

# Project Delays on Cost Overrun Risks: A Study of Gasabo District Construction Projects Kigali, Rwanda

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## ABSTRACT

The purpose of this study was to examine the major causes of project delays and costs/risks that arise from project delays when implementing public construction projects in Gasabo district, Kigali City. The objectives were; to assess the relationship between project expected time and real time, determine project expected cost and real cost, to calculate both project delay and cost overruns and finally to identify the relationship between public construction project delay and their respective cost overruns. The study adopted a descriptive survey research design. Data were collected using open-ended questionnaire. Research samples were randomly selected from a total of 42 public construction project managers, consultants/ implementers for projects that had been ongoing for the period 2009 until 2012. A sample of 38 respondents was taken to assure a 95% significant result. To examine the nature of project delays and cost overruns, project delays and cost overruns were calculated, compared and regressed. The study revealed that 65.7% of public construction projects which were implemented between 2009-2012 were delayed, whereas only 5.2% of these projects faced cost overruns. From the results, the study recommends the use efficient mitigation techniques for planning efficiency rather formalities.

**Keywords:** Time, Cost, Overrun, Mitigation, Project, Kigali, Rwanda

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## INTRODUCTION

The Construction industry is large, volatile, and requires tremendous capital outlays. Projects have grown larger over time, and increased size implies higher economic risks. A recent survey of top management in 25 of the largest construction firms in the world showed that executives see managing and pricing risk as one of their key challenges, and 63 percent of respondents said it was their biggest issue. Executives cited poor forecasting,

poor risk identification, and cost escalation as the three top reasons for reduced profit margins (KPMG, 2005).

A unique element of risk in the construction industry is the manner in which disputes and claims are woven from the fiber of the construction process. The type of contract used, is often based on an overall attempt to allocate (often shifting) the risks of the work to the parties involved and deciding what must always be recognized and accepted. Risk can only be mitigated, it cannot be eliminated (Hendrickson and Au, 2003).

Delays occur in every construction project, and the magnitudes of these delays vary considerably from project to project. Some projects delay by a few days while others delay for over a year. At the onset, it is essential to define the actual causes of delay in order to minimize associated costs in any construction project (Hendrickson and Au, 2003).

Hirsch and Catchim (2012) argue that late in the past, intellectuals such as Plato (427-347 BC) believed in human incapacity to predict the future. His assertions show how skeptical they were to the idea of setting up plans for the future and implementing project ideas efficiently. Researchers have argued that there is no construction project without risk, implying that in some instances, construction projects are completely unpredictable. Risk can be managed, minimized, shared, transferred, or accepted but it cannot be ignored.

In their study, Cook and Williams (2004) argue that risks are considered as generic to infrastructure projects. However, time overrun situations are complex in nature. A time overrun in an activity may not result in the same amount of project delay. The time overrun caused by a party may or may not affect the project completion date and may or may not cause damage to another party. The time overrun may occur concurrently with other delays and all of them may impact the project completion date. In addition to lack of a sound empirical basis, one of the major factors that account for overrun risks is the absence of institutional checks and balances that would enforce accountability with contractors and clients towards risk. Such accountability would generate a demand for knowledge about real risks that is often absent today (Bruzelius, Flyvbjerg, 1998).

The concept of success in a construction project can be evaluated only when risk dimensions are adequately defined (Baker et al, 1991 and Morris and Hough, 1997). In most projects the evaluation of project success or failure dimensions correspond to the traditional constraints of time, cost, and quality parameters. Ashley et al (1997) opines that project success will be evaluated in terms of cost, schedule, quality, safety, and participant satisfaction.

To achieve construction project success, one must have an understanding of behavior/ patterns of construction project variables and their relationship, and future monitoring control techniques will be of great importance. Gasabo is one of the three districts in Rwanda's capital city, Kigali. The district covers a surface about 50% of the capital city's land area.

In a report by Rukirande (2012), the national budget of the Government of Rwanda for the fiscal year 2012/2013 emphasized a scaling up of infrastructure projects in order to enhance growth and poverty reduction strategies, and this development will see an increase in construction and rehabilitation investment projects in local governments to Rwf 79 billion compared to Rwf 25 billion in the previous year. A 23% share of the entire budget compared to the 21% budget in the previous fiscal year 2011/12 was also observed.

