

Project Cost Overrun in the South African Construction Sector: A case study of Johannesburg Metropolis

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Abstract

The cost overrun on projects brings about poor speculation comes back from the utilization of the undertaking, delay in the usage of the general population offices and expanded burden for people in general. Putting resources into foundation is a prime method to help financial development, enhance the social prosperity of populations, and advance territorial incorporation. In any case, unnecessary cost overruns result in expanded subsidizing needs and go about as an imperative to advancement. The objective of this study is to identify Building Contractors, Consultants and Clients perception on cost overrun in South Africa construction sector, examine factors that cause, or influence cost overrun in South Africa construction sector and identify the challenges in the construction sector regarding cost overrun. This study employs mixed methods that is an application of both quantitative and qualitative approaches to triangulate data. Based on the contractor's, consultants, and building clients response on identification and ranking of the determinants that causes cost escalation in projects from most pressing cause to least causes, the study revealed factors as listed in order of most pressing factor as; Poor planning, Fluctuation of prices of project materials, High interest rates by bankers, Inflationary pressure, Cost of labor, Poor coordination between agents of construction, On site poor financial management, Inadequate local production of raw materials.

Keywords

Project, Cost Overrun, Construction sector, South Africa.

1. Introduction

The African Development Bank (AfDB), governments and NGO's are concerned about critical cost accelerations of construction in execution. This is especially imperative, given the AfDB's solid sense of duty regarding scale up its help to framework improvement, as an operational need of its Ten-Year Strategy 2013-2022 (Mubila, 2014). Putting resources into foundation is a prime method to help financial development, enhance the social prosperity of populaces, and advance territorial incorporation. In any case, unnecessary cost overruns result in expanded subsidizing needs and go about as an imperative to advancement (Mubila, 2014).

The basic to increase infrastructure and enhance the intensity of African economies is being compelled by constrained information accessibility (Gbahabo and Ajuwon, 2017). In fact, there is a shortage of data with respect to the expenses of actualizing street foundation extends in Africa, albeit critical information of each cost of undertakings development offices in the district. There is in this way a need to efficiently audit and examine these sources, to enhance the age of measurable information on the unit expenses of different sorts of street framework projects.

Studies done in the last four years back watched that cost overruns in street infrastructure projects had turned out to be progressively normal. The normal cost overwhelm was 35 percent, yet in 33% of the cases it could be as high as 50 to 100 percent. The suspicion has been that the increments are because of an assortment of elements, incorporating absence of rivalry in the offering procedure, increments in fuel and bituminous item costs locally and universally, technology utilized as a part of street works, contract management rehearses, and the accessibility and nature of street development materials (Mubila, 2014).

Although the South African construction sector is given high conspicuousness, a few imperfections are observed in the sector that need prompt activity. A noteworthy issue is the way that present framework and construction projects demonstrate huge cost variety (ECIDP, 2014). This is happening regardless of the way that the South African

Government assumed critical part in helping temporary workers by giving, preparing, providing apparatus, and by creating strong direction (ECIDP, 2014).

The cost overrun on projects brings about poor speculation comes back from the utilization of the undertaking, delay in the usage of the general population offices and expanded burden for people in general.

These issues apply an immense money related weight on government, and they can keep down or disable arranged monetary advancement results (Mukuka et al., 2014). Consequently, recognizable proof of the main drivers of the difficulties and pointing the conceivable way out in discussion with partners are basic factor. In doing as such, it means to distinguish fundamental foundations for cost variety of development projects. Also, it would fill in as a reason for additionally inquire about construction. Such a comprehension would additionally address the most squeezing issues of human lives.

1.1 Problem Statement

Ahiaga-Dagbui and Smith (2014) reported on the need to reconsider what is customarily alluded to as overrun in construction. They try to impact a refinement between the much of the time conflated purposes behind improvement to cost underestimation and conceivable cost overpowers. Essential to their dispute is the viewpoint for assessing cost overwhelm. While some measure the degree of cost invades as the difference between cost at the period of decision to make and last fulfillment costs, others measure the traverse of overpowers as the refinement between cost at contract respect and last complete cost. This prompts a wide range in the traverse of overpowers uncovered in different examinations.

