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Determinants of Cost Overrun on Public Building Construction Projects: A Case of Gamo Zone Arba Minch Town; Southern Region, Ethiopia

Negalign Nigatu Oynaka
MSC in Accounting and Finance, Lecturer in WolaitaSodo University

***Corresponding Author:** Negalign Nigatu Oynaka, MSC in Accounting and Finance, Lecturer in Wolaita Sodo University, Ethiopia.*

ABSTRACT

The study aims to identify determinants of cost overrun on public construction project: A case study in Gamo Zone Arba Minch Town. To achieve the "general and specific objectives" the study was look socio political, economic, and managerial, timeliness of payment and financial factor and construction techniques and design changes are the major cause for the occurrences of cost overrun. This study also used descriptive research design and quantitative research approach were used and the primary sources of data were collected from 82 construction project in Arba Minch Town. The sampling techniques used in this study were purposive sampling method. However, the sample was selected from public construction project. For data analysis, multiple regression and descriptive statistics were used. The results of this study were indicated that socio political, economic, and managerial, timeliness of payment and financial factor and construction techniques and design changes were identified as causes of cost overrun in public construction project. Finally this study recommended that in public construction project the concerned body should be provide a good planning and scheduling are continuing process during construction and match with the resources and time to develop the work to avoid cost overrun. The concerned body should revise the bid document such as technical specification during bill of quantities and the design of the project in a good way. However, the concerned body should facilitate payment to contractors in order to overcome delay in progress payment and avoid the occurrences of cost overrun.

Keywords: *Cost Overrun, Construction Project, Political Instability, Design Change.*

BACKGROUND OF THE STUDY

Cost overrun is a global phenomenon in the construction industry where very rarely projects are finished within the budgeted cost. In a global study on construction project performance, cost overrun was identified the major problem where 9 of 10 projects faced the overrun in the range of 50 to 100%. The problem of cost overrun in the construction industry is a global phenomenon (Ameh et al. 2010).

Many factors are responsible for these cost overruns such as underestimation of costs to make the projects more viable, addition of scope during later stages of project planning and even during construction, changed conditions, etc. One of the most important contributing factors to the magnitude of cost overrun in large transportation projects are project delays. Furthermore, the length of project development phase from planning to construction seems to be a major factor in the extent of cost overrun (Touran and Lopez, 2006).

Cost is the fundamental component for any construction project. However, cost overrun is observed as one of the most frequently occurring issues in construction projects worldwide and need to be more studied to alleviate this issue in the future (Memon, A. et al., 2010).

In addition, in construction project is an indication of project failure so, the key to success is to realize and understand the challenges early in the planning process, to develop strategies to address them and to establish accurate and achievable expectations. Moreover, it provides the decision makers with early warning devices to reduce the cost overrun problems.

So, understanding these factors allows for appropriate actions to mitigate factor impacts. Project participants can take action to curtail or control the effects of these identified cost escalation factors throughout the life of the project. Indeed, cost overrun occurs due to many factors that differ from one country to another.

Construction industry is an important industry that plays a vital role in the socio-economic growth of a country. Economically, it contributes in significant improvement in the overall GDP of a country. It also improves the quality of life by providing the necessary infrastructure such as roads, hospitals, schools and other basic and enhanced facilities. Hence, it is fundamentally crucial to make construction projects completed successfully within time, budget and expected quality. However, being a complex, fragmented and schedule driven industry it always facing chronic problems such as low quality and productivity, cost overrun, time overrun, construction waste and others. Of these, cost overrun is a severe problem (Cantarelli, 2009, Olawale and Sun, 2010) because it affects the overall development of any country.

The issue of cost overrun has become a serious concern to investors, which needs stern attention and in-depth research to put forward solutions to this issue. Hence, this study focused on assessing significant factors contributing to cost overrun issue in Ethiopia construction project particularly in Gamo Zone Arba Minch Town public building construction project.

Previous studies show that, the ranking of factors causing cost overrun is different from one country to another because of the different circumstances that surround construction industry. So, the main objective of this paper is to determine and discuss the most influencing factors in public construction projects that causing cost overrun occurrence.

Statement of the Problem

There are a number of researches about factors leading to cost overrun occurrence in construction projects in several countries (developed and developing countries), as follow. However, it should be performed more such studies in developing countries, in particular Egypt to face the critical problem of cost overrun in construction field. Past researchers studied the factors affecting construction costs from various perspectives. However, different countries have different cost factors for consideration. After the literature review, the researcher extracted the following facts: Whereas, Ekab, (2009) mentioned that poor review of drawings and Changes in design is the most influencing factor in cost overrun of construction projects in Iraq then, poor contracts management and fluctuation in material prices.

