



ORIGINAL RESEARCH PAPER

Management

CRITICAL FACTORS CAUSING DELAY AND COST OVERRUN IN PUBLIC BUILDING PROJECTS IN DAR-ES-SALAAM, TANZANIA

KEY WORDS: Delays, Cost, Overrun, Construction, Building Projects, Dar-Es-Salaam, Tanzania.

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ABSTRACT

Construction delays and cost overrun are common problems in building construction projects and is more severe to developing countries and Tanzania particularly. There are numerous factors causing delays and cost overrun in building projects, but their frequency of occurrence and degree of severity vary considerably. The main objective of this study was to identify and rank critical factors causing delay and cost overrun in building project in Dar-Es-Salaam. Data were collected through self-administered questionnaire to clients, consultants and contractors. Respondents were random selected. Out of 75 distributed questionnaires, only 47 were returned. Data were analyzed using Microsoft excel and ranked according to frequency index and severity index. The finding revealed that; delay in decision making, incomplete design and estimate at the time of tender, improvement of standard drawings/design changes during construction stage and errors and omission in drawings and in the bill of quantity were found to be the most severe factors. The study recommended that the prompt decisions are required during construction process in public organisations, design change should be controlled while ensuring prompt resolution in design change queries, effective coordination and communication between parties, ensuring prompt resolution in design change queries, effective and efficient material procurement system and a plan material delivery.

INTRODUCTION

The construction industry worldwide has over the years been challenged with cost and time overruns, despite the advent of advanced technology and construction management techniques. According to Bentil *et al.*, (2017) state that inability to complete the project on time, and within budget continues to be the chronic problem worldwide and worsening. In the same view Kaliba *et al.*, (2009) argues that; it is fairly common all construction industry, to observe projects having delays and cost-time overrun, hence making them a major problem in both developed and developing countries.

In Sub-Saharan Africa, delay and cost overrun have been observed in different countries, which can be confirmed by Bentil *et al.*, (2017) writings, which found that; cost and time overrun exist in more than 40% of building construction project in Ghana. Likewise, Mukuka, (2015) observed that; construction schedule overrun are not uncommon projects, even South African construction industry has not escaped the challenge on failing to deliver projects on time. Furthermore, Ijigah *et al.*, (2012) also conducted analysis and prediction of cost and time overrun in Nigeria; ending up observing that; most projects are completed at the cost much higher than initial estimate. According to Kikwasi, (2012), delays and disruption are among the challenges faced in the course of executing construction projects in Sub-Saharan Africa. It may sometimes exceed 100% of the anticipated cost of the project. Additionally, Kikwasi, (2012), reports that; Tanzania also face challenges on importation of industrial plants and equipment, due to its unlimited purchasing power caused by foreign exchange problems, that leads to some of building construction works previously planned, encountering with delays and cost overruns. Also Kyando, (2013) affirm that; the extent of poor planning, contributes to the delay on construction works in Tanzania, causing wastage of time and money, that results to price escalation.

overrun in construction projects. Kyando, (2013) ascertained the extent of actual delay in various completed buildings. Ndatwa, (2009) determined the reason for delays in road construction projects in Tanzania and suggested the ways to overcome it. Moreover, Bitomwa, (2013) also investigated the critical causes of cost overrun within Tanzania road construction sectors, investigated on the effect and lastly came up with a suggested relative solution to overcome. Nevertheless, Pallangyo, (2013) researched on the reason, extent and impact of cost overrun in most of the projects and lastly proposed the appropriate measure to mitigate. Yet though, Kikwasi, (2012) researched on the causes and effect of delays and disruption in construction project in Tanzania. All these studies focused on identifying factors that leads to delays and cost overrun, nothing has been done on frequency of occurrence and severity impact of the factors for delay and cost overrun in building projects.

Factors influencing delay and cost overrun are numerous and therefore requires in depth analysis in order to determine their frequency of occurrence and degree of severity. In Tanzania, the delay and cost overrun issues have been and continue to be a major problem to both private and public building projects; resulting into shortfall on meeting the original budget, and the expected client satisfaction. As per Alinaitwe *et al.*, (2013), delays and cost overrun have debilitating effect on clients, consultant and contractor in terms of growth in adversarial relationship, mistrust, litigation, arbitration, cash flow problems, and a general feeling of trepidation toward each other. Basically, both project delays and cost overruns are issues that directly lead to a project failure. If the problem is unsolved, as per Mahamid & Dmadi, (2013); Rahman *et al.*, (2013) it will bring unanticipated and unexpected impact to the company as well as construction industry, unless the project manager and site contractors pays serious attention in dealing with it.