A considerable number of international literatures opine that the inability to complete projects on time and within budget continues to be a chronic problem worldwide and a far worsening case (Ahmed, Azher, Castillo, and Kappagantula, 2002; Azhar and Farouqui, 2008). However,

as the trend of construction projects cost overrun becomes severe, a number of adverse consequences such as project failure, reduction of profit margin, loss of belief of citizen in government funded projects, would certainly take place. In Vietnam for example, a developing country in Asia, many problems had arisen during implementation of construction projects, out of which two main concerns were delay and cost overruns, and the frequently faced consequences were also project failure, reduction of profit margin, and loss of belief of citizen in government funded projects among others (Le-Hoai, Young, and Jun, 2008).

According to the 2012/13 Rwanda national budget, 46% was donor funded, and worse again where effort to increase taxpayers' contribution to the budget has resulted in reducing the aid from 85% in 2000. Absent or inadequate risk assessment and management is, in themselves, an important source of risk for projects. Because, until now, no reliable measure has been available for estimating risk in urban construction projects, effective risk assessment and management have been impossible. Further, studies that have been conducted to determine causes of time and cost overrun have relied heavily on quantitative measure and few have attempted to use both quantitative and qualitative measure to determine relationships and causes of overruns. The study described below is aimed at changing this situation. It denotes a first step toward empirically grounded and valid risk assessment and management of construction projects by presenting and analyzing data that allow such risk assessment and management techniques.

### **General objectives**

The researchers wanted to examine the relationship between delays and cost overruns on project performance of public construction projects in Kigali, Rwanda, during the period starting from 2009 until 2012.

### **Specific Objectives**

- To assess the relationship between project expected completion time and resources
- To determine the relationship between project's expected cost and real cost
- To calculate project delay time and cost overruns
- To identify the relationship between delay and cost overruns for public construction projects in Gasabo District.

### **Research question**

The objectives above were logically translated into research questions;

- What is the relationship between expected completed times and resources for public construction project over a period starting from 2009 till 2012?
- What are the expected costs in relation to real costs of public construction projects over a period starting from 2009 till 2012?
- To what extent are public construction projects delayed and what are their cost overruns?
- Does project delay during implementation of public construction project affect project cost overruns?

## **REVIEW OF LITERATURE**

In a series of interesting empirical studies covering twenty countries across the five continents Flyvbjerg, Holm and Buhl (2002, 2003, and 2004), Merewitz (1973), Kain (1990), Skamris and Flyvbjerg (1997). Al-Momani (2000) conducted a survey on 130 public projects in Jordan and found delays occurred in 106, represented by 82%. Frimpong, Oluwoye, and Crawford, (2003) observed that 33(70%) out of 47 projects in Ghana were delayed.

Hillson (2004) posits that, nothing can be said to be certain, except death and taxes. The great Plato (427-347) stated that, the problem with the future is that more things might happen than will happen (Hirschand, 2012). Therefore, people's plan would therefore take more time and efforts compared to predictions. Researchers, who believed that this uncertainty could be reduced, wanted to find the cause of project delay and cost overrun. Most researchers argue that for every problem, there would be a cause. So the issue of delays and cost overruns consequently focused on understanding human inefficiency (Hirschand, 2012).

On the other hand, Singh (2009) published a list of delays and cost overruns causes and their occurrence. The study of Ogunlana, Promkuntong, and Vithool (1996) in Thailand, and that of Kaming, Olomolaiye., Holt, and Harris(1997) in Indonesia found that the blame for most project delays were laid on the contractor. Majid and McCaffer (1998) found that 50% of the delays of construction projects could be categorized as non-excusable delays, for which the contract were responsible. However, though a number of relations with project cost were studied, it is rare to find studies where researchers throughout the time have tested the relationship between time overrun and cost overruns in construction projects. In a study by Kumaraswamy and Chan (1994) it was reported that nowadays, realistic construction time has become increasingly important, for a simple reason that it often serves as a crucial benchmark for assessing the performance of projects and the efficiency of the contractors.

