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Cost overruns have provided a significant challenge in the construction industries of both developed and developing countries. Financial and Contract Management incorporate designs and approaches which take keen interest on issues associated with Contract Financing which informed the basis of investigation of the concept of Construction Cost Overruns in Real Estate Projects in this study. The purpose of this study was to investigate the influence of Contract Financing on Construction Cost Overruns of real estate projects in Nairobi and Kisumu Counties. The study was guided by objectives to establish the extent to which Contract Financing influence construction cost overruns in real estate projects.

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*Classification:* DDC Code: 658.1511 LCC Code: HF5657.4

*Language:* English



LJP Copyright ID: 392951  
Print ISSN: 2631-8474  
Online ISSN: 2631-8482

London Journal of Engineering Research

Volume 22 | Issue 4 | Compilation 1.0





# Contract Financing on Construction Cost Overruns in Real Estate Projects: Nairobi and Kisumu Counties, Kenya

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*Cost overruns have provided a significant challenge in the construction industries of both developed and developing countries. Financial and Contract Management incorporate designs and approaches which take keen interest on issues associated with Contract Financing which informed the basis of investigation of the concept of Construction Cost Overruns in Real Estate Projects in this study. The purpose of this study was to investigate the influence of Contract Financing on Construction Cost Overruns of real estate projects in Nairobi and Kisumu Counties. The study was guided by objectives to establish the extent to which Contract Financing influence construction cost overruns in real estate projects. The study was based on a 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 are 7 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 sampling method, 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. Structured questionnaire was the main instrument for data collection, supported by the interview guide. Hypothesis tested at  $\alpha=0.05$  level of significance and the results were: .*Ho: There is no significant relationship between Contract Financing and Construction Cost Overruns in real estate projects was rejected since  $P=0.000<0.05$ . Therefore the study concluded that there is significant influence of all financial and contract management approaches**

*as well as contracting on construction cost overruns in real estate projects.*

*Keywords:* contract financing, construction cost overrun, real estate projects.

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## I. INTRODUCTION

Cost overruns is a significant challenge in construction projects. The significance and linkage of the construction industry to economic growth and development of all sectors in a country cannot be underrated ((Durdyev, Omarov, and Ismail, 2017). The constraints of cost, time and quality contribute to performance of projects, the construction industry focuses its lenses on cost constraints as a result of past performances of various studied projects. Overruns in terms of 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).

Contract financing in construction of real estate has been researched in relation to financing of working capital. Financial institutions come to the aid of contractors through availing advance project funding at a high interest rate which affects profitability in contracts; on the other hand clients can facilitate contractors by giving advance payments to kick-start a project in time. There are various forms of contract financing to help small and medium contractors in under developed or developing countries but the one setback is their repayment mode is punitive only to the advantage of the financier (Rameezdeen, Palliyaguru and Amaratunga, 2006).

### 1.1 Research Objective

The objective of the study was to establish how Contract financing influence Construction Cost Overruns in real estate projects.

### 1.2 Research Hypothesis

Ho: There is no significant relationship between Contract Financing and construction Cost Overruns in real estate projects.

## II. 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 other hand, 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 found 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 unanticipated expenses. Therefore, this study established the key indicators of reduction of cost overruns on

real estate projects in Kenya's Nairobi and Kisumu Counties.

## *2.2 Contract Financing and Construction Cost Overruns in Real Estate Projects*

Contract financing refers to the advances given to a contractor in form of advance payments, loan guarantees, performance based payments, progress on cost based payment and completion percentage based payment. Various studies have been conducted with regard to contract financing and the management of cost overruns in projects.

The World Bank Research and Policy Report highlights the fact that despite the important role Micro, Small and Medium Enterprises (MSMEs) play in the economy, they normally experience difficulties accessing finances and funding compared to the large enterprises (Abraham and Schmukler, 2017).

In view of this, Huang, Chiu, Mo and Marjerison (2018) conducted a study among Micro, Small and Medium Enterprises (MSMEs) in China with the aim of understanding the institutional environment of the crowdfunding industry. This is because of the largely unregulated regulatory frameworks, uncovered patterns of development, profiling crowdfunding platforms and analyzing the regulatory landscape. The study employed an extensive desk research using data collected from the public and private sectors, which was then analyzed alongside existing academic literature.