Gajewska, and Ropel, (2011) stated that the delay in diction making, miscalculation, and not finding the right contractor are the most influencing factors of delay the construction projects which leading to cost overrun occurrence in Sweden. In addition, Memon et al, (2011), Toh et al, (2012) and Abd-Karim et al, (2013) mentioned that client requirements on quality, poor design and delays in design, unrealistic contract duration and requirements imposed lack of experience, late delivery of materials and equipment, relationship between management and labor, fluctuation of prices of materials, cash flow and financial difficulties faced by contractors and shortages of materials are the most influencing factors in cost overrun in Malaysia.

In Malaysia, a study investigated large projects and found that cash flow and financial difficulties faced by contractors, contractor's poor site management and supervision, inadequate contractor experience, shortage of site workers, incorrect planning and scheduling by contractor were most severe factors while changes in scope of project and frequent design changes are least affecting factors on construction cost (Memon AH et al., 2010).

Based on the above previous study the seeds of present study were attempting to find major influencing factors or bottlenecks that affect the occurrences of cost overrun in construction project. It is believed that the challenges for cost overrun were indicated socio political factor due to political interference and instability, economic factor due to economic instability, exchange rate fluctuation, fluctuation in raw material price, managerial factors due to delays in decision making process, poor project management leadership style and owners interference, construction techniques and design factor due to frequent design change, design error and mistakes, incomplete design at the time of tender, deficient design and delays in design process and risk management strategy and time lines of payment and financial factor due to delay in progress payment by clients, poor financial control on site were identified as causes of cost overrun in public construction project. To facilitate the present study, the researcher examining the factors that leads to cost overrun in public construction project.

Thus, the first motive to undertake this research was to fill the research gap that were not addressed by any one of the earlier studies,

specifically problems associated with cost overrun in public construction project in Southern region of Ethiopia. Therefore, this study were prove critical in bridging the knowledge gap by identifying the cases of cost overrun and facilitate appropriate measures to avoid the problem and attempts to provide answers for the following basic research questions;

In privies most studies focused on factors leading to cost overrun occurrence in construction project in developed and developing country. There was little study was conducted in sub Saharan country especially in Ethiopia but there was no study conducted so far in southern region GamoZone Arba Minch Town on this issue, however there was an attempt made on other regional and national levels.

Therefore, this study may prove critical in bridging the knowledge gap by identifying the factors that cause cost overrun on public building construction project and facilitate appropriate measures to avoid their occurrence and attempts to provide answers for the following basic research questions;

1. What are the social and Political factors affecting Cost overrun on public building construction projects in Arba Minch town?
2. What are the Economic factors affecting Cost overrun on public building construction projects in Arba Minch town?
3. What are the managerial factors affecting Cost overrun on public building construction projects in Arba Minch town?
4. What are the financial factor that cases cost overrun on public building construction projects in Arba Minch town?
5. What are the constructions techniques and design affecting Cost overrun on public building construction project in Arba Minch town?

Research Objective

The general objective of this study is to identify factors affecting cost overrun on public building construction projects in Gamo ZoneArba Minch town; Sothern region, Ethiopia.

Based on the above general stated objective the following specific objectives are drawn.

1. To assess socio political factors affecting Cost overrun on public building construction projects.
2. To determine economic factors affecting Cost overrun on public building construction projects.
3. To examine managerial factors affecting Cost overrun on public building construction projects.
4. To identify financial factors affecting Cost overrun on public building construction projects.
5. To evaluate constructions techniques and design change affect Cost overrun on public building construction projects.

Literature Review

Theoretical Review

Cost Overrun in Construction Industry

Cost is the common factor of any construction project. However, cost overrun is one of the most occurring risks construction projects and the most severe in developing countries, where these overruns sometimes exceed 100% of the estimated budget (Memon, A et al., 2010). Construction cost which is out of control adds investment pressure, increases construction cost, affect investment decision making. Hence, it is important to identify the factors that contribute to cost overrun to avoid and reduce the problems (Ali, A. & Kamaruzzaman, 2010). This part of the thesis focuses on theoretical approaches to examine the approaches and techniques as tools towards public building construction. Additionally, related studies, a review of books, thesis, standards and relevant guidelines are reviewed.

A project is a sequence of unique, complex, and connected activities that have one goal or purpose and that must be completed by a specific time, within budget, and according to specification. Project management is an organized common-sense approach that utilizes the appropriate client involvement in order to meet sponsor needs and deliver expected incremental business value. Projects arise out of unmet needs. Those needs might be to find a solution to a critical business problem that has evaded any prior attempts at finding a solution Wysocki, (2014).