### **Causes of time overrun**

Researches in developing countries especially Africa have made progress in determining the causes behind project delays and cost overruns. Kaliba, Muya, and Mumba (2009) explain in their study that, the major causes of delay in road construction projects in Zambia were delayed payments, financial deficiencies on the part of the client or contractor, contract modification, economic problems, material procurement, changes in design drawings, staffing problems, equipment unavailability, poor supervision, construction mistakes, poor coordination on site, changes in specifications, labor disputes, and strikes. In Uganda, Agaba (2009) attributes delays in construction projects to poor designs and specifications, and problems associated with management and supervision. In their study, El-Razek, Bassioni, Mobarak, (2008) found that delayed payments, coordination difficulty, and poor communication were important causes of delay in Egypt.

Studies outside the African continent seem to also have identified almost similar causes. Sambasivan and Soon (2007), and Alinaitwe (2008) established that poor planning, poor site management, inadequate supervisory skills of the contractor, delayed payments, material shortage, labor supply, equipment availability and failure, poor communication and rework were the most important causes of delays in the Malaysian Construction Industry. Kouskili and Kartan (2004) identified the main factors affecting cost and time overrun as inadequate/inefficient equipment, tools and plant, unreliable sources of materials on the local market, and site accidents. Hence, the list of causes confirm above agree with the findings of AbdMajid and McCaffer (1998) who concluded that if such causes are effectively dealt with, then time overrun can effectively be mitigated.

### **Causes of cost overruns**

Since the 1980s various studies have investigated the causes for project cost overruns on construction projects. Kaming, Olomolaiye, Holt, and Harris (1997), who studied 31 construction projects in Indonesia, found that from a contractor's point of view, cost

overruns were mainly caused by inaccuracy of material take-off, increase in material costs and cost increase due to environmental restrictions. Le-Hoai et al. (2008) ranked the three top causes of cost overruns in Vietnam as material cost increase due to inflation, inaccurate quantity take - off, and labor cost increase due to environment restriction. Kaliba, et al. (2009) conclude that cost escalation of construction projects in Zambia are caused by factors such as inclement weather, scope changes, environment protection and mitigation costs, schedule delay, strikes, technical challenges and inflation. Bubshait and Al-Juwait (2002) listed the following as factors that cause cost overrun on construction projects in Saudi Arabia; effects of weather, number of projects going on at the same time, social and cultural impacts, project location, lack of productivity standards in Saudi Arabia, level of competitors, supplier manipulation, economic stability, inadequate production of raw materials by the country, absence of construction cost data. In another study on construction projects in Nigeria, conducted by Okpala and Aniekwu (1988), it was found that architects, consultants and clients agreed that shortage of materials, finance and payment of completed works and poor contract management were the most important causes of cost overruns. Mansfield, Ugwu and Doran (1994) studied the performance of transportation infrastructure projects in Nigeria and concluded that material price fluctuations, inaccurate estimates, project delays and additional work contributed most to cost overruns. During a review of public sector construction projects in Nigeria, Dlakwa and Culpin (1990) found that the three main reasons for cost overruns are "fluctuations in material, labor and plant costs, construction delays and inadequate pre-planning. Unfortunately, both researches are only specific to Nigeria.

It is worth mentioning that Kaming et al, (1997) and Mansfield et al,1994 also identified design change, inadequate planning, unpredictable weather condition, and fluctuation in construction materials as factors influencing cost overruns. Nine (9) critical causes time cost overrun were identified: incomplete design at the time of tender; additional work at owner's request; changes in owner brief; lack of cost planning/monitoring during pre-and-post contract stages; site/poor soil conditions; adjustment of prime cost and provisional sums; re-measurement of provisional works; logistics due to site location; lack of cost reports during construction stage, they also provided a list of other nine (9) other critical causes which are usually ignored. They include; delays in issuing information to the contractor during construction delays, Technical omissions at design stage, contractual claims, such as, extension of time with cost claims, Improvements to standard drawings during construction stage, wrong decision by the supervising team in dealing with the contractor's queries in delays, delays in costing variations and additional works, Omissions and errors in the bills of quantities, Ignoring items with abnormal rates during tender evaluation, especially items with provisional quantities, Some tendering maneuvers by contractors, such as front-loading of rates.