Hence; this study focuses on identifying and ranking the critical factors causing delay and cost overrun in public building projects,

A number of studies have been conducted on delay and cost

through analyzing the frequency index for occurrence of the factors in causing delay and cost overrun; determining the severity of impact of the factors on causing delay and cost overrun; in Dar-Es-Salaam, Tanzania. The study essential in helping on ranking the factors causing delay and cost overrun in building project in the order of frequency of occurrence and severity of impact; which informs parties in construction works, to pay particular attention to ranked factors occurring regularly, and whose impact is more severe.

LITERATURE REVIEW

2.1. The concept of Time and Cost Overrun

Cost overrun sometime called cost escalation or cost increase or Budget Overrun and has been defined as when the final cost of the project exceeds the original estimates (Avots,1983). In other word is the excess of actual cost over budget. Cost overrun may also be defined as the change in contract amount, divided by the original contract award amount; OR the difference between the actual cost and the initially projected cost. This calculation can be converted to a percentage (%) for ease comparison. For the purpose of this study, the definition by Kyando,(2013) on cost overrun being the difference between the final actual cost of construction project at completion and the contract amount agreed between the client and the contractor during signing of the contract, is used.

Delay or Time Overrun: — in construction project can be defined as; the late in progress or actual completion of work compared to the baseline construction schedule or contract schedule. Vast majority of project delays occur during the construction phase, where many unforeseen factors are always involved. According to Braimah, (2008), the term 'delay' in construction contracts has no precise technical meaning. It can be used in different sense to mean different conditions in project execution. However, the term is often used in its basic sense to mean any occurrences or events that extend the duration or delay the start or finish of any of the activities of a project. Kyando,(2013) defined Time Overrun, as the difference between the Actual Project Duration and the Estimated Project Duration.

2.2. Factors Causing Delay and Cost Overrun

Many studies have been conducted to identify the causes of cost overrun and delay in construction projects. Naveenkumar & Probhur (2016), found that poor economic condition, poor site management, slowness in giving instruction, delay of material approval by consultant, delay in bill settlement, unskilled operator, low productivity of labor, lack of maintenance for the equipment, poor site condition, delay of material delivery, insufficient number of staff, unrealistic contract duration imposed by the owner, owner interference, high quality of work required, lack of contractors skills, poor material handling on site, absence of consultants site staff, lack of material in market, bad contract management by the consultant, equipment and tool shortage on site, contract modification, equipment availability and failure and problems with neighbors were the factors influencing time and cost overrun in construction projects. These findings were supported by Mohamid & Dmaidi,(2013). They found that fraudulent practices and kickbacks, contract management, additional work, duration of contract period, contractual procedure, and frequent changes in design and lack of adequate manpower are among factors contributing cost overrun. They further found that factors related to project participants were disputes on site, lack of coordination between construction parties, poor financial control on site, poor planning, previous experience of contract and relationship between managers and labors.

Memon,(2014) analyzed the time overrun factor in Malaysian thus: construction project industry, change in the scope of the project , change in the scope of the project, delay in progress payment by owner, financial difficulties of owner, delays in decisions making, owner interference, unrealistic contract duration and requirements, delay in inspection and approval of completed, unrealistic contract duration and requirements, frequent design changes, mistakes and errors in design, delay

preparation and approval of drawings, incomplete design at the time of tender, inadequate planning and scheduling, lack of experience, poor site management and supervision, incompetent subcontractors, cash flow and financial difficulties, mistakes during construction, fluctuation of prices of materials, shortages of materials, late delivery of materials and equipment, insufficient numbers of equipment, labor productivity, shortage of site workers, effect of weather, unforeseen ground condition and accidents on site.