The study highlighted three business models that are used in real estate crowdfunding in China: Cooperative Building Model – which focuses solely on residential properties and the investors must be identified and confirmed; before the land is acquired. The investors can participate in the in-house development, designs and interior decorations; Marketing and Sales Model - these real estate projects are also solely used for residential properties. To promote sales of the houses, the real estate companies use fixed yield, lottery or auction of houses with discounted prices; and Wealth Management Model – used in real estate projects cover both residential and commercial properties. This model is the mainstream one adopted by real estate crowdfunding in China, (Huang, et al., 2018).

The study emphasized on the important role that crowdfunding plays in innovation and entrepreneurial-based economic development, thus the need for a regulatory framework that would help leverage advances of online financing technology to create an early-stage funding market place.

This would help facilitate capital formation while providing investor protections through education and training. The researchers noted that the risk associated with online financing required regulatory protection and collaboration with other entrepreneurial activities such as private sectors, incubators, accelerators and universities to build the culture of trust which is essential to promote web-based interactions.

Venture capital and private equity (VC and PE) funds majorly provide funds for projects that are considered risky but which have a high potential for growth. These types of funding infrastructure projects have increased considerably over the past decade. In this regard therefore, Sharma and Tripathi (2016) undertook a 10-year longitudinal study in India with the purpose of examining the various aspects of staging and decision-making with regard to VC and PE financing of their infrastructure investments. This study analyzed VC/PE investments in the Indian infrastructure sector during the 2004-2014 period using the Venture Intelligence database with a final sample consisting of 540 deals involving 233 VC and PE investments.

In relation to the foregoing, Cheng, Lv, Jin, Du and Chen (2016) conducted a study in China titled “Research on Investment and Financing Mode of Urban Infrastructure under Perspective of Cost Management”. The study posited that any city's survival and development, normally relies on the efficacy of its infrastructure which is directly determined by the magnitude of investment in construction. The researchers noted that the growth of the country's national urban infrastructure supply had not been in tandem with the pace of urbanization which expands the new demand for urban infrastructure, a factor that was attributed to inadequate monetary resources.

This study used data from various sources including the national bureau of economic analysis, the World Bank and the OECD to analyze the relationship between urban

infrastructure construction investment and urbanization rate and per capita GDP. For instance, data from China's Ministry of Construction showed that in 2004, the country's urban construction demand stood at 500 – 600 billion Yuan, while the actual urban construction was estimated at 475.4 billion. The study concluded that although the construction of infrastructure is a major determinant of urban competitiveness, decision-makers in major cities continue being in a dilemma with regard to financing the same.

In view of the fact that contract financing plays an important role in the reduction of cost overruns in projects, Downs and Xu (2015) conducted a study to examine the contrasting influence of portfolio lending and securitization in the resolution of distressed commercial real estate. The researchers further analyzed the effects of the economic and financial crisis on high commercial mortgages including the high default and delinquency rates.

The overall delinquency rate of commercial multifamily mortgages climbed to 13.03 % in 2012. The results of the study were statistically significant.

Three out of the five studies by Huang et al., (2018); Cheng et al., (2016); Downs and Xu (2015) used qualitative research methods with extensive desktop research and literature review. However, the utilization of secondary data for research is limiting because it does not take into account contextual factors that keep on changing.

Therefore, the researchers ought to have considered incorporating primary data to strengthen the findings from the secondary data. On the other hand, Larsen, et al. (2016), Mbithi and Okiro (2018) and Sharma and Tripathi (2016) employed quantitative approaches in their studies. From the foregoing therefore, the proposed study will use mixed method design.