### **Consequences of time and cost overruns**

Kaliba et al. (2009) argue that if projects costs or schedules exceed their planned targets, client satisfaction would be compromised, the funding profile no longer matches the budget requirement and further slippage in the schedule could result. In addition, project delays and cost overruns also have devastating effect on contractors and consultants in terms of growth in adversarial relationships, mistrust, litigation, arbitration, cash-flow problems, and a general feeling of trepidation towards other stakeholders (Ahmed et al., 2002). Although this problem is not unique to developing countries; it is also experienced in most developed economies (Kaliba et al. 2009).

## EMPIRICAL STUDIES ON PROJECT CONTROLS PRACTICES

Sohail and Baldwin (2004) observed that construction professionals seem to pay more attention to cost performance of projects than time performance. According to a survey research by Yakubu and Sun(2010) in the United Kingdom, only 58% of respondents always apply time controls to their project, a further 29% indicated that they frequently apply time control techniques, and 11% respondents indicate that they rarely or do not apply time control during their projects.

Table 1: Techniques used for project planning and time control

Techniques	Contractors	Consultants
Gantt Bar Chart:	35%	33%
Critical Path Networks/Method (CPM):	28%	34%
Milestone Date Programming Technique:	17%	17%
Program Evaluation and Review Technique (PERT):	10%	9%
Elemental Trend Analysis/Line of Balance (LOB):	5%	2%
Precedence Network Diagram (PND):	2%	2%
Simulation:	1%	3%

Source: Yakubu and Sun (2010)

Table 2: Software packages used for project planning and time control

Software	Contractors	Consultants
Microsoft Project	35%	57%
Asta Power Project	44%	19%
Primavera	15%	19%
Project Commander	4%	5%
Delttek Open Plan	2%	-

Source: Yakubu and Sun (2010)

In Table 1, the most popular time planning and control technique is Gantt Bar Chart, which was used by 35% of contractors and 33% consultants. This is closely followed by critical path method (CPM) used by 28% contractors and 34% consultants. The use of software support is wide spread. In the study, the three leading applications were Microsoft Project, Asta Power Project and Primavera (Yakubu and Ming, 2010).

Unlike time control techniques where two methods were found to be dominant, cost control techniques are more diverse. Several techniques, such as project cost-value reconciliation, overall profit and loss, profit and loss at valuation dates, unit costing and earned value analysis, have some degrees of usage. However, none can be regarded as the overwhelming choice. Similarly, the use of support software is also more varied (Yakubu and Ming, 2010). The table below illustrates different techniques used to control project cost.

Table 3: Techniques used for project cost control

Techniques	Contractors	Consultants
Project Cost-Value Reconciliation	22%	20%
Overall profit or Loss	15%	16%
Profit or loss on each contract at valuation dates	17%	10%
Labour/Plant/Material (actual versus forecast reconciliation)	18%	11%
Unit Costing	8%	13%
Standard Costing	6%	14%
Earned Value Analysis	7%	11%
Program Evaluation and Review Technique (PERT/COST)	7%	4%
Leading Parameter Method	-	1%

Source: Yakubu and Sun (2010)

Table 4: Software packages used for project cost control

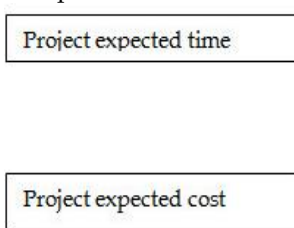
Techniques	Contractors	Consultants
Bespoke/in-house Systems	29%	38%
Microsoft Project	20%	32%
Project Costing System (PCS)	15%	11%
Asta Power Project	15%	5%
Primavera Sure Trak	8%	5%
Microsoft Excel	7%	3%
COINS	5%	3%
WinQS	-	3%

