
# DETERMINANTS OF TIMELY COMPLETION OF ROAD CONSTRUCTION PROJECTS IN KAKAMEGA COUNTY, KENYA

**Onenga, L. M., Miroga, J. & Otinga, H. N.**

The Strategic JOURNAL of Business & Change MANAGEMENT
ISSN: 2312-9492 www.strategicjournals.com
*Vol. 7, Iss. 2, pp 311 – 326 June 3, 2020. www.strategicjournals.com, ©Strategic Journals*

# DETERMINANTS OF TIMELY COMPLETION OF ROAD CONSTRUCTION PROJECTS IN KAKAMEGA COUNTY, KENYA

**Onenga, L. M.,[1] Miroga, J.[2] & Otinga, H. N.[3]**
[1]MSc. Candidate, Jomo Kenyatta University of Agriculture & Technology [JKUAT], Kenya
[2]Ph.D, Lecturer, Jomo Kenyatta University of Agriculture & Technology [JKUAT], Kenya
[3]Ph.D, Lecturer, Kenyatta University of Agriculture & Technology [JKUAT], Kenya

**Accepted: May 31, 2020**

**ABSTRACT**
*This study investigated the influence of project manager's competency, project cost overruns, project financing structure and project lead time on timely completion of county road construction projects in Kakamega County, Kenya. The study was based on descriptive research design and targets prequalified contractors in Kakamega County, county public works officers Employees in Kakamega County, Transport and Infrastructure department, Contractors' technical staff, Government civil engineers from National Construction authority, Kakamega region, who were stratified and selected by simple random sampling technique. Data was collected using structured questionnaires and analyzed using SPSS version 24, where descriptive and inferential statistics was computed. Both descriptive and inferential statistics showed that all of the study's conceptualized independent variables (project manager's competency, project financing structure, project cost overruns, project lead time) significantly influenced timely completion of county road construction projects in Kakamega County (dependent variable). The study concluded that one; competencies of a project manager such as client's managerial capability, professional/work experience in road construction projects, manager's technical competency significantly influence timely completion of road construction projects. Secondly, a well stipulated and authorized project financing structure can really boost timely completion of road construction projects; and three; effective management of project cost overruns in terms of good construction site management and quality material supplies/control can significantly influence timely completion of road construction projects. The study recommended that one; road construction companies must employ competent and experienced project managers to enhance timely completion of road construction projects; two, to effectively manage project cost overruns, project managers must ensure there is secure construction site management and quality material supplies/controls to guarantee timely completion of road construction projects; and lastly, to effectively control long project lead time construction project managers must ensure high construction material delivery rates, short duration of critical paths, shortened time frame for delivery of orders, rectifications, payments or claims so as to enhances timely completion of road construction projects.*

*Key Words: Manager's Competency, Project Cost Overruns, Financing Structure, Lead Time*

**CITATION:** Onenga, L. M., Miroga, J. & Otinga, H. N. (2020). Determinants of timely completion of road construction projects in Kakamega County, Kenya. *The Strategic Journal of Business & Change Management*, 7(2), 311 – 326.

## INTRODUCTION

Timely performance of road construction projects is related to many topics and factors such as time, cost, quality, client satisfaction; productivity and safety. That is, most road construction projects suffer from delays due to contractor or client related reasons. Kerzner (2016) asserted that time management for schedule performance of a project can be expensive, fraught with pressures, and subject to much uncertainty. Some key factors having an influence on successful project delivery include the use of overly complex scheduling specifications, construction brokering by the contractor, errors and omissions, differing site conditions, user changes, and inadequate time extensions. These can be compounded by reservation of rights for delay, cumulative impacts, and ignoring possible completion date waivers.