Le-Hoai *et al.*, (2008) identified the three top causes of cost overruns in Vietnam as materials cost increases due to inflation, inaccurate quantity takeoffs and labor cost increases due to environmental restrictions. Sweis *et al.*,(2008) also found that Financial difficulties faced the contractors, too many change orders by the owner, Poor planning and scheduling of the project by the contractors and Shortage of man power (skilled, Semi-skilled, unskilled) were the causes of delay in Construction Projects: in the case of Jordan. El-Razek *et al.*,(2008) likewise found Financing projects by contractors during construction, Delay in contractors' payment by owner, Design changes by owners during construction, Partial payments during construction and Non utilization of professionals during construction and construction management were causes of delay in Building construction projects in Egypt.

Table #2.01: Summary of factors causing delays and cost overrun from different literature review

SN.	FACTORS CAUSING DELAY AND COST OVERRUN	SOURCES
01.	Poor economic condition	Naveenkumar & Probhur (2016); Memon <i>et al.</i> (2010),
02.	Lack of cost and monitoring planning	Mansfield, Ugwu, & Doran,(1994); Sambasivan & Soon (2006), Sweis <i>et al.</i> (2000), Mohamid & Dmaidi(2013)
03.	Price fluctuation	Mansfield, Ugwu, & Doran,(1994)
04.	Poor site management	Naveenkumar & Probhur (2016), Memon (2014), Rahman & Azis (2012), Sambasivan & Soon (2006)
05.	Slowness/delay in giving instruction	Naveenkumar & Probhur (2016) Kyando,(2013).
06.	Delay of material approval by consultant	Naveenkumar & Probhur (2016), Memon (2014)
07.	Omission and errors in the Bill of Quantity	Naveenkumar & Probhur (2016), Kyando,(2013).
08.	Unskilled operator	Naveenkumar & Probhur (2016), Jayuawardene & Panditha (2003),
09.	Low productivity of labor	Naveenkumar & Probhur (2016), Memon (2014), Rahman & Azis(2012),
10.	Poor site condition	Naveenkumar & Probhur (2016), Jayuawardene & Panditha (2003), Jeykathan & Jayawardena (2012), Mtallib (2007), Rajakumar (2016)
11.	Delay of material delivery	Naveenkumar & Probhur (2016), Memon (2014)
12.	Insufficient number of staff	Naveenkumar & Probhur (2016),
13.	Unrealistic contract duration imposed by the owner	Naveenkumar & Probhur (2016), Menon (2014)
14.	Owner interference	Naveenkumar & Probhur (2016), Menon (2014), Jayuawardene & Panditha (2003), Assaf & Al-Hejji (2006), Sweis <i>et al.</i> (2008), El- Razek (2008)
15.	Poor material handling on site	Naveenkumar & Probhur (2016),
16.	Absence of consultants site staff	Naveenkumar & Probhur (2016),

17.	Shortage of material in the market	Naveenkumar & Probhur (2016), Jeykanthan & Jayawardena (2012), Mansfield, Ugwu, & Doran,(1994), Sambasivan & Wen (2006), Rajakumar (2016)
18.	Poor contract management	Naveenkumar & Probhur (2016), Mansfield, Ugwu, & Doran,(1994)
19.	Equipment and tool shortage on site	Naveenkumar & Probhur (2016), Memon (2014), Jayuawardene & Panditha (2003), Sambasivan & Soon (2006)
20.	Problems with neighbors	Naveenkumar & Probhur (2016),
21.	Incomplete design and estimate at the time of tender	Kyando (2013), Rajakumar (2016) Mohamid & Dmadi (2013)
22.	Variation at the design stage	Memon (2014), Memon et al, (2010), Jeykanthan & Jayawardena (2012), Rajakumar (2016)
23.	Improvement of standard drawing during construction stage	Kyando (2013), Jeykanthan & Jayawardena (2012), Sambasivan & Wen (2006), Sambasivan & Wen (2006), Rajakumar (2016)
24.	Delay in decision making	Memon (2014), Kyando (2013),
25.	Lack of communication and coordination between parties	Memon (2014), Memon et al, (2010), Sambasivan & Soon (2006)
26.	Shortage of manpower	Sweis et al, (2008), Sambasivan & Soon (2006), Mohamid & Dmadi (2013)
27.	Government interference	Mtallib (2007), Rajakumar (2016)
28.	Act of God (weather)	Rajakumar (2016), Kaliba, Muya & Mumba (2008)
29.	Dispute on site	Mohamid & Dmadi(2013)
30.	Political situation	Mohamid & Dmadi(2013), Al-Najjar(2008)
31.	Strikes by site personnel	Iyer, Chaphalkar & Joshi (2007); Kouskili & Kartan (2004)
32.	Large and complex projects	Ghoddosi, Husseinlipour & Jalal (2008)

Source: Authors,(2018).