This study found that advance payments should be availed to contractors, contractors should be supported with start-up costs, loan guarantees should be accessed by contractors, credit enhancement are important to contractors, payments upon accomplishment should be considered in projects, clear activity completion

measurement criteria should be availed by consultants, progress payments should be encouraged, payment application should be done correctly, percentage of work completed for a period payment should be used and that mismanaged overbilling of payment should be controlled to positively influence Construction Cost Overruns in Real Estate Projects. Hence, the study investigated the key indicators in contract financing and construction cost overruns in real estate projects in Kenya's Nairobi and Kisumu.

### *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 Bruner (2015). The theory studies the behaviour of individual firms in regards to fixation of price and output and their reaction to the 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 the independent variables and dependent variables.

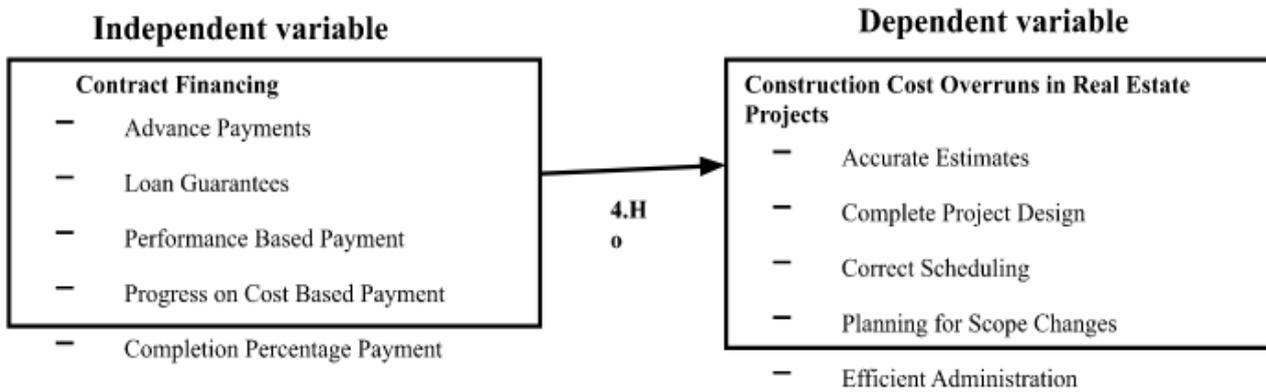


Figure 1: Conceptual Framework for Contract Financing of Construction Cost Overruns in Real Estate Project

### III. RESEARCH METHODOLOGY

This study used a descriptive survey research design and specifically; cross sectional survey as well as correlational research design. 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 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 professionals. Thus a minimum of 7 project professionals per real estate project constituted a target population of 4000 = (570×7) project professionals as well as 10 key informants.

A sample size of 351 was drawn from a target population of 4000 project professionals 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;

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

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 a survey questionnaire.

### IV. RESULTS AND DISCUSSIONS

#### 4.1 Questionnaire Return Rate

Out of the 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 duly 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
<b>Total</b>	<b>343</b>	<b>336</b>	<b>97.96</b>

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 the 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.

**Distribution of Respondents 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 the cadre of the project professional whose information were considered to be significant 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
<b>Total</b>	<b>336</b>		<b>100.00</b>	

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 the 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 Contract Financing and Construction Cost Overruns in Real Estate Projects

Contract financing in this study refers to advances given to a contractor in the form of advance payments, loan guarantees, performance based payments, progress on cost based payment and completion percentage based payment. This was the fourth objective that the study sought to achieve; therefore, 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 frequency, percentage, mean 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.

Table 3: Contract Financing and construction cost overruns in real estate projects