Many construction projects in both developed and developing countries suffer from schedule performance due to many contributing factors. For example construction industry in the Gaza Strip suffered from many problems and complex issues in performance. That is, construction of 14 dwelling units at Rafah Area suffered from poor schedule performance because of delay for about 110 days. There were many realistic reasons such as closures, amendment of drawings and amendment of the design. In addition, there are other different reasons affecting construction projects performance in the Gaza strip such as poor management and leadership; inappropriate participants; poor relations and coordination; absence of motivation, control, monitor or decision making systems; inadequate infrastructure, political problems; cultural problems and economic conditions (UNRWA, 2010). In the past years, Kenya has stepped up investment in road infrastructure. This is in clear recognition that no economy has ever taken off with a tattered road infrastructure. Undoubtedly, this has cost the Kenya government millions and tremendously contributed to the ballooning of the national debt. Most of the so-called cowboy contractors have been kicked out of the business either through lack of political connections, natural attrition or through the dominance of Chinese contractors who come with financial backing from their government. As a result, the standards and speed of construction have improved considerably and the country is enjoying better standards of road construction especially the highways but rural road construction by local contractors has experienced very poor schedule performance (Kenya Engineer Magazine, 2016).

More so, schedule performance of construction projects in Kenya is increasingly becoming an issue of concern among the stakeholders in the construction industry. The most important factor influencing schedule performance of construction projects in Kenya is financing by the contractor, during the project, changes in designs by the owner or his agent during the construction, delays in contractor's payment and non-utilization of professional construction management. In addition, preparation and approvals of shop drawings also contribute to the delays to a significant extent (Project, 2017). Road construction workers in Kenya are perceived to be relatively unskilled and lack of adequate planning at the early stages of the road projects resulting in time and cost overruns., thus both the national and county governments prefer Chinese contractors who plan on how to 'train' the Kenyan labor force on Chinese road construction methods and possibly improve on road construction technology.

### Statement of the problem

Timely completion of road construction projects is fundamental if the project objectives and success is to be achieved within the stipulated cost, time, scope and quality. However, many construction projects are notorious for failing to complete in time due to cost and time overruns saddled with scope creep and poor communication protocols (Guerin, 2012).

In this regard, road construction projects' timely completion has recently attracted serious attention from researchers, financing clientele, practitioners in the construction industry, and road users. According to Kagiri and Wainaina (2016), major projects in the devolved units in Kenya have failed or taken long than they could do because of both the internal and external factors in the counties

Further, road construction projects in all the 47 counties has never been a success to a tune of 55% due to various prevailing constraints like lack of sufficient projects finances, politicization of development projects, insecurity in some counties, poor state of enabling infrastructure, poor technology and low levels of community participation. KNBS (2018) report indicated that more than 70.0% of projects in Kakamega County are not timely completed as expected due to client related obstacles, material unavailability, poor infrastructure, natural calamities, financial inadequacy and poor management abilities. In Kakamega County for example, the road terminal joining Kisumu was carpeted with Ksh.110 million that came from the revenue of about 4.1billion that was collected by the Kakamega county government but took too long to be completed among other county roads (World Bank, 2017).

Many researchers Cheung *et al*. (2014) identified construction project performance categories such as people, cost, time, quality, safety and health, environment, client satisfaction and communication without qualifying their assertion with empirical backing.

Therefore, lack of empirical evidence on what really determines timely completion of county road construction projects motivated this study to investigate if competencies of a project manager, project cost overruns, project financing structure and project lead time influences timely completion of county road construction projects in Kakamega County, Kenya.

**Objectives of the study**

The general objective of this study is to investigate determinants of timely completion of county road construction projects in Kakamega County, Kenya. The specific objectives were;

- To examine the influence competencies of a project manager on timely completion of county road construction projects in Kakamega County, Kenya.
- To examine the influence of project financing structure on timely completion of county road construction projects in Kakamega County, Kenya.
- To evaluate the influence of project cost overruns county on timely completion of county road construction projects in Kakamega County, Kenya.
- To assess the influence of project lead time on timely completion of county road construction projects in Kakamega County, Kenya.