Source: Yakubu and Sun (2010)

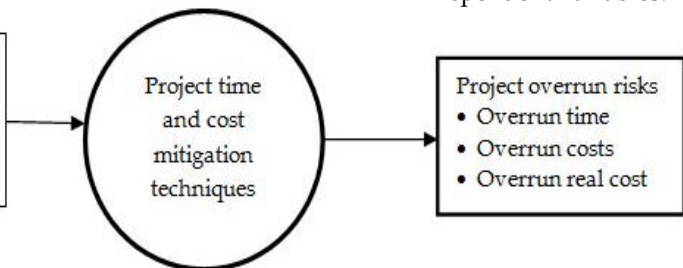
In Table 4, it is apparent that both control techniques; software and non-software, their utilization rates vary, and interestingly their rate of utilization varies among different project stakeholders. In the above case, it is between consultants and contractors. It is therefore certain that variation in the rates of cause affect project delays and cost overruns. Thus any change in the monitoring, control system and project stakeholders may deliver different project delays and cost overruns information.

**Conceptualization of the study**

Independent variables:



Dependent variables:



Source: Researchers, (2013)

**METHODOLOGY**

The study used a descriptive survey design. This involved collecting data from construction project contractors, consultants or officers during the period starting from 2009 till 2012 in Gasabo, a district in Kigali, Rwanda. A descriptive study is one in which information is collected without changing the environment (i.e., nothing is manipulated). Sometimes these are referred to as “correlational” or “observational” studies.

**Target population and sample selection**

The target population of the study consisted of a total number of 42 construction project managers, consultants or implementers during the period starting from 2009 till end 2012. Gasabo district was selected as an area of study because it currently has recorded the highest number of construction projects, and the most populated District in both Kigali city and Rwanda in general (National Institute of Statistics, 2012).

For the sake of a representative sample, simple random sampling was used. For each construction project implemented in Gasabo district during the period 2009-2012, random sampling was used to select managers, consultants or project implementers.

Slovin's formula;  $n = N / (1 + Ne^2)$ , where  $n$  is the sample size,  $N$  is the research population and  $e$  is the sampling error that must be insignificant ( $= < 0.05$ ) (Adanza, 1995) was used in determining sample size. As the proposed  $N$  was 42 respondents,  $e = < 0.05$ , and the sample size ( $n$ ) was  $\{42 / [1 + 42 * (0.05)^2]\}$ ; respondents were 38.

Calculation of the sample size using Slovin's formula:

$$n = N / (1 + Ne^2) \text{ where } N = 42, \text{ and } e = < 0.05$$

$$\{42 / [1 + 42 * (0.05)^2]\}$$

$$42 / 1 + 42 * (0.0025)$$

$$42 / 1 + 0.105$$

$$42 / 1.105$$

$$38 \text{ samples}$$

To collect data, a questionnaire, and documentary reviews were used in the course of data collection. In order to insure the acquisition of accurate information, questionnaires were distributed to 38 respondents. The questionnaire contained both closed and open ended questions. Each questionnaire had 22 questions.

Further, the District budget, procurement plan, projects plans, and procurement reports for the period were consulted. Further district budgets for the period; 2009 Mini budget, 2009-2010, 2010-2011, and 2011-2012, 4 relative procurements plans, their corresponding 4 procurement reports, 18 project studies, and 38 project reports were equally consulted.

## Data analysis methods

Average completion times in percentage were computed for each individual project. Average level of both project delays and cost overruns were also computed. Scatter charts were generated to compare both projects' delays and cost overruns. To examine the actual effect of project time overrun on project delay, regression analysis was used to extract a systemic relationship between both parameters. Further, to assess construction projects' expected time in view of resources, projects' expected costs and real costs, to calculate both projects' delay and cost overruns, and to identify the relationship between public construction project delay and cost overruns for public construction projects in Gasabo District, results were presented in tables illustrating both expected time and cost of construction projects as provided by 38 respondents. Overall delays were calculated in terms of time, amount for cost and of percentage for both.