ITEMS	SA	A	N	D	SD	Mean	Std. dev
Advance payments should be availed to contractors	121(36%)	150(44.6%)	44(13.1%)	13(3.9%)	8(2.4%)	4.08	0.925
Contractors should be supported with start-up costs	112(33.3%)	167(49.7%)	48(14.3%)	5(1.5%)	4(1.2%)	4.13	0.793
Loan guarantees should be accessed by contractors	118(35.1%)	176(52.4%)	42(12.5%)	0(0.00%)	0(0.00%)	4.23	0.653
Credit enhancement are important to contractors	146(43.5%)	140(41.7%)	46(13.6%)	4(1.2%)	0(0.00%)	4.27	0.739
Payments upon accomplishment should be considered in projects	139(41.4%)	152(45.2%)	43(12.8%)	2(0.6%)	0(0.00%)	4.27	0.701
Clear activity completion measurement criteria should be availed by consultants	157(46.7%)	146(43.5%)	29(8.6%)	4(1.2%)	0(0.00%)	4.35	0.737
Progress payments should be encouraged	154(45.9%)	151(44.9%)	30(8.9%)	1(0.3%)	0(0.00%)	4.36	0.655
Payment application should be done correctly	177(52.7%)	134(39.9%)	25(7.4%)	0(0.00%)	0(0.00%)	4.45	0.631
Percentage of work completed for a period payment should be used	198(58.9%)	116(34.6%)	22(6.5%)	0(0.00%)	0(0.00%)	4.52	0.618
Mismanaged overbilling of payment should be controlled	197(58.7%)	115(34.2%)	24(7.1%)	0(0.00%)	0(0.00%)	4.51	0.628

The results in Table 3 indicate that the composite mean and composite Standard deviation for the Contract financing were 4.39 and 0.683 respectively; implying that using the Likert scale a majority of participants at least agreed (mean=4.39) that Contract financing influences Construction Cost Overruns in Real Estate Projects. Similarly ten statements were developed to measure the extent to which Contract financing influences reduction of Construction Cost Overruns in Real Estate Projects.

Statement (1) that 'Advance payment should be available to contractors' had a mean of 4.08 and a standard deviation of 0.925. These results indicate that out of 336 study participants, 121(36%) strongly agreed, 150(44.6%) agreed, 44(13.1%) were neutral, 13(3.9%) disagreed and 8(2.4%) strongly disagreed that advance payment should be available to contractors. This results shows that the line statement mean score of 4.08 was lower than the composite mean of 4.39. The implication of this result to the study is that there is need to avail advance payment to contractors in order to positively influence management of Construction Cost Overruns in Real Estate Projects. The study results support findings by Aje, Olatunji and Olalusi (2015) who found out that advance payment to contractors can be used as a means of preventing cost overruns in construction projects.

Statement (2) that 'Contractors should be supported with start –up costs' had a mean of 4.13 and a standard deviation of 0.793. These results indicate that out of 336 study participants, 112(33.3%) strongly agreed, 167(49.7%) agreed, 48(14.3%) were neutral, 5(1.5%) disagreed and 4(1.2%) strongly disagreed that contractors should be supported with start –up costs. This results shows that the line statement mean score of 4.13 was lower than the composite mean of 4.39. The implication of this result to the study is that there is a need to support contractors with start –up costs in order to positively influence management of Construction Cost Overruns in Real Estate Projects. The study results support findings by Meijers, Doree and Boes (2014) found that negotiated start –ups seem to reduce costs making them applicable to smaller projects where

high set up costs would not be justifiable due to their limited size, complexity, or cost.

Statement (3) that 'Loan guarantees should be accessed by contractors' had a mean of 4.23 and a standard deviation of 0.653. These results indicate that out of 336 study participants, 118(35.1%) strongly agreed, 176(52.4%) agreed and 42(12.5%) were neutral that loan guarantees should be accessed by contractors. This results shows that the line statement mean score of 4.23 was lower than the composite mean of 4.39. The implication of this result to the study is that there is a need for contractors to access loan guarantees in order to positively influence management of Construction Cost Overruns in Real Estate Projects. The study results support findings by Renaud (2012) who found that loan guarantees should not be over or under-regulated since overpricing of real estate causes moral hazard which could eventually lead to overruns.

Statement (4) that 'Credit enhancement is important to contractors' had a mean of 4.27 and a standard deviation of 0.739. These results indicate that out of 336 study participants, 146(43.5%) strongly agreed, 140(41.7%) agreed, 46(13.7%) were neutral and 4(1.2%) disagreed that credit enhancement is important to contractors. This results shows that the line statement mean score of 4.27 was lower than the composite mean of 4.39. The implication of this result to the study is that there is a need to enhance credit to contractors in order to positively influence management of Construction Cost Overruns in Real Estate Projects. The study results supported by Fan, Sing, Ong and Sirmans (2004) found that governance and optimal financing had unique features such as credit enhancement which were viewed as interesting financial innovations for the construction industry.