Construction project is a mission, undertaken to create a unique facility, product or service within the specified scope, quality, time, and cost (Chiittkara, 2004). In practice, however, some construction projects encounter cost overrun, delay on completion time or poor Workmanship upon completion. Cost overrun, poor quality workmanship and delay of construction projects require an in-depth investigation to improve the outputs of the construction industry

Cost overrun is common in infrastructure and building construction projects. Researches on construction projects in some developing countries indicate that by the time a project is completed, the actual cost exceeds the original contract price by about 30 % Alla- Momanii (1996].

Factors Leading to Cost Overrun in Construction Projects

There are many factors causing of project cost deviation in other words, causes of variations between estimated cost or planned cost (PC) and actual cost (AC) of project which will be explained in details later. Hence, the researcher reviewed a lot of studies concern with the causing factors of cost overrun in construction projects. Many studies show that 90% of construction projects have underestimated costs and this percentage increases in the developing countries because of the lack of experience in the project management process. So, there are many factors can cause cost overrun that are different from one project to another and from one place to another. Cost overrun will be identified, its reasons will be clarified, and many of previous studies will be analyzed (Ammar, M. et al,. 2009).

A cost overrun, also known as cost increase or budget overrun, involves unexpected costs incurred in excess of budgeted amounts due to an underestimation of the actual cost during budgeting. Cost overrun should be distinguished from cost escalation, which is used to express an anticipated growth in a budgeted cost due to factors such as inflation.

Socio Political factors

Politicians are elected by citizens to decide public policy, including the delivery of public projects, whereas bureaucrats are employed by the government to implement these policies. When faced by high levels of political competition in their constituencies, politicians may be incentivized to improve the quality of potentially vote-winning public projects. Consequently, they may seek to overcome barriers such as bureaucrats' indecency, inertia, or corruption. Existing evidence suggests political competition can improve the delivery of public projects.

According to Markus and Tanis (2010), political interference plays a critical but poorly understood role in determining the success or failure of the processes of project management that dominate efforts to form international regimes or, more generally, institutional arrangements in international society. An examination of the nature of project management serves as a springboard both for pinpointing the role of leadership in regime formation and for differentiating three forms of leadership that regularly come into play in efforts to establish international institutions: structural leadership, entrepreneurial leadership, and intellectual leadership Holland et al. (, 2009).

Economic Factors

Chism and Armstrong (2010) confirm the fact that the political environment affects the construction of a project. Fortune and White (2014) in their review of sets of critical success factors in sixty-three publications listed political stability as one of the twenty-seven critical success factors. Wideman (1986) assert that changes in government actions are a major external risk factor militating against the success of projects. Economic environmental considerations refer to the level of general economic activity and resources available to carry out construction

Memo, Rahman and Azis (2012) investigated the variation and claims in construction projects in Dubai and Abu Dhabi in the United Arab Emirates using 124 claims related to can be little more specific the range of the projects or typical project. He concluded that 1) a reasonable time should be allowed for the design team in order to reduce clear and complete contract documents with no or minimum errors and discrepancies; 2) efficient quality control techniques and mechanisms need to be established to minimize errors, mismatches, and discrepancies in the contact documents; 3) special contracting provisions and practices need to add in contract document and a strategy needs to introduce to deal with tighter scheduling requirements.

Alaghbari (2014) found several causes of delay in Saudi construction projects and they are drawing preparation, approval of design, payment delay, changes in design, slow cash flow, design errors, labour shortage.

Timeliness of Payment and Financial Factors

A common issue in worldwide construction companies is to complete projects both on time and within the budget initially planned. The completion of projects in a timely manner is often a critical factor and measure of project success. In recent years, there has been an increasing interest in the use of projects as

building blocks in the strategic management of organizations (Weiss & Potts, 2012). The success of any project is highly dependent on its completion timeand cost from start to delivery of results. This has a direct bearing on management decisions such as budgets, targets and standards (Seddon, 2008).

Al-Tabtabai (2002) conducted a study on causes of delays in construction projects in Kuwait and found out that the major causes of delay were: Slow financial and payment procedures; Slow decision-making process; Limited authority among supervision staff; Risk allocation mainly on the contractor; and Lack of design drawings coordination. Memon, Rahman and Azis (2012) conducted a study on time and cost performance in construction projects in Malaysia and revealed that only 21% of public sector projects and 33% of private sector projects were completed within time.

Empirical Reviews

There are a number of researches about factors leading to cost overrun occurrence in construction projects in several countries (developed and developing countries), as follow. However, it should be performed more such studies in developing countries, in particular Egypt to face the critical problem of cost overrun in construction field. Past researchers studied the factors affecting construction costs from various perspectives. However, different countries have different cost factors for consideration. After the literature review, the researcher extracted the following facts:

Whereas, Ekab, (2009) mentioned that poor review of drawings and Changes in design is the most influencing factor in cost overrun of construction projects in Iraq then, poor contracts management and fluctuation in material prices.