The study was guided by the following hypotheses;

- **$H_{01}$:** There is no significant relationship between competencies of a project manager and timely completion of county road construction projects in Kakamega County, Kenya.
- **$H_{02}$**: There is no significant relationship between project financing structure and timely completion of county road construction projects in Kakamega County, Kenya.
- **$H_{03}$**: There is no significant relationship between project cost overruns and timely completion of county road construction projects in Kakamega County, Kenya.
- **$H_{04}$**: There is no significant relationship between project lead time and timely completion of county road construction projects in Kakamega County, Kenya.

## LITERATURE REVIEW

### Theory of constraints


The Strategic Journal of Business & Change Management. **ISSN** 2312-9492 (Online) 2414-8970 (Print). www.strategicjournals.com

The theory of constraints (TOC) is an overall management philosophy introduced by Eliyahu M. Goldratt in his 1984 book titled The Goal that is geared to help organizations continually achieve their goals. Goldratt adapted the concept to project management with his book Critical Chain, published in 1997 (Eliyahu &Goldratt, 2004).

The underlying premise of the theory of constraints is that organizations can be measured and controlled by variations on three measures: throughput, operational expense, and inventory. Inventory is all the money that the system has invested in purchasing things which it intends to sell. Operational expense is all the money the system spends in order to turn inventory into throughput. Throughput is the rate at which the system generates money through sales (Eliyahu & Goldratt, 2004).

**Theory of controlling**

The proponents of the theory of controlling were Koskela and Howell (2002). The core process of controlling is divided into two sub-processes: performance reporting and overall change control. Based on the former, corrections are prescribed for the executing processes, and based on the latter, changes are prescribed for the planning processes. Here only performance reporting is considered, based on performance baseline and associated corrections to execution. It clearly corresponds to the cybernetic model of management control (thermostat model) that consists of the following elements: there is a standard of performance; performance is measured at the output (or input); and the possible variance between the standard and the measured value is used for correcting the process so that the standard can be reached.

**Stakeholder theory**

The stakeholder theory, according to Phillips, Freeman and Wicks (2003), is a theory of organizational management and ethics. Managing for stakeholders involves attention to more than simply maximizing shareholder wealth. Attention to the interests and well-being of those who can assist or hinder the achievement of the organization's objectives is the central admonition of the theory.