Statement (5) that 'Payment upon accomplishment should be considered in projects' had a mean of 4.27 and a standard deviation of 0.701. These results indicate that out of 336 study participants, 139(41.4%) strongly agreed, 152(45.2%) agreed, 43(12.8%) were neutral and 2(0.6%) disagreed that payment upon accomplishment should be considered in projects.

This results shows that the line statement mean score of 4.27 was lower than the composite mean of 4.39. The implication of this result to the study is that there is a need to consider payment upon accomplishment of projects in order to positively influence management of Construction Cost Overruns in Real Estate Projects. The study results contradicts findings by Omopariola, Windapo, Edwards and Thwala (2019) who found out that delay in payments, difficulty in obtaining financial aid and inadequate budgetary control are the causes of cash flow problems during construction projects which lead to cost overruns.

Statement (6) that 'Clear activity completion measurement criteria should be availed by consultants' had a mean of 4.35 and a standard deviation of 0.737. These results indicate that out of 336 study participants, 157(46.7%) strongly agreed, 146(43.5%) agreed, 29(8.6%) were neutral and 4(1.2%) strongly disagreed that clear activity completion measurement criteria should be availed by consultants. This results shows that the line statement mean score of 4.35 was lower than the composite mean of 4.39. The implication of this result to the study is that there is a need to conduct clear activity completion measurement criteria by consultants in order to positively influence Construction Cost Overruns in Real Estate Projects. The study results support finding by Eriksson (2017) found out that payment based on activity completion may enhance efficiency therefore reducing cost overruns.

Statement (7) that 'Progress payment should be encouraged' had a mean of 4.36 and a standard deviation of 0.655. These results indicate that out of 336 study participants, 154(45.9%) strongly agreed, 151(44.9%) agreed, 30(8.9%) were neutral and 1(0.3%) disagreed that progress payment should be encouraged. This results shows that the line statement mean score of 4.36 was lower than the composite mean of 4.39. The implication of this result to the study is that there is a need to encourage progress payment in order to positively influence management of Construction Cost Overruns in Real Estate Projects. The study results support findings by Perera and Dewagoda (2020) who found that progress payments should be made since delayed payments contribute to adverse consequences such as cost overruns.

Statement (8) that 'Payment application should be done correctly' had a mean of 4.45 and a standard deviation of 0.631. These results indicate that out of 336 study participants, 177(52.7%) strongly agreed, 134(39.9%) agreed and 25(7.4%) were neutral that payment applications should be done correctly. This results shows that the line statement mean score of 4.45 was higher than the composite mean of 4.39. The implication of this result to the study is that correctly done payment applications positively influence management of Construction Cost Overruns in Real Estate Projects. The study results support findings by Treacy, Spillane and Tansey (2014) found out that construction disputes in Ireland are as a result of payment factors that could emanate from payment application issues.

Statement (9) that 'Percentage of work completed for a period payment should be used' had a mean of 4.52 and a standard deviation of 0.618. These results indicate that out of 336 study participants, 198(58.9%) strongly agreed, 116(34.6%) agreed and 22(6.5%) were neutral that the percentage of work completed for a period payment should be used. This results shows that the line statement mean score of 4.52 was higher than the composite mean of 4.39. The implication of this result to the study is that use of percentage of work completed for a period payment positively influences management of Construction Cost Overruns in Real Estate Projects. The study results support findings by Perera and Dewagoda (2020) who found that proper strategies must be instituted to streamline management of delay in payment for works done.