According to Bageis and Fortune.(2009) and Alfouzan, (2013) that there are many factors lead to cost overrun in construction projects in KSA as Decision-making regarding tenders which depend on the size of contractor, contractor's classification status and type of main client, corruption in selling lands and government's poor role in monitoring materials prices.

Whereas, Zujo et al. (2010) the main only factor causes cost overrun in Bosnia and Herzegovina is the delay in projects handing over. In addition, Ameh et al. (2010) extracted that the junior factors cause cost overrun in Nigeria are the economic stability, shortage of materials, government policies (laws and regulations), domination of construction industry by foreign firms and aids, project location and absence of construction cost data.

Gajewska, and Ropel, (2011) stated that the delay in diction making, miscalculation, and not finding the right contractor are the most influencing factors of delay the construction projects which leading to cost overrun occurrence in Sweden. In addition, Memon et al, (2011), Toh et al, (2012) and Abd-Karim et al, (2013) mentioned that client requirements on quality, poor design and delays in design, unrealistic contract duration and requirements imposed lack of experience, late delivery of materials and equipment, relationship between management and labor, fluctuation of prices of materials, cash flow and financial difficulties faced by contractors and shortages of materials are the most influencing factors in cost overrun in Malaysia.

Whereas, Banaitiene and Banaitis, (2012) stated that lack of experience, design errors, scheduling errors and failure to comply with contractual quality requirements, and technology changes in Croitia. In addition, Apolot et al, (2012) stated that the most influencing factors of cost overrun in Uganda are lack of project management during execution: insufficient and ineffective working, delays, changes in scope of work and location, law and order.

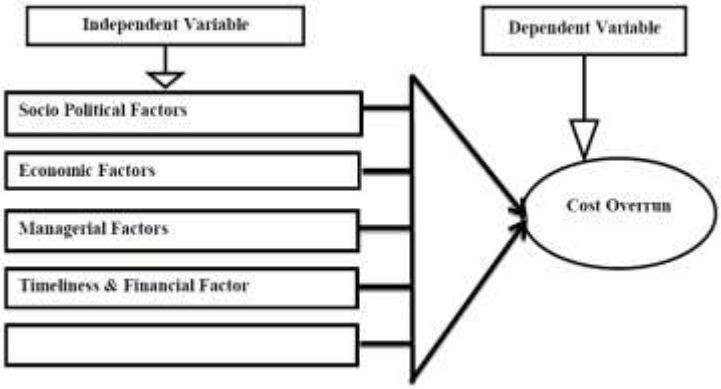
Besides, Doloi, (2013) clarified that the planning and scheduling deficiencies, Methods/techniques of construction, effective monitoring and feedback process, complexity of design and construction, improper control over site resource allocations and contractor's deficiencies in planning and scheduling at tender stage are the main causes of cost overrun of construction projects in Australia.

Shaqour**,** (2014)**;** Khodeir and Hamdy, (2015) and Yakoub, (2016) mentioned that the junior factors cause cost overrun in Egypt are changes in project scope, material prices, Poor estimation of project cost, additional works at owner's request, donor policy in bidding to the lowest price, fluctuations in the cost of building materials, delay in project completion time, fraudulent practices, kickbacks, corruption and economic instability/ political insecurity, Unsupportive governmental policies and Governmental control and regulations.

Conceptual Framework

The Conceptual Framework gave a depiction on how the variable related to one another. The

variable defined here are dependent and independent variables. The independent variables in this study are socio Political factors, Economic factors, Managerial factors and Timeliness of payment and construction techniques and design changes.



Source: *Developed by the researcher 2020*

Fig1. *Conceptual Frame Work Model*

Knowledge Gap Identification

Construction building projects are notorious for failing to complete in time being over budgeted, late and saddled with scope creep, as well as for poor communication protocols and inadequate controls around scope change management this especially pronounced in non-profit organizations (Guerin, 2012). Timely and within budgeted completion of construction project is fundamental if the project objectives and success is to be achieved. A project that is completed in cost exhibits overall efficiency of project planning, management and implementation and effective tracking project progress.

Little study had been carried on the causes of cost overrun on public building construction projects by construction organizations which are inconsistent. This study sought to fill this research gap by investigating Determinants of cost overrun on public building construction projects: A Case Study of Gamo Zone Arba Minch town.

Research Design and Methodology

The research designs adopted in this research were descriptive research design and quantitative research approaches were adopted with structured close-ended questionnaires. Primary data sources were collected. For data process and procedures, this study were used a five point Likert scale. The judgmental sampling techniques were used. Based on the judgment of the researcher the total sample size was 82.Therefore, the researcher used 100% of the total population for sample size and to distribute questionnaire for the number of participants in this study. For data analysis multi linear regression model and Descriptive statistics were used to identify factors affecting cost overrun.