## RESULTS

### Characteristics of respondents

This includes gender of respondents, categories of respondents depending on whether they were contractors, consultants, or District officers in charge, category of respondents depending on project's budget year.

Referring to figure 1, the study observed that there were more males than females. 90% of respondents were males, whereas only 10% were females.

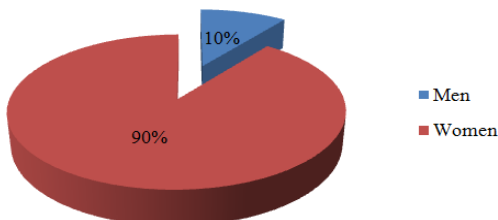


Figure 1: Respondent's gender (Source: Primary data, 2013)



The study established that project officers and contractor were mostly available during data collection. Figure 2 demonstrates that among the respondents, 66% were district officers who were in charge of projects, 34% were contractors. It should be noted that there were no project consultants interviewed.

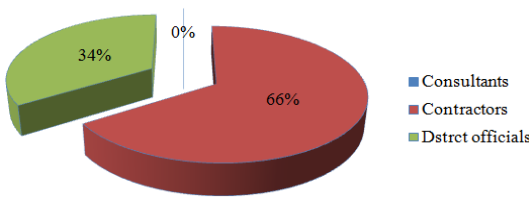


Figure 2: Category of respondents (Source: Primary data, 2013)

Table 5: Respondents per budget year

Budget years	Number of respondents	Percent
2009	1	3%
2009-2010	9	24%
2010-2011	15	39%
2011-2012	13	34%
Total	38	100

### Relationship between project expected time and overrun costs

The study observed that as construction projects took long to be executed, they required more time and incurred more costs. Figure 3 relates project periods with expected public construction project costs, whereas figure 4 relates project periods with real public construction project costs.

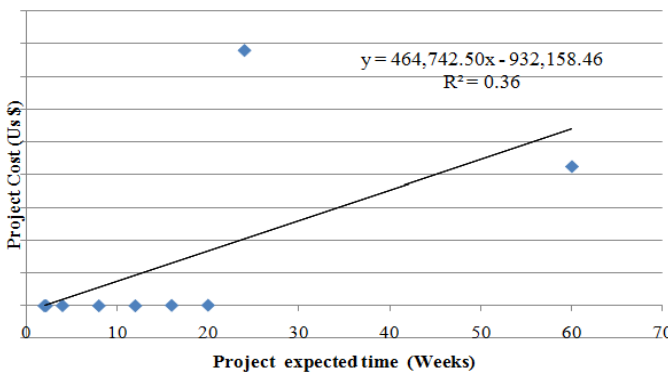


Figure 3: Relation between project periods with expected public construction project costs (Source: Primary data, 2013)

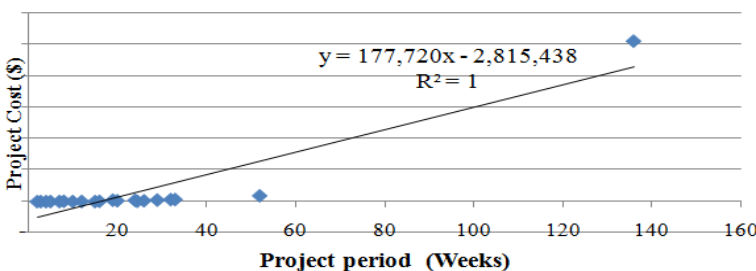


Figure 4: Relation between project periods with real public construction project costs (Source: Primary data, 2013).

### Assessment of project expected cost and real cost

In figure 5, results reveal that as project expected cost increased, their real cost increased proportionally with expected cost.