Statement (10) that 'Mismanaged overbilling of payment should be controlled' had a mean of 4.51 and a standard deviation of 0.628. These results indicate that out of 336 study participants, 197(58.7%) strongly agreed, 115(34.2%) agreed and 24(7.1%) were neutral that mismanaged overbilling of payment should be controlled. This results shows that the line statement mean score of 4.51 was higher than the composite mean of 4.39. The implication of this result to the study is that control of mismanagement of overbilling positively influences management of Construction Cost Overruns in Real Estate Projects. The study results support finding by Agyekum, Adinyira and

Amudjie (2020) found that corrupt, fraudulent, collusive or coercive practices, client divulging more information to the preferred bidder and inflating tender prices led to mismanagement of construction payments.

#### 4.5 Correlation Analysis on Contract Financing and Construction Cost Overruns in Real Estate Projects

The study sought to examine the relationship between Contract financing and reduction of

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

**Table 4:** Correlations of Contract Financing and Construction Cost Overruns in Real Estate Projects

Contract financing statements		Construction cost overruns in real estate projects
1. Advance payment should be availed to contractors	Pearson correlation	0.205*
	sig. (2-tailed)	0.000
	n	336
2. Contractors should be supported with start-up costs	Pearson correlation	0.147*
	sig. (2-tailed)	0.007
	n	336
3. loan guarantees should be accessed by contractors	Pearson correlation	0.177*
	sig. (2-tailed)	0.001
	n	336
4. credit enhancement are important to contractors	Pearson correlation	0.204
	sig. (2-tailed)	0.000
	n	336
5. payment upon accomplishment should be considered in projects	Pearson correlation	-0.009*
	sig. (2-tailed)	0.863
	n	336
6. clear activity completion measurement criteria should be availed by consultants	Pearson correlation	0.030*
	sig. (2-tailed)	0.584
	n	336
7. progress payment should be encouraged	Pearson correlation	0.025*
	sig. (2-tailed)	0.647
	n	336
8 payment application should be done correctly	Pearson correlation	-0.002*
	sig. (2-tailed)	0.967
	n	336
9 percentage of work completed for a period payment should be used	Pearson correlation	0.134*
	sig. (2-tailed)	0.014
	n	336
10. mismanaged overbilling of payment should be controlled	Pearson correlation	0.238*
	sig. (2-tailed)	0.000
	n	336
Contract financing (overall correlation)	Pearson correlation	0.180*
	Sig.(2-tailed)	0.001
	n	336

(n=336);\*Correlation is significant at 0.05 level (2-tailed)

To test the extent of the relationship between Contract financing and reduction of construction cost overruns in real estate projects; several

characteristics of Contract financing and reduction of construction cost overruns in real estate projects were analyzed based on the

following hypothesis; Ho: There is no significant relationship between Contract financing and reduction of construction cost overruns in real estate projects. The corresponding mathematical model for the hypothesis was identified as follows: reduction of construction cost overruns in real estate projects = f (Contract financing). The correlation results presented in Table 4.26 indicated that six out of ten statements of contract financing were significant since the P-values <0.05: (Statement 1; advance payment should be availed to contractors;  $r=0.205$ ,  $P\text{-value}=0.000<0.05$ , Statement 2; contractors should be supported with start-up costs;  $r=0.147$ ,  $P\text{-value}=0.007<0.05$ , Statement 3; loan guarantees should be accessed by contractors;  $r=0.177$ ,  $P\text{-value}=0.001<0.05$ , Statement 4; credit enhancement are important to contractors;  $r=0.204$ ,  $P\text{-value}=0.000<0.05$ , Statement 5; payment upon accomplishment should be considered in projects;  $r=-0.009$ ,  $P\text{-value}=0.863>0.05$ , Statement 6; clear activity completion measurement criteria should be availed by consultants;  $r=0.030$ ,  $P\text{-value}=0.584>0.05$ , Statement 7; progress payment should be encouraged;  $r=0.025$ ,  $P\text{-value}=0.647>0.05$ , Statement 8; payment application should be done correctly;  $r=-0.002$ ,  $P\text{-value}=0.967>0.05$ , Statement 9; percentage of work completed for a period payment should be used;  $r=0.134$ ,  $P\text{-value}=0.014<0.05$  and Statement 10; mismanaged overbilling of payment should be controlled;  $r=0.238$ ,  $P\text{-value}=0.000<0.05$ ).