METHODOLOGY

3.1. Research Design

The objective of this research was to identify critical factors which influence delay and cost overrun in public building construction projects. Through a quantitative approach, data were collected through questionnaire survey. 45 factors that might cause delays of building construction projects were defined through this literature review. The factors were tabulated in a questionnaire form. The questionnaire was divided into two main parts which covered for both client, consultants, and building contractors; Part I related to general information about the respondents' experience in the construction industry. Part II included the list of the identified causes of delay public building projects. For each factor two questions were asked; what is the frequency of occurrence? and what is the degree of severity? Both frequency of occurrence and severity were categorized on a 4-point Likert scale rather than a standard - point scale. The neutral point (which allows respondent to declare no opinion on the matter) was eliminated from the 5-point scale to obtain the respondent views on the subject, because the selected respondents were assumed to be knowledgeable about the subject. The ratings used determine the frequency of occurrence and degree of severity, whereby; Always(A)=4; Often(O)=3; Sometimes(S)=2; Rarely(R)=1, was used on analyzing the factor causing delays and cost overrun in building construction projects.

3.2. Population and Sample of the Study

The study population consists of contractors, consultants

(Engineers, Architects and Quantity surveyors) and clients. In Tanzania contractors are categorized into seven classes. Criterion set to obtain the sample from building contractors was: building contractors to be class one, two and three because in Tanzania these are grouped as large contractors. The rationale behind selecting class I and II only is, most of delays and cost overrun are evidenced on large construction projects undertaken mostly by top most classes i.e. I and II. Delays and cost overrun are most common and frequent problem in large building projects, (Haseeb, et al.,(2011). A total of 39 large contractors were selected on purposive sampling. For the case of consultants stratified sampling was not used because their population did not constitute a homogeneous group instead snowball sampling was used to draw companies from the lists of consultants who have been involved in public projects. The population of consulting firm includes Quantity surveying, Architectural and engineering. A total of 30 consultants were selected whereby 24 were quantity surveyors, 4 architects and 2 engineers. Purposive sampling was also used to select clients on the basis that they have involved in building projects. Total of 6 clients were selected.

3.3. Data Analysis

The collected data was analysed using Statistical Package for Social Sciences (SPSS). The findings for this study were relatively analysed by calculating mean score, frequency index, and severity index (Marzouk & El-Rasas, 2014)

$$\text{Value of Mean Score (M.S.)} = \frac{\sum FxS}{N}$$

Where: F = Frequency of response for each score
S = Score given each cause
N = Total number of responses for each factor

For Mean Score:-
(3.0 - 4.0)- are ranked as High Mean Score
(2.0 - 2.9)- are ranked as Moderate Mean Score
(0.0 - 1.9)- are ranked as Low Mean Score

Frequency Index (F.I.) =

$$(F.I)(\%) = \sum_{i=1}^4 (aif * nif) / (4 * N) \times 100$$

Where: aif = Number of respondent who chose a certain frequency degree
nif = Degree of frequency (1, 2, 3 or 4)
N = Total number of respondents

Severity Index (S.I.) =

$$(S.I)(\%) = \sum_{i=1}^4 (ais * nis) / (4 * N) \times 100$$

Where: aif = Number of respondent who chose a certain severity degree
nif = Degree of frequency (1, 2, 3 or 4)
N = Total number of respondents

Both frequency index and severity index were categorized from 0-20%, 20-40%, 40-60% 60-80% and 80-100% as indicated in Table #301.

Table #3.01: Scale used to identify factor's severity and frequency of occurrence.

Scale	Degree of Severity	Frequency of occurrence
00%-20%	Very Low (VL)	Very Low (VL)
20%-40%	Low (L)	Low (L)
40%-60%	Moderate (M)	Moderate (M)
60%-80%	High (H)	High (H)
80%-100%	Very High (VH)	Very High (VH)

Source: Authors,(2018).