Model Specification and Explanation

COR =β0+β1SPF+β2EF+β3MF+ β4TPFF + β5TPFF +ε..... (1)

Where; **COR** = Costoverrun, SPF = Socio political Factor, EF = Economic Factor, MF = Managerial Factor, TPFF = Timeliness of payment and financial factor, CTDF = construction techniques and design factor, ε =error term, β= coefficient

Results, Findings and Discussions

Descriptive Analysis

Socio Political Factors

N.B On five point Likert scale: SA=strongly agree, AG = Agree, NU = neutral, DA= disagree, SD= strongly disagree)

Table4.7. *Factors Indicating Socio political factors for the occurrence of cost overrun*

Items	SA %	AG %	NU %	DA %	SD%	Mean
Policy and regulations	9.1%	18.2%	0	27.3%	45.5	2.18
Structural leadership	13.6%	22.7%	22.7%	36.4%	4.5%	3.05
Political interference	9.1%	54.1%	27.3%	4.5%	4.5%	3.59
Political instability	22.7%	45.5%	4.5%	13.6%	13.6%	3.50

Source: *Survey outcome and own computation 2012*

The survey results indicated in the above table 4.7 shows that according to **policy and regulation** the respondent response 27.3% and 45.5% of the respondents are disagreed with

mean score of 2.18. With regard to **structural leadership** the respondent response 22.7% neutral, 36.4% and 4.5% of the respondents are indicated disagreement with mean score of 3.05. The finding reviled that the policy and regulation, structural manager or structural leadership are not causes for socio political factors that leads to cost overrun. According to **political interference** the respondent response is 9.1% and 54.1% of respondents are indicated agreement with mean score of 3.59. The finding reviled that the political interference are the major causes for socio political factors. This confirms that political pressure can influence the selection of project. There is usually many more project seeking funding than available resources. In this case powerful politicians may push their pet projects to the front of the line regardless of their economic merits. Under the implementation stage, public procurement may be a source of corruption when political pressure is asserted to influence the selection of bidder. This can lead to collusion and corrupt relationships between the bidder and their backers. Inappropriate funding models can also lead to poor infrastructure outcomes. According to **political instability** the respondent response is 22.7% and 45.5% of respondents are indicated agreement with mean score of 3.50. The finding reviled that the political instability are the major causes for socio political factors with relatively important index and mean score. This confirms that the instability of political situation can be a major cause that leads to cost overrun.

Economic Factors

Table4.8. *Factors Indicating Economic factors for the occurrence of cost overrun*

Items	SA	AG	NU	DA	SD	Mean
Economic instability	27.3	27.3	4.5	31.8	9.1	3.32
Exchange rate fluctuation	13.6	86.4	0	0	0	4.86
Fluctuation in raw material price	100	0	0	0	0	5.00
Financial difficulties of owner	31.8	0	4.5	40.9	22.7	2.77

Source: *Survey outcome and own computation 2012*

The survey results indicated in the above table 4.8 shows that according to **economic instability** the respondent response 27.3% and 27.3% of respondents are indicted agreement with mean score of 3.32. The finding reviled that the economic instability are causes for economic factor. This confirms that the change in interest rate and market fluctuation are cause for economic instability this is also cause leads to cost overrun. According to **Exchange rate fluctuation** the respondent response is 13.6% and 86.4% of respondents are indicated agreement with mean score of 4.86. The finding reviled that most of the world currencies are bought and sold based on flexible exchange rates or price fluctuate based on the supply and demand in the foreign exchange market. A high demand for a currency or a shortage in its supply will causes an increase in price this is the hindering factor for exchange rate fluctuation and causes for the occurrences of cost overrun. According to **Fluctuation in raw material price,** 100% of respondent's response is indicated agreement with mean score of 5.00. The finding reviled that the fluctuation in raw material price are the major causes for economic factors. This confirms that the exchange rate fluctuation and price fluctuation are causes price fluctuation in construction raw material this is the major cause for the occurrences of cost overrun in construction project. According to **Financial difficulties of owner** the respondent response is 31.8% of respondents are indicated agreement and the rest 40.9% and 22.7% of the respondents are indicated disagreement with mean score of 2.77. The finding reviled that the financial difficulties of owner are not causes for economic factors. This confirms that the financial difficulties of owner cannot be cause for the occurrence of cost overrun.