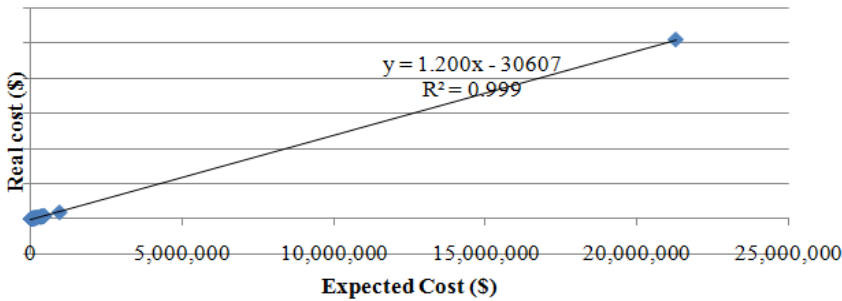


Figure 5: Correlating project expected cost with real cost (Source: Primary data, 2013)

### Calculation of both project’s delay, and cost overruns

In the study, it was observed that among 38 construction projects in Gasabo District, 25 were delayed by a total of 292 weeks. Two projects had cost overruns of 4,257,023\$, which consists of 5.2% of the overall cost of project implemented during the period starting from 2009-2012. As mentioned in figure 6, the study observed that project delays are almost insignificant with  $r=0.001$ . Analysis of causes behind resulted into the fact that all studied construction projects were offered to contractors through a Rwanda Public Tender Process (RPTP) that generally consider a potential contractor as the one with the lowest cost among bidders when acceptable administrative qualities are met. Article 43 of law no 16 of the 22/04/2013 modifying article 74 of law no 12/2007 of the 27/03/2007 on public procurement in the Republic of Rwanda orders to start of a new tender once the case appear at 20%. Hence, the mitigation technique prevents contractors from going back into the bidding process.

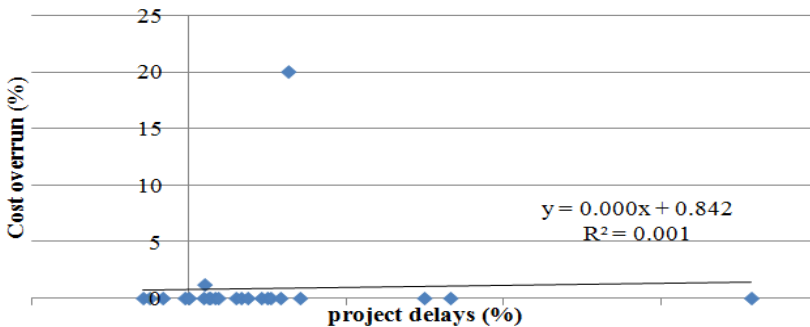


Figure 6 relationship between Project delays and cost overrun time (Source: Primary data, 2013)

### Relationship between public construction project delay and cost overruns

In figure 6, although results indicate low level of delay (insignificant) that could have resulted from strict adherence to public project procurement procedure, the figure still demonstrates a slight increase in project delay that directly corresponds to an increase in cost overrun.

### Major causes of project’s delay and cost overrun

The study identified some important information on number causes of delays and cost overruns. The study revealed that over 25 (65.7%) of implemented projects delayed. Among these delays, 11 were cause by delayed payments, 9 were due financial deficiencies on the part of the client or contractor, 4 were caused by material procurement, whereas the remaining 1 was caused by poor supervision. Cost overruns on the other side were all due to changes in

design drawings. Figure 7 presents the different factors that cause delay.

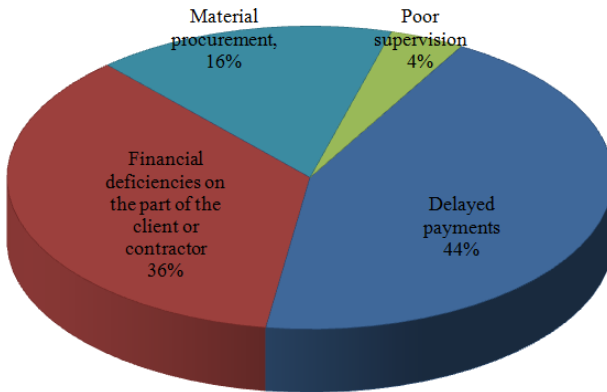


Figure 7: Causes of time overruns

Regarding cost overruns, the study observed that the 2 projects which suffered from cost overrun were affected by financial deficiencies either on the part of the client or contractor.