The average value for responses to each factor is calculated to find out its severity degree and frequency of occurrence. Then, the map for factors causing delay and cost overrun in public buildings construction projects was developed based on Figure 1. The map is a 5x5 matrix with severity ranging from VL to VH on the horizontal axis and frequency (with the same range) on the vertical axis (Marhaviilas et al., 2011).

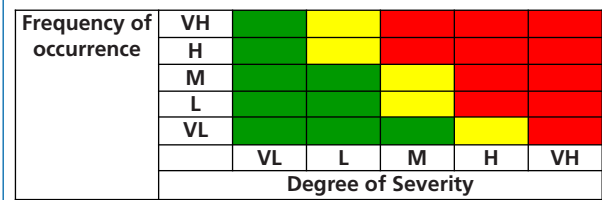


Fig #3.01: Risk map matrix, Source: Authors,(2018).

The map is classified into three zones:

1. Green zone: risks in this zone are low level, and can be ignored.
2. Yellow zone: risks in this zone are of moderate importance,

and should be controlled.

3. Red zone: risks in this zone are of critical importance, and a close attention should be paid.

RESULTS AND DISCUSSION

The proportion of the respondents comprised of 50% contractors, 32.5% consulting firms, 5% 12.5 clients. Majority of respondents (85%) have years of experience between 10 and 25.

4.2. Experience of Project Delays

Delays in projects undertaking have been the order of the day. Clients, consultants and contractors have indicated that they have experienced delays in projects they were involved with varying degrees. In particular, 70%, 60% and 66% for clients, consultants and contractors respectively have had projects delayed.

4.3. Frequency and Severity Factors Causing Delay and Cost Overrun in Public Buildings.

The 32 factors which cause delay and cost overrun were mapped in term of frequency of occurrence and severity. The results are indicated in Table #4.01

Table #4.01: Respondents mapping the level of occurrence and severity of factors causing delay and cost overrun in public building projects

SN.	Factors	TNR	Frequency of Occurrence		Degree of Severity		Remark	Map Zone
			Mean	F.I (%)	Mean	S.I (%)		
01.	Poor financial status of contractor	47	2.47	61.70%	2.30	57.45%	HM	Red
02.	Poor site management	47	2.66	66.49%	2.74	68.62%	HH	Red
03.	Unskilled operator	47	1.96	48.94%	1.94	48.40%	MM	Yellow
04.	Low productivity of labor	47	2.19	54.79%	2.26	56.38%	MM	Yellow
05.	Poor equipment	47	2.23	55.85%	2.28	56.91%	MM	Yellow
06.	Poor site condition	47	2.21	55.32%	2.60	64.89%	MH	Red
07.	Delay of material delivery	47	2.72	68.09%	2.72	68.09%	HH	Red
08.	Poor supervision	47	2.45	61.17%	2.34	58.51%	HM	Red
09.	Unrealistic contract duration imposed by the owner	47	2.55	63.83%	2.53	63.30%	HH	Red
10.	Owner interference	47	2.62	65.43%	2.72	68.09%	HH	Red
11.	Poor material handling in site	47	2.19	54.79%	2.19	54.79%	MM	Yellow
12.	Shortage of material in the market	47	2.26	56.38%	2.55	63.83%	MH	Red
13.	Poor contract management	47	2.64	65.96%	2.70	67.55%	HH	Red
14.	Problems with neighbors	47	1.87	46.81%	1.70	42.55%	MM	Yellow
15.	Late giving instruction	47	2.83	70.74%	2.60	64.89%	HH	Red
16.	Delay of material approval	47	2.68	67.02%	2.62	65.43%	HH	Red
17.	Omission and errors in the bill of quantity	47	2.74	68.62%	2.81	70.21%	HH	Red
18.	Incomplete design and estimate at the time of tender	47	2.72	68.09%	2.98	74.47%	HH	Red
19.	Re -design of work	47	2.60	64.89%	2.49	62.23%	HH	Red
20.	Logistic due to site location	47	2.32	57.98%	2.19	54.79%	MM	Yellow
21.	Improvement of drawing during construction stage	47	2.91	72.87%	2.85	71.28%	HH	Red
22.	Delay in costing variation and additional work	47	2.74	68.62%	2.55	63.83%	HH	Red
23.	Delay in decision making	47	3.09	77.13%	3.04	76.06%	HH	Red
24.	Lack of communication and coordination between parties	47	2.62	65.43%	2.79	69.68%	HH	Red
25.	Price fluctuation	47	2.43	60.64%	2.23	55.85%	MM	Yellow
26.	Shortage of man power	47	2.23	55.85%	2.00	50.00%	MM	Yellow
27.	Government inference	47	2.26	56.38%	2.79	69.68%	MH	Red
28.	Act of God	47	2.02	50.53%	2.64	65.96%	MH	Red
29.	Dispute on site	47	2.36	59.04%	2.30	57.45%	MM	Yellow
30.	Political situation	47	1.91	47.87%	2.02	50.53%	MM	Yellow
31.	Strikes by site personnel	47	1.94	48.40%	2.11	52.66%	MM	Yellow
32.	Large and complex projects	47	2.28	56.91%	2.17	54.26%	MM	Yellow

