost overruns in real estate projects**

b. Predictors: (Constant), **Contracting Process**

Table 7. Coefficients for the Regression of Contracting Process and Construction Cost Overruns in Real Estate Projects

Model	Coefficients			t	Sig.
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta		
1 (Constant)	28.062	1.817		15.443	0.000
Contracting Process	0.366	0.042	0.431	8.718	0.000

a. Dependent Variable: **Construction cost overruns in real estate projects**

The simple linear regression coefficients result from Table 7 indicated that there was significant influence of Contracting Process on Construction cost overruns in real estate projects. The coefficient of the constant term ($\beta_0 = 28.062$; P-value=0.000 < 0.05) and Contracting Process ($\beta_1 = 0.366$; P-value=0.000 < 0.05) were statistically significant. The regression model for Contracting Process was $y=28.062 + 0.366X_1$ implying that for each unit of Contracting Process, construction cost overruns in real estate projects marginally changed by 0.366 units other predictors held constant. It was therefore concluded that Contracting Process and Construction cost overruns in real estate projects were positively and linearly related. The results are consistent with the findings of a study by Mosley and Bubshait (2016) who found out that Contracting Process and Construction cost overruns in real estate projects were positively and linearly related.

5. Conclusions and Recommendations

The research objective was to examine the extent to which Contracting process influence Construction Cost Overruns in Real Estate Projects. The simple linear regression coefficients as well as the Pearson correlation results indicated that there was significant influence of contracting process on Construction Cost Overruns in Real Estate Projects. The small p-values; implied that there was a significant relationship between Contracting process and Construction Cost Overruns in Real Estate Projects.

Considering the study findings and conclusions, the following recommendations were made: Project professionals and other relevant real estate project stakeholders should encourage comprehensive contracting process as critical concerns in assembling pertinent information and creating avenues that could be utilized to reduce construction cost overruns in real estate projects.

6. Limitations of the Study

The study involved project professionals in interviews, these are busy people and therefore adequate time was required to schedule meetings with them. The challenge was mitigated through allocating sufficient time for appointments and increased use of online technology for both communication and data collection. The period when the proposed study was envisioned to take place was marred with great uncertainty of events due to corona virus pandemic but this was mitigated through flexibility of adapting the most effective and functional technology that was used to reach the proposed respondents.

REFERENCES

[1] Ahady, S., Gupta, S. and Malik, R.K. (2017) A critical

- review of the causes of cost overrun in construction industries of developing countries. *International Research Journal of Engineering and Technology*, 4(3), pp.2550-2558.
- [2] Alias Z, Zawawi E.M.A, Yusof K, Aris N.M (2014). Determining critical success factors of project management practice: *A conceptual framework*. *Procedia: Social and Behavioral Sciences*, 153: 61–69.
- [3] Almahmoud Essam & Doloi Hemanta. (2015). Assessment of social sustainability in construction projects using social network analysis. *Facilities*. 33. 152-176. 10.1108/F-05-2013-0042.
- [4] Alzahran, J.I. and Emsley M.W. (2013) The Impact of Contractors' Attributes on Construction Project Success: *A Post Construction Evaluation*. *International Journal of Project Management*, 31, 313-322, <http://dx.doi.org/10.1016/j.ijproman.2012.06.006>.
- [5] Asiedu Richard & Adaku Ebenezer. (2019). Cost overruns of public sector construction projects: a developing country perspective. *International Journal of Managing Projects in Business*. 13. 10.1108/IJMPB-09-2018-0177.
- [6] Asiedu Richard, Frempong Nana & Alfen Hans. (2017). Predicting likelihood of cost overrun in educational projects. *Engineering, Construction and Architectural Management*. 24. 21-39. 10.1108/ECAM-06-2015-0103.
- [7] Blyth Karl, Lewis John & Kaka Ammar. (2004). Developing a framework for a standardized works programme for building projects. *Construction Innovation*. 4. 193-210. 10.1191/1471417504ci077oa.
- [8] Brooke J., (2013). "SUS-A quick and dirty usability scale (in Usability Evaluation in Industry)" *London publisher*.
- [9] Cantarelli, C., Flyvbjerg, B., Molin, E.J.E. & van Wee, B. (2010) "Cost Overruns in Large-Scale Transportation Infrastructure Projects: Explanations and their Theoretical Embeddedness". *European Journal of Transport and Infrastructure Research*, 10(1), 5–18.
- [10] Chong Heap-Yih & Oon Chee. (2016). A practical approach in clarifying legal drafting: Delphi and case study in Malaysia. *Engineering, Construction and Architectural Management*. 23. 610-621. 10.1108/ECAM-04-2015-0059.
- [11] Contract Management Principles and Procedures, (2019). Best practices of contract management approach towards excellent service culture in construction project. 10.13140/rg.2.2.34415.59041.
- [12] Cunningham, T. (2017), "Cost Control During the Pre-Contract Stage of a Building Project" – An Introduction, Arrow, Dublin Institute of Technology, online: <http://arrow.dit.ie/beschreoth/49/>.
- [13] Doloi, H. (2012). "Analyzing Factors Affecting Delays in Indian Construction Projects." *International Journal Project Management*, 30(4), 479–489.
- [14] Doloi, H. (2013). "Cost Overruns and Failure in Project Management: Understanding the Roles of Key Stakeholders in Construction Projects". *Journal of Construction Engineering and Management*, 139, 267–79.
- [15] Durdyev, S., Omarov, M. and Ismail, S. (2017). SWOT Analysis of the Cambodian construction industry within the ASEAN economic community, Proceedings of the 28th