As indicated by Gbahabo and Ajuwon (2017), there are three sorts of cost overrun in South Africa; categorized as; technical, psychological, and political-economic. Specialized clarifications represent cost overrun regarding technical, psychological, and political-economic, and so forth. Mental clarifications represent overwhelm regarding positive thinking predisposition with forecasters. Extension crawl, where the prerequisites or targets ascends amid the task, is normal. At last, political-monetary clarifications consider overwhelm to be the consequence of vital deception of degree or spending plans (Ahiaga-Dagbui and Smith, 2014). Genuinely, political elucidations for cost escalation have been accepted to be the most overarching. In the USA, the designing firm Home Architects has attributed this to a human quality they call "Mind research of Construction Cost Denial", as for the cost development of custom homes.

Barely few undertakings get finished inside unique expenses and schedules delays occur for a variety of reasons on different set of activities which has prompted the civil argument on the most proficient method to limit these development project cost and calendar overrun (Alinaitwe et al., 2013). Keeping in mind the end goal to discover measures of limiting these overwhelms, the first and most vital advance is to recognize and comprehend the variables in charge of the overrun.

According to Mukuka, Aigbavboa & Thwala (2014) cost escalation are exceptionally basic in the construction business. Barely few tasks get finished inside unique expenses. These issues have required the need to address the set objectives of this study.

1.2 Objectives of the study

The objective of this study is to identify Building Contractors, Consultants and Clients perception on cost overrun in South Africa construction sector, examine factors that cause, or influence cost overrun in South Africa construction sector and identify the challenges in the construction sector regarding cost overrun.

2. South African Construction Sector

The brisk improvement of the construction industry realized extending number of transitory laborers emerging the business. Diverged from various diverse organizations, the construction sector expects basic part in South Africa's economy and is an essential supporter of money related improvement (CIDB, 2012).

The South African Construction industry as that basic bit of the economy that produces building and essential arranging structures and chooses how much theory attempts in a benefit rich country are changed over into venture comes about (Mukuka et al., 2014).

Africa is confronting challenges in the Construction Industry regardless of it being the quickest creating landmass and the construction industry is a zone of center and has been drawing positive consideration and best substantial weight organizations are currently completely centering in the African development industry (Gbahabo and Ajuwon, 2017).

In Africa things are looking into a bit for the construction industry. New development begins have been solid lately, development spending ascended all through a lot of 2014, the creation of development materials has been up for a half year in succession, and extensive organizations such as Caterpillar, to the point that are as of now on the African ground have posted solid income reports for the past couple of quarters– a confident sign that little and medium sized organizations will likewise improve the situation. However, there is no uncertainty the business still faces a lot of difficulties and both of all shapes and sizes organizations are yet attempting to counter the difficulties.

2.1. Concept of Overrun Cost

The concept of cost overrun is a term for a cost increment, or a higher spending, includes unexpected expenses over a given budget plan for a period. Cost overrun as the adjustment in contract sum partitioned by the first contract grant sum. Be that as it may, cost invade characterized as overabundance of genuine cost over spending plan. Cost overrun is additionally now and then called cost acceleration, cost increment or spending invade (Windapo & Cattell, 2013).

2.2. Causes of cost overrun construction sector

Cost overrun do not simply happen normally, there are various components amid the construction procedure that when not oversaw appropriately can prompt cost invades. Wide overview of composing shows a sum of 42 determinants or variables of cost escalation and classified as: Technical idiocy, poor legitimate structure, and disillusionment of the venture, nonattendance of cost reports in the midst of advancement sort out, inadequate endeavor preparation, masterminding and utilization, delays in issuing information to the legally binding specialist in the midst of improvement arrange, nonappearance of coordination at setup organize, change in the degree of the errand or in Government plans, Some offering moves by brief laborers, for instance, front-stacking of rates, lacking layout at the period of fragile, repulsive assignment of work deferrals in decisions and implementation by government (Mukuka et al., 2014).