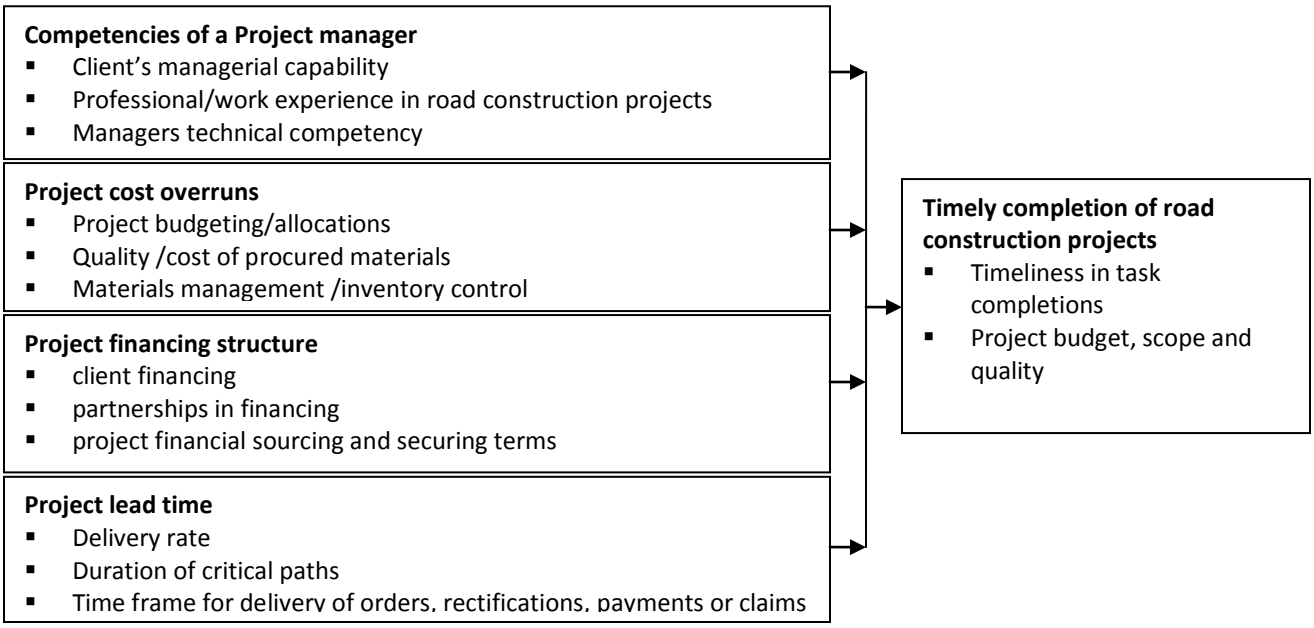


**Figure 1: Conceptual Framework**


The Strategic Journal of Business & Change Management. **ISSN** 2312-9492 (Online) 2414-8970 (Print). www.strategicjournals.com

**Empirical Review**

In a study conducted by Assaf *et al*. (2014) it was found that difficulty in coordination between the parties is one of the factors that contribute to project completion delay. That is, coordination problems due to incompetencies of a project manager may cause project delays. In a road construction project, there are many parties involved such as a contractor, consultant, sub-contractor and client. Often, it may be difficult for these various separate parties to coordinate well in order to complete the project.

Ali *et al*. (2008) found that that lack of coordination between contractors and subcontractors will lead to delay, for example in the situation that newly revised contractions drawings of a project may be issued later by the contractors to the subcontractors. This leads to construction mistakes and the work requiring to be redone. Reconstruction work takes additional time, therefore impacting upon the completion time of the project, which may question competency of the overall project manager.

Kanda, Muchelule and Mamadi (2016) study in Kakamega County found that there was a positive, but weak correlation among client related financing factors such as financial capacity, owner financial interference and poor decision making. Contractor related factors had a strong positive correlation with timely project completion, thus, the study recommended a well-defined project financing structure that can boost timely project completion.

Gwadoya (2001) found that financial resources for construction projects should be estimated realistically at the time of planning for the project. While it is critical to plan for project execution together, resources for each function should be separate. In practice, each project should have two separate budget lines for example the project and for its monitoring and evaluation agreed in advance with partners. But interestingly, the researcher found that sourcing and securing financial resources for construction project can pose completion challenges.

Lenin, Krishmaraj, Prasad and Kumar (2014) carried out a study on improper material management affecting cost in construction projects in India. Findings revealed that the top five major causes of cost overruns were: design issues, market condition, store issues, contractor issues, and external issues. Inventory control is important in ensuring that the right quantities of materials are on site at any given time that managing cost overruns which normally affect timely completion of construction projects.

Oglesby *et al*. (2009) found that although at times poor costing or cost overshoots affect road construction timely completion, that is, the shoddy construction most often than not occurs in road projects where reputable donors have no oversight over cost overruns.

Madhavi, Mathew and Sasidharan (2013) carried out a study on how material management in construction in India affected project lead time. Findings revealed that material management can be improved by the use of the following: purchase requisition slip, tender quotation form, radio frequency identification, and personal digital assistant so as to avoid task completion parameter in project lead time which consequently can have a bearing on construction project completion.

Chan and Kumaraswamy (2012) study reported that construction time which some practitioners in the construction industry call project lead time is increasingly becoming important because it often serves as a crucial benchmarking for assessing the performance of a construction project and the efficiency of the project completion within the stipulate time.

Patil and Pataskar (2015) studied on the efficient procurement of materials as a key role in managing project lead time. Findings revealed that the main

causes of material and equipment procurement delay were organizational weaknesses, suppliers' defaults, governmental regulations, and transportation delays. Among materials, delays in the supply of aggregates were found to occur most frequently while delays associated with pavers occurred most frequently among equipment. The study concluded that inefficient procurement of project materials impacted negatively on project lead time which then had an effect on timely completion of construction projects.