- International Business Information Management Association Conference, Seville, November 9-10.
- [16] Eriksson, P.E. & Westerberg, M. (2011). "Effects of Cooperative Procurement Procedures on Construction Project Performance. *A Conceptual Framework International*". *Journal of Project Management*, 29(2), 197–208.
- [17] Irfan M., Malik M.S.A & Khel S.S.U.H (2020) Effect of factors of organizational structure influencing nonphysical waste in road projects of developing countries. *Engineering, Construction and Architectural Management*, 27(10), 3135–53.
- [18] Kagiri, D & Wainaina, G. (2013). Time and Cost Overruns in Power Projects in Kenya: *A Case Study of Kenya Electricity Generating Company Limited*. ORSEA Journal, 3(2), 69-115.
- [19] Khodeir & Ghandour, (2018). "Examining the Role of Value Management in Controlling Cost Overrun (*Application on Residential Construction Projects in Egypt*)".
- [20] Khoso Ali & Yusof Aminah. (2019). "Extended Review on Contractor Selection in Construction Projects". *Canadian Journal of Civil Engineering*. 10.1139/cjce-2019-0258.
- [21] Kothari, C. R. (2004), "Research Methodology- Methods and Techniques". 2nd revised edition. *Published by New age international publisher*. Page 32. Kotval and Mullin.
- [22] Kothari, C.R. (2011) "Research Methodology: Methods and Techniques". *New Age International*, 401 p.
- [23] Krejcie, R.V., & Morgan, D.W. (1970). "Determining Sample Size for Research Activities". *Educational and Psychological Measurement*, 30, 607-610.
- [24] Leblanc H., Thomson C., Cameron I. & Nitithamyong P. (2013). Developing a planned work process model for housing associations. *Engineering*, 20. 10.1108/09699981311323989.
- [25] Lee, Jin. (2018). Rapid needs assessment: An evidence-based model. *European Journal of Training and Development*. 10.1108/EJTD-08-2018-0077.
- [26] Lerner, A. P. (1968) "Microeconomic Theory", Printed in *Perspectives in Economics*, edited by Brown, Neuberger and Palmatier (Preliminary edition), p. 30.
- [27] Lind & Brunes, F., (2015). "Explaining Cost Overruns in Infrastructure Projects: A New Framework with Applications to Sweden". *Construction Management Economics*. 33 (7), 554–568.
- [28] Mosley J. & Bubshait A.. (2016). Performance Evaluation of International Contractors in Saudi Arabia. *Journal of Professional Issues in Engineering Education and Practice*. 142. 04015007. 10.1061/(ASCE)EI.1943-5541.0000254.
- [29] Mugenda, O. M. & Mugenda, A. G. (2003). "Research methods: Quantitative and qualitative Approaches". *Nairobi: African Centre for Technology Studies*.
- [30] Niazi G. A. & Painting N. (2017). "Significant Factors Causing Cost Overruns in the Construction Industry in Afghanistan" *Procedia Engineering* 182 510.
- [31] Odoemena & Horita (2017). "A Strategic Analysis of Contract Termination in Public-Private Partnerships: Implications From Cases In Sub-Saharan Africa", *Construction Management and Economics* 36(6): 1-13.
- [32] Opawole Akintayo. (2018). A Conceptual framework for procuring public-private partnership contracts in developing countries: *an empirical case study of Southwestern Nigeria*.
- [33] Perera G.P.P.S., Tennakoon M., Kulatunga U., Jayasena H. & Wijewickrama M.K. (2020). Selecting suitable procurement system for steel building construction. *Built Environment Project and Asset Management. ahead-of-print*. 10.1108/BEPAM-03-2020-0056.
- [34] Rosenfed (2013). "Root-Cause Analysis of Construction-Cost Overruns", *Journal of Construction Engineering and Management*, 10(1), pp.1-10.
- [35] Shehu, Z., Endut, I. R., Akintoye, A., & Holt, G. D. (2015). Cost overrun in the Malaysian construction industry projects: A deeper insight. *International Journal of Project Management*.
- [36] Suprpto, Bakker, Mooi & Hertogh, (2015). "Relational Factors in Owner Contractor Collaboration: The Mediating Role of Team Working". *International Journal Project Management* 33, 1347–1363.
- [37] Udofia W., Hadikusumo B. & Santoso D. (2015). Road project termination and rebidding strategies in Nigeria. *Journal of Financial Management of Property and Construction*. 20. 208-234. 10.1108/JFMPC-06-2015-0020.
- [38] Zou W., Brax S. A., & Rajala R. (2018). Complexity in Product-Service Systems: Review and Framework. *Procedia CIRP*, 73, 3-8. <https://doi.org/10.1016/j.procir.2018.03.319>.