In order to determine the correlation between Contract financing 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 ( $r=0.180$ ) which was statistically significant as  $P<0.05$  ( $p=0.001$ )

between Contract financing and construction cost overruns in real estate projects; implying that there is a significant relationship between Contract financing and construction cost overruns in real estate projects leading to rejection of the null hypothesis (Ho: There is no significant relationship Contract financing 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 Contract financing and construction cost overruns in real estate projects. This finding is in agreement with findings by Ali, Azmi and Baaki (2017) study that found out that there is a significant relationship between Contract financing and cost overruns in construction projects.

#### 4.6 Regression Analysis of Contract Financing and Construction Cost Overruns in Real Estate Projects

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

##### 4.6.1 Model summary of Contract Financing and Construction Cost Overruns in Real Estate Projects

The model summary sought to determine how Contract financing 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 Contract Financing and Construction Cost Overruns in Real Estate Projects

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.180 <sup>a</sup>	0.0324	0.032	3.59168
a. Predictors: (Constant), Contract financing				

The model summary table suggests that there is a positive correlation ( $R=0.188$ ) between Contract financing and construction cost overruns in real estate projects and those predicted by the regression model. In addition, 3.5% of the variation in the construction cost overruns in real estate projects is explained by Contract financing. The results are consistent with the findings of a study by Ali, Azmi and Baaki (2017) who found out that a regression model for refurbishment cost prediction indicates that procurement strategy, incompetent contractors, availability of funding, materials and equipment, and force majeure were

significant predictors of building refurbishment cost performance which is equivalent to construction cost overruns.

#### 4.6.2 ANOVA of Contract Financing 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 Contract financing. The ANOVA results are presented in Table 6.

**Table 6:** An ANOVA of the Regression of Contract financing and Reduction of Construction Cost Overruns in Real Estate Projects

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	157.335	1	157.335	12.196	0.001 <sup>b</sup>
	Residual	4308.653	334	12.900		
	Total	4465.988	335			
a. Dependent Variable: <b>construction cost overruns in real estate projects</b>						
b. Predictors: (Constant), Contract financing						

The ANOVA results indicated that (F-statistics (1,334)=12.196 is significant since the P-value  $0.001 < 0.05$  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 Durdyey (2020) who found out that Contract financing significantly predicts better Construction cost overruns in real estate projects.

#### 4.6.3 Coefficients for Regression of Contract Financing and Construction Cost Overruns in Real Estate Projects

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

**Table 7:** Coefficients for the Regression of Contract financing and Construction Cost Overruns in Real Estate Projects

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	37.169	1.916		19.394	0.000
	Contract financing	0.154	0.044	0.180	3.492	0.001

*Dependent Variable:* construction cost overruns in real estate projects  
The simple linear regression coefficients result indicated that there was significant influence of Contract financing on construction cost overruns

in real estate projects. The coefficient of the constant term ( $\beta_0 = 37.169$ ; P-value= $0.000 < 0.05$ ) and Contract financing ( $\beta_4 = 0.154$ ; P-value= $0.001 < 0.05$ ) were statistically significant. The regression model for Contracting Process was

$y=37.169 + 0.154X_4$  implying that for each unit of Contract financing, construction cost overruns in real estate projects marginally changed by 0.154 units. It was therefore concluded that Contract financing and reduction of construction cost overruns in real estate projects were positively and linearly related. The results are consistent with the findings of a study by Ingle, Mahesh and Deepak (2020) who found out that Contract financing and Construction cost overruns in real estate projects were positively and linearly related.

## V. CONCLUSIONS AND RECOMMENDATIONS

The research objective was to examine the extent to which Contract Financing 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 Contract Financing on Construction Cost Overruns in Real Estate Projects. The small p-values; implied that there was a significant influence of Contract Financing on 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 ensure that correct payment application is done accurately and payment upon accomplishment of project activities is given due consideration to avoid unnecessary cost overruns.

## VI. 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 coronavirus pandemic but this was mitigated through flexibility of adapting the most effective and functional technology to reach the proposed respondents.

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