## METHODOLOGY

This study utilized descriptive survey design. The target populations (those cases that contained the desired information) were prequalified contractors in Kakamega County Technical staff, county public works officers, Employees from County Transport and Infrastructure department, Government road engineers from National Construction authority (NCA), Kakamega. The study used structured (close ended) questionnaire to get uniform responses from respondents. The quantitative data collected was analyzed by Statistical Package for Social Sciences (SPSS) version 24 where descriptive and inferential statistics was computed.

## FINDINGS

These are descriptive statistics showing frequencies and percentages in brackets, means and standard deviations based on summarized responses on each statement measured on likert scale and arranged in table form according to each study variable.

### Project manager's competency and timely project completion

These are summarized descriptive statistics on respondents' perceptions of how project manager's competency influences timely completion of county road construction projects in Kakamega County, Kenya. The summarized descriptive statistics were shown in table 1.

**Table 1: Descriptive statistics; Project Managers competency**

| Statement | 5 | 4 | 3 | 2 | 1 | Mean | Std.dev |
|---|---|---|---|---|---|---|---|
| 1. Client's managerial capability influences road construction timely completion | 10(12.0) | 43(51.9) | 10(12.0) | 18(21.7) | 2(2.4) | 3.54 | 0.788 |
| 2. Project manager's professional expertise in in road construction project influence road construction timely completion | 11(13.3) | 41(49.4) | 5(6.0) | 21(25.3) | 5(6.0) | 3.45 | 0.912 |
| 3. Project manager's work experience in road construction projects influences road construction timely completion | 9(10.8) | 45(54.3) | 9(10.8) | 17(20.5) | 3(3.6) | 3.58 | 0.934 |
| 4. Project managers technical competency influences road construction timely completion | 7(8.4) | 44(53.1) | 7(8.4) | 19(22.9) | 6(7.2) | 3.51 | 0.916 |
| 5. Generally, project manager's competency influences road construction timely completion | 8(9.6) | 42(50.7) | 7(8.4) | 22(26.5) | 4(4.8) | 3.47 | 0.841 |
| **Valid list wise=83** | | | | | | | |
| **Grand mean 3.51** | | | | | | | |


The Strategic Journal of Business & Change Management. **ISSN** 2312-9492 (Online) 2414-8970 (Print). www.strategicjournals.com

From table 1, most respondents agreed (51.9%) that client's managerial capability influences road construction timely completion; which was reinforced by 49.4% of respondents who agreed that project manager's professional expertise in in road construction project influence road construction timely completion. This implies that incompetent project managers can possibly have a negative effect on timely completion of road construction projects.

More so, 54.3% of respondents agreed that project manager's work experience in road construction projects influences road construction timely completion and a further 53.1% of respondents agreed that project manager's technical competency influences road construction timely completion. This means that possibly experienced and technically competent project managers can really boost timely completion of road construction projects.

Further, 50.7% and 9.6% of respondents agreed that generally, project manager's competency influences road construction timely completion. This is supported by Brown and Adams (2016) who studied a new approach to the measurement of the effect of Building Project Management on time, cost and quality outputs using 15 `cases' derived from UK data. The evaluation undertaken demonstrated that Building Project Management as it is presently implemented in the UK fails to perform as expected in relation to the three predominant performance evaluation criteria; time, cost and quality, thus recommended construction firms to outsource very competent project managers.

**Project financing structure and timely project completion**

These are summarized descriptive statistics on respondents' perceptions of how project financing structure influences timely completion of county road construction projects in Kakamega County, Kenya. The summarized descriptive statistics were shown in table 2.