Source: Authors,(2018).

NOTE THAT:-

NOTE THAT:-	F.I	-	Frequency Index,	HH	-	High Frequency and High Severity
	S.I	-	Severity Index,	HM	-	High Frequency and Moderate Severity
	ML	-	Moderate Frequency and Low Severity	MM	-	Moderate Frequency and Moderate Severity

Table #3.02 indicates that; 20 factors causing delays and cost overrun are mapped in the red zone. The finding indicates that these factors are serious and need serious attention to address them. Other factors were located in yellow zone indicating that they have moderate severity and moderate frequency of occurrence but they need to be controlled. None of the factors were located at green zone. This finding imply that all 32 factors have potential in causing delay and cost overrun in public building projects and need to be controlled. The summary of most critical factors causing delay and cost overrun are indicated Table #4.02.

Table #4.02: The summary of most critical factors causing delay and cost overrun in public building projects

SN.	Factors	TNR	Frequency of occurrence		Degree of Severity		Remark	Map Zone	Rank
			Mean	F.I(%)	Mean	S.I(%)			
01.	Delay in decision making	47	3.09	77.13%	3.04	76.06%	HH	Red	1
02.	Incomplete design and estimate at the time of tender	47	2.72	68.09%	2.98	74.47%	HH	Red	2
03.	Improvement of drawing during construction stage	47	2.91	72.87%	2.85	71.28%	HH	Red	3
04.	Omission and errors in the bill of quantity	47	2.74	68.62%	2.81	70.21%	HH	Red	4
05.	Delay of material delivery	47	2.72	68.09%	2.72	68.09%	HH	Red	5
06.	Poor site management	47	2.66	66.49%	2.74	68.62%	HH	Red	6
07.	Owner interference	47	2.62	65.43%	2.72	68.09%	HH	Red	7
08.	Poor contract management	47	2.64	65.96%	2.70	67.55%	HH	Red	8
09.	Late giving instruction	47	2.83	70.74%	2.60	64.89%	HH	Red	9
10.	Delay of material approval	47	2.68	67.02%	2.62	65.43%	HH	Red	10
11.	Delay in costing variation and additional work	47	2.74	68.62%	2.55	63.83%	HH	Red	11
12.	Unrealistic contract duration imposed by the owner	47	2.55	63.83%	2.53	63.30%	HH	Red	12
13.	Re-design of work	47	2.60	64.89%	2.49	62.23%	HH	Red	12

Source: Authors,(2018).

Table #4.02 indicates 13 critical factors which cause delay and cost overrun in construction projects. Thus the probability of occurrence is high and has high severity. In term of ranking, delay in decision making was the first ranked, followed by improvement of drawing during construction which was ranked second, Incomplete design and estimate at the time of tender, Omission and errors in the bill of quantity, Delay of material delivery, Poor site management.

DISCUSSION

The findings of the research showed that there are quite a number of critical factors causing delays and cost overrun in public building construction projects in Tanzania. The study established that all 32 factors identified from the literature have the potential to cause delays and cost overrun in public building projects. Out of 32 factors, 13 factors were found to be very critical. However, the top five critical factors include, factors related to delay in decision making, Incomplete design and estimate at the time of tender/design change during construction, Design errors and omission in both drawings and in the bill of quantity, Delay of material delivery, Poor site management. These findings are very much similar to those identified in the literature review. The review of the literature acknowledged, delay in decision making, design changes, during construction stage, Omission and errors in design and in the bill of quantity, Delay of material delivery, Poor site management as factors causing delays and cost overrun in building projects (Adugna, 2015; Memon, 2014).