**Major mitigation techniques used against delays and cost overruns**

In the study, it was observed that different techniques were used to monitor project time. Among the 38 surveyed projects, (100%) utilized Gantt's Charts techniques. Table 6 shows how 22 respondents believed that the methods used to control cost overruns were inefficient, 9 classified the method as efficient, and 7 considered the method as very efficient. Respondents justified their choice of the monitoring technique as follows; 17 believed that it was the best, 11 had no other choice, 6 believed it was easy and quick to use whereas 4 had found it affordable.

Table 6: Performance of Gantt Chart technique as time overrun mitigation tool

Gantt chart performance	Frequency	Percent
Excellent	-	0
Very efficient	7	18.4
Efficient	9	23.7
Poorly efficient	22	57.9
Worst efficient	-	0

(Source: Primary data, 2013).

**Most used software against delays and cost overruns**

Regarding software utilization during project time control, the study observed that 31 of the 38 respondent used MS Excel when monitoring projects period, whereas the remaining 7 respondent use Primavera. The survey revealed that among the 31 respondents that utilized MS Excel 29 (93.5%) over 2 found it poorly efficient, and the rest believed the software was efficient. Among the 7 respondents utilizing primavera 6 of them found it very efficient as the remaining respondent qualified it as efficient.

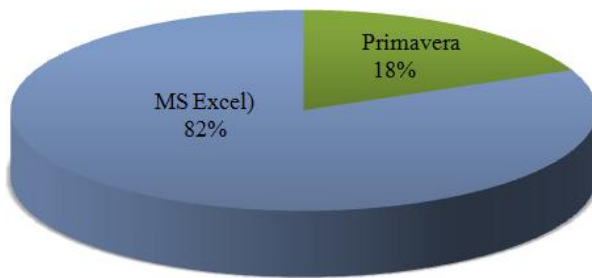


Figure 8: Most utilized time overrun monitoring software (Source: Primary data, 2013).

Figure 8 shows that MS Excel was ranked high in usage during monitoring of project cost (100%). 34 respondents represented by 89.4% considered MS Excel efficient whereas the remaining 10.6% did find the software as not efficient. Of the 38 respondents who applied MS Excel 27 (71%) were not aware of alternative whereas 29% utilized it because it was affordable.

## SUMMARY OF MAJOR FINDINGS

The study revealed that 65.7% of public construction projects implemented during the period 2009-2012 delayed at 58% of their cumulative expected period, whereas only 5.2% of these projects suffered from cost overruns of 15.9% of total project value. A linear relationship between expected time and project costs expected or planned cost and real cost, projects delay and cost overruns as described in figure 5 were observed. The above findings are discussed in view of delayed payments, financial deficiencies for both the contractors and the client, and material procurement (96%) as some of the major causes of public project delays, and where change in the drawing design was the main cause for cost overrun. The study also established that both project delays and cost overruns status, occurred when Gantt's chart was utilized to monitor and mitigate project delays. Meanwhile, profit or loss on each contract at valuation date was utilized and considered by all users as very efficient. Finally, concerning the application of information technologies to reduce project delays and cost overruns, the study found that 81.5% program managers and implementers utilized Excel program during project time monitoring against 17.5% who used primavera software, whereas MS excel was utilized by all during cost control and monitoring.

## CONCLUSION

When project costs are efficiently monitored, other conditions kept constant, as construction project periods increase, a proportionate increase in their costs or value is recorded. In addition, when construction projects' expected or planned cost is increased, a simultaneous increase in their relative real cost must take place. However, though monitoring can efficiently reduce the project's cost overruns, the longer construction projects delay become the higher cost overruns.

## RECOMMENDATIONS

- It is worth encouraging the use of mitigation techniques for both project cost overrun and project delays' in all organization in order to efficiently monitor both of them, and hence improve time and cost planning efficiency.
- These mitigation techniques should not just be utilized as formalities, their choice must take place on the basis of their efficiency in dealing with both construction project time and cost.
- Other managerial and administrative techniques need to be instituted. Practices such as sight visits, internal controls and strict project progress reports need to be implemented. This will provide the necessary early warning to create adjustments in speed, resource use and quick adjustments in schedules.

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