Mahamid and Amund, (2012) reported on about 169 street development projects, where all the tasks experience the ill effects of cost deviation: 76% of the undertakings are under-assessed taken a toll while the rest 24% of the activities are over-evaluated. In an examination, a rundown of twenty determinants utilized in recognizing and control hindering variables: expansion of costs, vacillation of money/swapping scale, temperamental government approaches, frail direction and control, capricious climate conditions, reliance on imported materials, low talented labor, hazard and vulnerability related with projects, precarious loan fee, absence of legitimate preparing and experience of pm, absence of proper programming, off base assessment of undertakings time/length, non-execution of subcontractors and named providers, project extortion and debasement, design changes, financing and portion for completed works, multifaceted nature of works, irregularities in contract documentation, contract and specific explanation logical inconsistency and battle between venture parties. As requirements be, the best five segments recognized in frustrating effective endeavor cost control in jumping demand are: Design changes, Risk and helplessness related with ventures, off kilter evaluation of exercises time/traverse, Nonperformance of subcontractors and chose suppliers and multifaceted nature of works. The essential factor of design change is astoundingly fundamental and necessities careful organization. These best five segments were considered for prescribing assuaging measure and as requirements be 90 directing measures of preventive, perceptive, healing and progressive natures were inferred by influencing serious writing to survey and up close and personal talk with 15 members (Gbahabo and Ajuwon, 2017).

An assessment made on project administration development Gbahabo and Ajuwon (2017); Abadir (2011) discovered that 22%, 22%, 22% and 28% of the temporary workers cost administration process development is fragmented, perform casually, perform formally and oversaw well, individually. While, the cost administration hone development is 10%, 48%, 38% and 5% apply no training, inadequate, fundamental and moderate, separately. His investigation called attention to that 90% of the contractual workers get ready definite gauge of cost of work, material and apparatus. In any case, just 75% get ready spending plan, around 70% track cost of work, material and apparatus independently, and 67% gather and utilize organization's verifiable information for planning of cost assess. His examination additionally demonstrates that exclusive 1/3 of the temporary workers utilize PC instruments for cost evaluate arrangement and around 2/3 refresh their financial plan frequently in any event.

2.3. Challenges in the construction sectoral development

Windapo & Cattell (2013) studied on associate examination of the difficulties expected to impact the execution, advancement and development of the South African industry. Their discoveries showed that industry partners see the key look at to the execution, improvement and development of the development business in African country on a

high expense of inputs, that infers that either there's a quality for specific forms of inputs or that there's an awesome dependence on specific materials, prompting attractiveness while not a coordinating offer. However, Zewdu & Aregaw (2015) from their studies outlined top challenges that because cost invade in development extends as; lack of foresight, vacillation of cost of materials, poor efficiency, inflationary weight and task financing.

3. Research Design and Methodology

A research design is a framework for investigating with most extreme control over factors that may interfere with the legitimacy of the discoveries (Cronbach, 2013). A research design illustrates a plan for selecting variables, research areas and data collection techniques to provide findings to a given research questions. This study employs mixed methods that is an application of both quantitative and qualitative approaches to triangulate data. Mixed methods approach is a method of data collection and analyzing in both quantitative and qualitative techniques in a single study.

3.1. Description of the Study Area

The study area is Johannesburg Metropolitan. The metropolis coordinates the local administration and governance of Johannesburg, South Africa. Johannesburg Metropolitan is located on the 26°10'S 28°0'E of latitude and longitude on the South African map.

3.2. Sampling Methods and Sample Size

Considering the homogeneity of the construction segment from review one to three as far as detailing and classification, helpful testing was embraced for pretest and final sample. Convenient sampling was utilized because of the way that the affectability of the inquiry composes and needs some development and further push to get good responses and to have high number of returns of the questionnaire. Among the most imperative component of the study, the sample estimate is the one which tends to the qualities of the whole populace with certainty. To stay with great measurable legitimacy, the investigation made utilization of a sample test estimate.

3.3. Data type, Sources, and Methods of Data Collection

The study particularly used quantitative and qualitative methods. Respondents' data were coded and analyzed using SPSS software. Qualitative analysis on the other hand was done for identifying fundamental factors from extensive review of literature. The study used a well-structured questionnaire to gather data. This study basically made use of primary data for empirical analysis. For the study, pretested poll was created to evaluate factors for cost invade observation. Preparatory polls were sent to 12 temporary workers and experts for their remark and change. Their reactions were fused in the last poll that was managed.