**Table 2: Descriptive statistics; Project financing structure**

| Statement | 5 | 4 | 3 | 2 | 1 | Mean | Std.dev |
|---|---|---|---|---|---|---|---|
| 1. Client financing influences road construction timely completion | 9(10.8) | 46(55.5) | 6(7.2) | 17(20.5) | 5(6.0) | 3.81 | 0.727 |
| 2. Partnerships in financing of road construction project influences road construction timely completion | 8(9.6) | 44(53.1) | 8(9.6) | 20(24.1) | 3(3.6) | 3.86 | 0.724 |
| 3. Varied financial sourcing for road project influences road construction timely completion | 10(12.0) | 45(54.3) | 5(6.0) | 18(21.7) | 5(6.0) | 3.62 | 0.717 |
| 4.Financial sourcing and partnership terms and conditions influences road construction timely completion | 12(14.5) | 43(51.8) | 5(6.0) | 19(22.9) | 4(4.8) | 3.53 | 0.742 |
| 5.Generally, project financing structure influences road construction timely completion | 11(13.3) | 41(49.4) | 7(8.4) | 21(25.3) | 3(3.6) | 3.42 | 0.777 |
| **Valid list wise=83** | | | | | | | |
| **Grand mean 3.648** | | | | | | | |

From table 2, most respondents agreed (55.5%) and strongly agreed (10.8%) that client financing influences road construction timely completion, meaning that poor client financing will delay


The Strategic Journal of Business & Change Management. **ISSN** 2312-9492 (Online) 2414-8970 (Print). www.strategicjournals.com

completion of a given road construction project. More so 53.1% and 9.6% of respondents agreed and strongly agreed respectively that partnerships in financing of road construction project influences road construction timely completion; that is, poor financing partnership may possibly delay road construction timely completion.

In terms of varied financing sources, 54.3% of respondents agreed that varied financial sourcing for road project influences road construction timely completion, while a further 51.8% and 14.5% of respondents agreed and strongly agreed respectively that financial sourcing and partnership terms and conditions influences road construction timely completion.

In summary, most respondents agreed (49.4%) and strongly agreed (13.3%) that generally, project financing structure influences road construction timely completion. This is supported by Gwadoya (2001) who found that financial resources for construction projects should be estimated realistically at the time of planning for the construction project.

That is, while it is critical to plan for project execution together, resources for each function should be separate. In practice, each project should have separate but defined budget lines for example the project and for its monitoring and evaluation agreed in advance with funding partners. The researcher found that sourcing and securing financial resources for construction project can pose construction project completion challenges which can be addressed early enough through a well understood and validated project financing structure.

**Project cost overruns and timely project completion**

These were summarized descriptive statistics on respondents' perceptions of how project cost overruns influences timely completion of county road construction projects in Kakamega County, Kenya. The summarized descriptive statistics were shown in table 3.

**Table 3: Descriptive statistics; Project cost overruns**

| Statement | 5 | 4 | 3 | 2 | 1 | Mean | Std.dev |
|---|---|---|---|---|---|---|---|
| 1. Project budgeting/allocations for road projects influence road construction timely completion | 9(10.8) | 43(51.9) | 5(6.0) | 21(25.3) | 5(6.0) | 3.77 | 0.862 |
| 2. Quality and cost of procured materials influence on road construction timely completion | 12(14.5) | 44(53.0) | 7(8.4) | 18(21.7) | 2(2.4) | 3.42 | 0.747 |
| 3.General inventory control has an effect on road construction timely completion | 11(13.3) | 42(50.6) | 6(7.2) | 20(24.1) | 4(4.8) | 3.39 | 0.917 |
| 4. Material management at construction sites influences road construction timely completion | 8(9.6) | 45(54.3) | 7(8.4) | 17(20.5) | 6(7.2) | 3.37 | 0.867 |
| 5.Generally, project cost overruns influences road construction timely completion | 10(12.0) | 41(49.5) | 8(9.6) | 19(22.9) | 5(6.0) | 3.53 | 0.985 |
| **Valid list wise=83** | | | | | | | |
| **Grand mean 3.496** | | | | | | | |

From table 3, most respondents agreed (51.9%) and strongly agreed (10.8%) that project budgeting and or allocations for road projects influence road construction timely completion, implying that low budget allocation may possibly delay project completion time. More so, 53.0% and 14.5% of


The Strategic Journal of Business & Change Management. **ISSN** 2312-9492 (Online) 2414-8970 (Print). www.strategicjournals.com

respondents agreed and strongly agreed respectively that quality and cost of procured materials influence on road construction timely completion, implying that poor quality materials may require frequent reordering and resupplies that may delay project completion time.