5.1. Delay in Decision Making

The study reveals that delay in decision making was the first ranked critical factor causing delay and cost overrun in public building projects. Clients for public projects are public organizations and most of the decision are based upon the approval process at different level of organization. Slow decision making could be caused by an organization's internal bureaucracy or wrong channel of communication in building projects. This finding compliment what was written by Adugna,(2015); Memon,(2014) & Kyando (2013) in their study documented that when client delay to make decision at the beginning of the project can cause time to delay and extra cost because if the client wants to add some design at the time of construction the contractor will incur extra cost and time. This may have severe impact to the project.

5.2. Improvement of Standard Drawing During Construction Stage and Design Changes.

The study reveals that changes/improvement of drawings during construction stage was second ranked critical factors in causing delay and cost overrun. Improvement of standard drawing at the construction stage stalls project execution because of time it takes for such design to be reviewed, amended and accepted for construction work. Thus, alteration may require temporary

stoppages that delays overrun project and increases cost considerably. This finding concur with the finding of Rajakumar,(2016) & Mohamid & Dmadi,(2013) who documented that engineering design have high level of influence on project cost and sometimes unsatisfactory design performance can lead to cost and time overrun. According to some scholars in the profession, changes are important to keep the relevance of the project through time. Shiferaw,(2013). However, if changes are made in order to improve relevance of a project, and if it caused a major cost overrun, the intended profit can turn to loss for project owner, considering the cost and delays consequences. From these explanations one can learn that changes can happen in construction projects but it can cause cost overrun. Therefore, the most important thing should be, there should be a limit for changes. This leads to believe that changes can happen and should be allowed only if the cost consequences can be met without exceeding the cost frame.

5.3. Design Error and Omission and Error in the Bill of Quantity (BOQ).

Error and omission in design and BOQ are found to be critical factors cause delays and cost overrun in public building projects. Projects are required to be completed on schedule, within budget and according to the specification. If the consultant does not identify errors and omission in the bill of quantity early enough it will lead to cost overrun. This compliments the study of Naveenkumar & Probu,(2016) were omission and errors in the bill of quantity were also found to be the severe factor in causing cost overrun in building projects. Most projects are hurriedly arranged as a result of either political pressure or to utilize funds which need to be spent within a time frame. Project preparation is most often not adequate because the Project Manager and his team have little time to package projects which sometime results to omission and errors. In the cause of correcting errors and omission, results to additional time and cost.

5.4. Poor Site Management and Materials Problems.

The finding of this study indicate that poor site management and delay of materials delivery are among the top five critical factors which cause delay and cost overrun in building construction projects. The finding is similar to what Alghbari et al,(2007) found in Malaysia. Upon tested 31 factors, they found that coordination and materials problems were among the top factors because delay and cost overrun in construction projects. Poor site management could be caused by lack of experience of contractors and poor planning, (Shah 2016).

CONCLUSION

The study examined the frequency of occurrence and severity of factors causes delay and cost overruns in public building construction projects in Tanzania. The findings of the research indicate that there are quite a number of critical factors causing delays and cost overrun in public building construction projects in

Tanzania. In analyzing severity index for the 31 factors causing delays and cost overrun in building project, 13 factors were concluded to be critical. Furthermore, it was observed that delay in decision making, incomplete design and estimate at the time of tender, Improvement of standard drawing during construction stage and omission and errors in the bill of quantity were the top most severe factors with high severity index i.e. above 70%. This implies that these factors are too severe when they occur in construction projects lead to delay and cost overrun. This study therefore recommends that it is important to remove bureaucratic nature of decisions within public organisations when it come to the decision regarding construction projects. Also the establishment of mechanism to control design change is important. Construction practitioners involve in the design stage should be responsible in providing drawings according the owners requirement and any changes should be made before the project is approved. Effective coordination and communication among parties at great extent may mitigate the occurrence of delays and cost overrun in building projects. Parties should coordinate and convey information to each other.

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