The questionnaires were administered to different organizations through personal interviews and email. Selected respondents of the questionnaire designed included Building/Road contractors (BC), consultants and clients. The review empowered the respondents to distinguish the test in the development concerning cost invade. The model in the survey cost invade factor was recognized based on an extensive literature review and support from (Abadir, 2011; Mahamid and Amund, 2012; Ibrahim and Nabil, 2013; Luka, 2014).

3.4. Perception on cost overrun in South Africa construction sector

To analyze the perception of stakeholders especially contractors' cost overrun in South Africa construction sector, the perception index approach was employed. The perception index formula is indicated as;

$$n_i = \left(\frac{\sum i}{n} \right)$$

n_i Connotes index computed for a statement under a main heading

i Connotes the figure assign to a scale.

n Connotes number of respondents

$$M_i = \left(\frac{\sum(n_1 + n_2 + \dots + n_i)}{c} \right)$$

M_i Denotes the index computed for a main heading (e.g. perception towards cost overrun)

C Denotes the number of sub-headings under the main headings

$(n_1 + n_2 + \dots + n_i)$ Connotes the summation of the indices computed for the individual statements.

The overall perception index was computed from equation below. It is presented as;

$$Q = \left(\frac{\sum M_1 + M_2 + \dots + M_i}{k} \right)$$

Q Connotes the overall perception index

K Connotes the number of the main headings

$(M_1 + M_2 + \dots + M_i)$ connotes the summation of the main headings

The study analyzed the information from respondents regarding their perception of stakeholders especially contractors' cost overrun in South Africa construction sector. Some statements adapted from literature review regarding perception of stakeholders especially contractors' cost overrun in South Africa construction sector were presented to the respondents to rank on a 5 point - Likert scale. In this case the average score for any possible responded statement have a mean score value = 3. This implies that a mean score above greater than 3 indicate a positive perception (agreement) and a mean score less than 3 indicates a negative perception or (disagreement) of a respondent to the respective items.

3.4.1. Examine factors that cause, or influence cost overrun in South Africa construction sector

This objective of the study was addressed using descriptive statistics such as; frequency, percentages, mean score, standard deviation and a 5 point - Likert scale. The greater the mean score value with regards to a cause of cost overrun the more it is to cause or affect cost overrun in construction sectors.

3.4.2. Identify the challenges in the construction sector regarding cost overrun

The Kendall's Coefficient of Concordance (W) was employed to assess the constraints stakeholders (contractors, consultants, clients) face in the construction sector regarding cost overrun in the South African economy. Respondents identify and rank selected challenges that all stakeholders (contractors, consultants, clients) face in the construction sector regarding cost overrun. Constraints faced by contractors, consultants, clients in the construction sector regarding cost overrun were obtained from reviewed literature and field observation. Contractors, consultants, clients were asked to select from a list of constraints and rank them in order of most pressing to the least constraint.

The statistic (W) was adopted for the study. It is expressed as;

$$W = \frac{12S}{m^2(n^3 - n) - mT}$$

Where;

$$S = \sum_{i=1}^n (R_i - \bar{R})^2$$

S = the sum of squared deviation, n = the number of constraints identified, m = the number of respondents or judges and T = the correction factor for tied ranked T = 0 if there are no ties in the rankings.

The computed statistic (W) of the variance of the rows sum of ranks R_i divided by the highest possible value the variance can take. This happens when all the variables are in total agreement. The estimate for the agreement lies between $0 \leq W \leq 1$ where, $W = 0$ means exactly no agreement between respondents and $W = 1$ indicates a perfect or total agreement between respondents.

Hypothesis testing for the constraints

H_0 : There exist no agreement between stakeholders in ranking of the challenges faced in the South African construction sector.

H_1 : There exist agreement between stakeholders in ranking of the challenges faced in the South African construction sector.