In terms of inventory control, most respondents agreed (50.6%) and strongly agreed (13.3%) that general inventory control has an effect on road construction timely completion, that is, poor inventory management will negatively affect quality and quantity of construction material which definitely will affect time taken to complete road construction.

More so, 54.3% and 9.6% of respondents agreed and strongly agreed that material management at construction sites influences road construction timely completion, thus, poor material managers by material engineers will impact negatively on timely completion of road construction projects.

Lastly, 49.5% and 12.0% of respondents agreed and strongly agreed respectively that generally, project cost overruns influences road construction timely completion. This is supported by Lenin,et al., (2014) who carried out a study on improper material management affecting cost in construction projects in India. Findings revealed that the top five major causes of cost overruns were: design issues, market condition, store issues, contractor issues, and external issues. Inventory control is therefore important in ensuring that the right quantities of materials are on site at any given time thus managing cost overruns which normally affect timely completion of construction projects.

**Project lead time and timely project completion**

These are summarized descriptive statistics on respondents' perceptions of how project lead time influences timely completion of county road construction projects in Kakamega County, Kenya. The summarized descriptive statistics are shown in table 4.

**Table 4: Descriptive statistics; Project lead time**

| Statement | 5 | 4 | 3 | 2 | 1 | Mean | Std.dev |
|---|---|---|---|---|---|---|---|
| 1.Task completion time influences road construction timely completion | 10(12.0) | 45(54.3) | 7(8.4) | 17(20.5) | 4(4.8) | 3.57 | 0.867 |
| 2.availability of resources as planned through project duration affects road construction timely completion | 11(13.3) | 43(51.8) | 8(9.6) | 18(21.7) | 3(3.6) | 3.46 | 0.628 |
| 3.Average delays because of closures and material shortage has a bearing road construction timely completion | 12(14.5) | 44(53.0) | 4(4.8) | 19(22.9) | 4(4.8) | 3.43 | 0.735 |
| 4. Time frame for delivery of orders, rectifications, payments/claims has an influence on road construction timely completion | 9(10.8) | 41(49.5) | 6(7.2) | 22(26.5) | 5(6.0) | 3.45 | .0797 |
| 5.Site preparation and planned time for road construction has a bearing on road construction timely completion | 8(9.6) | 42(50.7) | 7(8.4) | 20(24.1) | 6(7.2) | 3.48 | 0.733 |
| **Valid list wise=83** | | | | | | | |
| **Grand mean 3.478** | | | | | | | |

From table 4, most respondents agreed (54.3%) and strongly greed (12.0%) that task completion time influences road construction timely completion, thus long task completion time will delay project completion time. More so, 51.8% and 13.3% agreed and strongly agreed that availability of resources as


The Strategic Journal of Business & Change Management. **ISSN** 2312-9492 (Online) 2414-8970 (Print). www.strategicjournals.com

planned through project duration affects road construction timely completion, thus delayed supply of project resources may negatively affect timely completion of road construction projects.

Further, 53.0% and 14.5% of respondents agreed and strongly agreed respectively that average delays because of closures and material shortage has a bearing road construction timely completion; while a further, 49.5% and 10.8% agreed and strongly agreed respectively that time frame for delivery of orders, rectifications, payments/claims has an influence on road construction timely completion. This implies that average delays and time frame for project material procurement and supplies really affect timely completion of road construction projects.

Finally, 50.7% and 9.6% of respondents agreed and strongly agreed respectively that site preparation and planned time for road construction has a bearing on road construction timely completion. This is supported by Jeffrey (2011) study of 247 residential buildings in Australia which reported that about 70 per cent of construction sites reported some form of theft, significant enough to delay construction speed. A thriving black market for stolen construction materials exacerbated the situation, which negatively affected project average lead time, and its consequent impact on timely completion of road construction projects.