Managerial Factors

Table4.9. *Factors Indicating Managerial factors for the occurrence of cost overrun*

Items	SA	AG	NU	DA	SD	Mean
Delays in Decision making process	9.1	50.0	4.5	27.3	9.1	3.23
Poor project management Leadership Style	59.1	27.3	0	13.6	0	4.32
Poor Design assumptions(planning)	18.2	68.2	4.5	9.1	0	3.95
Owners interference	81.8	9.1	4.5	4.5	0	4.68

Source: *Survey outcome and own computation 2012*

The survey results indicated in the above table 4.9 shows that according to **Delays in Decision making process** the respondent response 9.1% and 50% of respondents are indicted agreement with mean score of 3.23. The finding reviled that the Delays in Decision making process are causes for managerial factors. This confirms that the delay is one of the leading issues often faced the construction project sites. Delays may result in negative influences such as increased costs, loss of productivity and revenue, claims between the holders and contractor and contract termination are implies delays of manager in decision making process this indicated challenges leads to cost overrun in construction project. According **Poor project management Leadership Style** the respondent response is 59.1% and 27.3% of respondents are indicated agreement with mean score of 4.32. The finding reviled that the Poor project management Leadership Style are causes for managerial factors. This confirms that poor planning and management of the construction projects may lead to several negative effects on the duration and completion of projects this implies the managerial factors are the hindering factors for the occurrences of cost overrun in public construction projects. According to **Owners interference** the respondent response is 81.8% and 9.1% of respondents are indicated agreement with mean score of 4.68. The finding reviled that the owner's interference are the major causes for managerial factors. This confirms that every construction project needs the freedom to carry out the work without interference, an owners attempt to constrain the project this result in expensive delays and additional costs to the contractor this implies the major factors that affecting cost overrun in construction project.

Construction Techniques and Design Factors

Table4.10. *Factors Indicating construction techniques and design*

Items	SA	AG	NU	DA	SD	Mean
Frequent Design changes	4.5	54.5	9.1	22.7	9.1	3.23
Design errors and mistakes	18.2	31.8	18.2	31.8	0	3.36
Incomplete design at time of tender	9.1	77.3	9.1	4.5	0	3.91
Deficient design and delays in design process	50.0	31.8	13.6	0	4.5	4.23
Risk management strategy	27.3	54.5	13.6	4.5	0	4.05

Source: *Survey outcome and own computation 2012*

The survey results indicated in the above table 4.10 shows that according to **Frequent Design change** the respondent response 4.5% and 54.5% of respondents are indicted agreement with mean score of 3.23. The finding reviled that the Frequent Design changes are causes for construction techniques and design factors. This confirms that the design change in construction project during post contract period the owner interaction to modify a design change to the scope of the work as defined by the contract document following the creation of legal relations between the principal and the contractor, the changes are not fault of the contractor but the design change may occur in architectural, structural, plumbing and drainage, site works or other aspects of construction are factors for the construction techniques and design change. Frequent design changes are the major factors for the occurrences of cost overrun.

According to **Design errors and mistakes** the respondent response is 18.2% and 31.8% of respondents are indicated agreement with mean score of 3.36. The finding reviled that the Design errors and mistakes are causes for construction techniques and design change. This confirms that the design errors and mistakes in the stages of construction project are cause that leads to cost overrun. According to **Incomplete design at time of tender** the respondent response is 9.1% and 77.3% of respondents are indicated agreements with mean score of 3.91. The finding reviled that there is an error and mistakes in design development and documentation to define further the size and character of the project. It include architectural, civil, structural, mechanical and electrical system material and other such project components are incomplete that can be factors for construction techniques and design this is also causes for the occurrence of cost overrun.

According to **Deficient design and delays in design process** the respondent response is 50% and 31.8% of respondents are indicated agreement with mean score of 4.23. The finding reviled that Deficient design and delays in design process are the major causes for

construction techniques and design factors. This confirms that poor design and documentation quality are the major causes of construction process inefficiency, leading directly to delays rework and variation and contributing to increasing in project time and cost this implies the deficient design and delays in design process are the major factors the contribute for the occurrences of cost overrun in construction project. According to **Risk management strategy** the respondent response is 27.3% and 54.5% of respondents are indicated agreement with mean score of 4.05. The finding reviled that Risk management strategy ranked as the major factor to construction techniques and design. This confirms that risk management strategies should be applied to all level of the project to avoid cost overrun, implementing a risk management plan at the beginning of the a project can help to remove some of the possible problems that can appear during project life cycle, so manager should apply risks management skill to avoid any cost problems.