4. Result and Discussion

4.1. Demographic

The organized overview was intended to decide the real reasons for cost variety in development projects in South Africa. 150 stakeholders were questioned in the survey. The respondents are categorized into three groups, namely fifty (50) contractors, fifty (50) consultants and fifty (50) clients. Out of the total sampled respondents, males were 120 while females were 30. Majority of about 85% of the respondents were Christians, 10% were Muslims and 5%

of the respondents were affiliated to other religions. Also, about 78% of all stakeholders or sampled respondents have obtained higher qualification from a tertiary education institution with building or construction license while 22% of the remaining respondents had vocational/technical educational status.

4.2. Building Contractors, Consultants and Clients Perception on cost escalation in South Africa construction sector

Table 1: Cross-Tabulation of Perception of cost overrun in South Africa construction sector

Perception level	Contractors	Consultants	Clients	Total
Low Percentage of Cost Overrun	2 (10%)	12 (60%)	6 (30%)	20 (13.33%)
Moderate Percentage of Cost Overrun	8 (18%)	17 (38%)	20 (44%)	45 (30.00%)
High Percentage of Cost Overrun	40 (64%)	21 (27%)	24 (9%)	85 (56.67%)
Total	50	50	50	150 (100%)

Source: Field survey, 2018

Analysis of the descriptive statistics obtained for the perception of contractors, consultants and clients on cost overrun in South Africa construction sector revealed that, majority of the stakeholders or agents in the construction industry perceive the proportion of cost overrun as higher. Results presented in Table 1 indicated that, about 56.67% of the agents in construction industry perceive a higher percentage of cost overrun. About 30% of the sampled construction agents stated that the cost overrun has been moderate over the years while a few of about 20% of all contractors, consultants and clients in general indicated that, the incurred cost overrun in South African construction sector is quite low below their projections. However, a cross tabulation as illustrated in Table 1 showed that, among all agents (stakeholders) in the construction industry, about 64% of contractors have higher perception for cost overrun than consultant (27%) and building clients (24%) respectively.

4.3. Factors that cause cost overrun in South Africa construction sector

Information solicited from sampled stakeholders; the contractor, consultant and clients, the study came out with identification of top factors that causes cost overrun of projects as presented in Table 2. Results presented in Table 2, indicate most pressing factor considered by both contractor, consultant and clients as the determinants of cost escalates arranged in order of descending. Based on means scores obtained for each of the factors, the study revealed that poor planning, Fluctuation of prices of project materials, High interest rates by bankers, Inflationary pressure, Cost of labor, Poor coordination between construction agents, On site poor financial management, Inadequate local production of raw materials while project location and time wasting were identified by respondents as the least causes of cost escalation in the construction sector.

Table 2: Factors that cause cost overrun in South Africa construction sector

Rank of Factors	Mean Score	Rank of Factors	Mean Score
1 st Poor planning of projects	3.997	16 th Number of ongoing projects	3.411
2 nd Fluctuation of prices of project materials	3.991	17 th Lack of adequate manpower or technical staff	3.398
3 rd High interest rates by bankers	3.956	18 th Number of competitors	3.372
4 th Inflationary pressure	3.912	19 th Poor productivity	3.358
5 th Cost of labor	3.902	20 th Absence of construction-cost data	3.344
6 th Poor coordination between construction agents	3.896	21 st Manipulation of suppliers	3.340
7 th On site poor financial control	3.891	22 nd Previous experience of contract	3.338
8 th Inadequate local production of raw materials	3.868	23 rd Transportation cost	3.322
9 th Contract management	3.861	24 th Project financing	3.208
10 th Cost of machinery	3.849	25 th Duration of contract period	3.188
11 th Cost of insurance	3.751	26 th Economic instability	3.145
12 th Bureaucracy in tendering method	3.698	27 th Contractual procedure	3.114
13 th Fraudulent practices and kickbacks	3.608	28 th Currency exchange	3.089
14 th High machinery maintenance cost	3.566	29 th Project location	3.074
15 th Wrong estimation method	3.423	30 th Waste on site	3.066

**Factors adapted from Ibrahim & Nabil (2013); Zewdu & Aregaw (2015),*

This when given careful attention and implementation would boost the construction industry of South Africa which would directly or indirectly contribute to the economic growth (GDP) of South Africa.

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Biographies

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