Financial and Time Lines of Payments

Table 4.11Factors Indicating Time lines of payments and financial factors

Items	SA	AG	NU	DA	SD	Mean
Delay in progress payment by owner for work completed	18.2	31.8	22.7	27.3	0	3.41
Cash flow difficulties by clients	13.6	22.7	18.2	45.5	0	3.05
Poor financial control on site	27.3	36.4	9.10	22.7	4.5	3.59
Financing and payments of completed project	9.1	22.7	18.2	18.2	31.8	2.59

Source: *Survey outcome and own computation 2012*

The survey results indicated in the above table 4.11 shows that according to **Delay in progress payment by owner for work completed** the respondent response 18.2% and 31.8% of respondents are indicted agreement with mean score of 3.41. The finding reviled that Delay in progress payment by owner for work completed are factor for cost overrun. This stated that in the contract the client should pay a payment to the contractor according to the progress of work, and the payment it should be monthly or according to the contract. The client should pay contractors claims timely to avoid any cost overrun in construction projects. **Poor financial control on site** with mean score of 3.59, **Cash flow difficulties by clients** with mean score of 3.05 and **Financing and payments of completed project**with mean score of 2.59. The finding reviled that financing and payments of completed project are not factors related to time lines of payment and financial factors for the occurrences of cost overrun.

Multiple Linear Regression Model

Table4.12. *Regression Models*

Model Summary										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.887[a]	.786	.719	.15456	.786	11.761	5	16	.000	2.0312
a. Predictors: (Constant), CTDF, TPF, EF, MF, SPF										
b. Dependent Variable: COR										

Source: *SPSS result of the own survey 2012*

The results from the table 4.12 above designated that a combination socio political, economic, managerial, timeliness of payment and financial, constriction techniques and design factors had 71.9% (R square= 0.719) predictive likelihood of effect to cost overrun. The predicator variable explains 71.9% of the variation in cost overrun measured by which was attributed to socio political, economic, managerial, timeliness of payment and financial, constriction techniques and design factors. From the findings, 29.1% of the variance is unexplained. In the outcome, R shows the value of the multiple correlation coefficients between the dependent and the independent variable. Multiple R = 0.887- R in the above table shows the correlation between dependent variable and independent variables. As given in the table, R of 0.887 represents a situation in which the model perfectly predicts the influencing factors of cost overrun.

Regression and Correlation Analysis between Factors

Table4.12. *Correlation Matrix for Cost over run (COR), Socio Political Factor (SPF), Economic Factor (EF), Managerial Factor (MF), Timelines of Payment and Financial Factor (TPF), Construction Techniques and Design changes (CTDF).*

Correlations							
		COR	SPF	EF	MF	TPF	CTDF
Pearson Correlation	COR	1	.837**	.476*	.591**	.500*	.611**
	SPF	.837**	1	.639**	.691**	.375	.654**
	EF	.476*	.639**	1	.260	.335	.438*
	MF	.591**	.691**	.260	1	.619**	.435*
	TPF	.500*	.375	.335	.619**	1	.311
	CTDF	.611**	.654**	.438*	.435*	.311	1
**. Correlation is significant at the 0.01 level (1-tailed).							
*. Correlation is significant at the 0.05 level (1-tailed).							

Source: *SPSS result of the own survey 2012,* **Note:** *Sig. (1-tailed) *P<0.01, **P<0.10 *N= sample size of 82*

The correlation matrix between different factors was shown in the above Table 4.12. By looking at the correlation matrix between the factors it can be understood that Socio political factors was, the most correlated element with cost overrun but it cannot be said cost overrun was highly influenced with this variable. In other words, this matrix does not show the causation of the variables rather showing the magnitude of their association.

The next predicting factor that was also more important was the construction techniques and design factors. This also shows a positive correlation with cost overrun. The correlation between construction techniques and design factors and cost overrun was 0.611, which shows that frequent design changes are the major factors for the occurrences of cost overrun.

The next factor, which was more important, was the Managerial factor with a correlation of 0.591, which shows a significant relationship with cost overrun. The finding shows the managerial factor due to delays in decision making process, poor project management leadership style and owners interference in each activity.

The three factors were the most important factors, which show somewhat strong correlation with the cost overrun relatively than the rest two variables.

The rest of the factors were also correlated but not as much as the socio political, construction techniques and design changes and managerial factors, Then the researcher analyzes the correlation of each factor with other factors. The perceived quality was most correlated with the satisfaction factor followed by commitment and least correlated with switching cost factor. The socio political factor was most correlated with the managerial factor (0.691) followed by construction techniques and design change (0.654) and economic factor (0.635) for the occurrences of cost overrun.

In construction techniques and design column, the socio political factor (0.654), economic factor (0.438) and managerial (0.435) factors were more correlated respectively than the others were. The managerial factor was most correlated with socio political factor (0.691) followed by timeline of payment and financial factors (0.619).

Coefficients of Regression Model

Table4.13. *The Coefficients of the Regression Model*

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.537	.300		5.118	.000
	SPF	.327	.079	1.040	4.150	.001
	EF	.122	.081	.261	1.512	.150
	MF	.125	.084	.322	1.490	.156
	TPF	.169	.073	.375	2.322	.034
	CTDF	.020	.044	.069	.448	.660
a. Dependent Variable: COR						

Source: *SPSS result of the own survey 2012*

The Regression Equation

The model was specified as follows:-

COR=β0+β1SPF+β2EF+β3MF+ β4TPF + β5CTDF ε.....

COR= 1.537+0.327SPF+0.122EF+0.125MF + 0.169TPF + 0.020CTDF + 0.300

Whereby COR= cost overrun, β0 was the constant term of the model, β1toβ5 were coefficients of independent variables and ε was the error term. SPF =socio political factor, EF= economic factor, MF= Management factor, TPF= timeliness of payment and financial factor, CTDF= construction techniques and design factors.

The equation above inferred that cost overrun on construction project was influenced by socio political, economic, managerial, timeliness of payment and financial, constriction techniques and design factors. Based on the above table 4.14, the regression coefficient for socio political is 0.327. This means that the relationship between cost overrun and socio political factors is positive. This implies that socio political factors are the major cases for the occurrences of cost overrun. The regression coefficient for economic factor is 0.122. This means that the relationship between cost overrun and economic factor is positive. This indicates that the economic factors are influences the costs overrun in construction project. The regression coefficient for managerial, timeliness of payment and financial, constriction techniques and design factors is 0.125, 0.169, and 0.020 respectively. This indicated that managerial, timeliness of payment and financial, constriction techniques and design factors are positively related with cases for the occurrences of cost overrun in construction project.

CONCLUSION

Based on the broad objective the study makes the following conclusion with regard to the specific objectives and research questions that guided the study. It was found thatfive most significant factors causing cost overrun in public construction project in Gamo Zone Arba Minch Town were as follows;

- The correlation result indicted that socio political factors, economic factors, Managerial factors, construction techniques and design, time lines of payment and financial factors are positively or significantly correlated with cost overrun in construction project in Arba Minch town.
- The descriptive results show socio political factors, due to political interference, instability of political situation can be a major cause that leads to cost overrun. On the other hand this study found that the policy and regulation, structural leadership is not significant factor for the occurrences of cost overrun.
- The result also shows that economic factors, due to change in interest rate and market fluctuation, exchange rate fluctuation, fluctuation in raw material price are the major factors leads to cost overrun.
- Regarding managerial factors,due to Delays in Decision making process, Poor project management Leadership Style, and Owners interference are the major factors. This confirms that the delay is one of the leading issues often faced the construction project sites.
- The output related with the construction techniques and design factors, due to Frequent Design change, Design errors and mistakes, incomplete design at time of tender, deficient design and delays in design process and Risk management strategy are significant factor for the occurrences of cost overrun.
- Regarding time lines of payment and financial factors, the output of this study reviled that Delay in progress payment by owner for work completed, Poor financial control on site, Cash flow difficulties by clients are the major factor for cost overrun.

RECOMMENDATION

It is apparent that construction project needs to seriously consider all the internal and external factors causing cost overrun. Based on the analysis of research findings the following recommendations are advocated for further research:

- The study recommended that government body should emphasize on the problems of cost overrun by clearly and effectively communicating the construction project and work in progress and the concerned body should be ensure the political stability and minimize political interference or political pressure during the selection of project and implementation of the project in order to reduce the occurrence of cost overrun.

- The contractor should be aware about the future economic factors in order to minimize the risk related with exchange rate fluctuation and fluctuation in raw material price.
- In a construction project the management activity should give a good attention to design and implement a process or structure appropriate to the problem and circumstance to clearly organizational goal, manage the external environment, focus on task, clarify line of authority and to give a good decision making in order to solve the problem related with the occurrence of cost overrun.
- With Regarding to construction techniques and design factor this study provides different measure that should be taken so as to minimize occurrence of the unnecessary change of design during construction, these measure are ensure proper feasibility study before design, ensure effective involvement of the parties during design stage, ensure sufficient budget for the project.
- Risk management strategies should be applied to all level of the project to avoid cost overrun, implementing a risk management plan at the beginning of the a project can help to remove some of the possible problems that can appear during project life cycle, so manager should apply risks management skill to avoid any cost problems.
- As it's been stated that in the contract the client should pay a payment to the contractor according to the progress of work, and the payment it should be monthly or according to the contract. The client should pay contractors claims timely to avoid any cost overrun in construction projects.
- Finally this study recommended that in public construction project the concerned body should be provide a good planning and scheduling are continuing process during construction and match with the resources and time to develop the work to avoid cost overrun. The concerned body should revise the bid document such as technical specification during bill of quantities and the design of the project in a good way. However, the concerned body should facilitate payment to contractors in order to overcome delay in progress payment and avoid the occurrences of cost overrun.

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