**Inferential statistics**

**Table 5: Correlations**

| | | Project managers Competency | Project Financing Structure | Project Cost Overruns | Project Lead Time | Timely completion of road projects |
|---|---|---|---|---|---|---|
| Project managers competency | Pearson Correlation | 1 | | | | |
| | Sig. (2-tailed) | | | | | |
| | N | 83 | | | | |
| Project Financing Structure | Pearson Correlation | .579** | 1 | | | |
| | Sig. (2-tailed) | .000 | | | | |
| | N | 83 | 83 | | | |
| Project Cost Overruns | Pearson Correlation | .559** | .595** | 1 | | |
| | Sig. (2-tailed) | .000 | .000 | | | |
| | N | 83 | 83 | 83 | | |
| Project Lead Time | Pearson Correlation | .553** | .566** | .583** | 1 | |
| | Sig. (2-tailed) | .000 | .000 | .000 | | |
| | N | 83 | 83 | 83 | 83 | |
| Timely completion of road projects | Pearson Correlation | .822** | .796** | .853** | .801** | 1 |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | |
| | N | 83 | 83 | 83 | 83 | 83 |

**. Correlation is significant at the 0.01 level (2-tailed).

**Multiple Regression Analysis**

Multiple regression analysis was computed after assumptions of multiple regression models were tested and met. The results in table 6 showed an R square of 0.872, thus we inferred that the study model explained 87.2% of the variations in the timely completion of county road construction projects in Kakamega while other factors not in this study model accounted for 12.8%, thus, it was a good study model.

Further, ANOVA results in table 6 also showed that the F-statistical value was significant (F=133.376, *significant* at *p<.001*), thus confirming the fitness of the model. That is, from the study model, the significant F value showed that the four independent variables (project manager's competency, project financing structure, project cost overruns, project lead time) were indeed different from each other and that they affect the dependent variable (timely completion of county road construction projects in Kakamega) in varied ways.

**Table 6: Multiple regression analysis**

**Model Summary**

| | | | | | Change Statistics | | | |
|---|---|---|---|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .934[a] | .872 | .866 | .47623 | .872 | 133.376 | 4 | 78 | .000 |

**ANOVA[b]**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 120.995 | 4 | 30.249 | 133.376 | .000[a] |
| | Residual | 17.690 | 78 | .227 | | |
| | Total | 138.685 | 82 | | | |

a. Predictors: (Constant), Project Lead Time, Project Financing Structure, Project Managers Competency, Project Cost Overruns

b. Dependent Variable: Timely completion of road projects

Finally, from the values of unstandardized regression coefficients with standard errors in parenthesis in table 7, all the independent variables (project manager's competency; β = 0.458 (0.062) at *p<0.05*; project financing structure; β = 0.230 (0.066) at *p<0.05;* project cost overruns; β = 0.473 (0.114) at *p<0.05,* project lead time*; β = 0.354 (0.146) at p<0.05;* were significant predictors of timely completion of county road construction projects in Kakamega (dependent variable).

Therefore, the final multiple regression equation for overall significant multiple influence of the study's independent variables (project manager's competency, project financing structure, project cost overruns, project lead time) on timely completion of county road construction projects in Kakamega (dependent variable) was;

$$y = 0.333 + 0.458X_1 + 0.230X_2 + 0.473X_3 + 0.354X_4$$

Where;

y= timely completion of county road construction projects in Kakamega

$X_1$= project manager's competency

$X_2$= project financing structure

$X_3$= project cost overruns

$X_4$= project lead time



The Strategic Journal of Business & Change Management. **ISSN** 2312-9492 (Online) 2414-8970 (Print). www.strategicjournals.com

**Table 7: Coefficients**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | .333 | .084 | .347 | 3.968 | .000 |
| | Project Managers Competency | .458 | .062 | .468 | 7.453 | .000 |
| | Project Financing Structure | .230 | .066 | .239 | 3.483 | .001 |
| | Project Cost Overruns | .473 | .114 | .449 | 4.162 | .000 |
| | Project Lead Time | .354 | .146 | .336 | 2.419 | .018 |

a. Dependent Variable: Timely completion of road projects

**Hypothesis testing**

**First, null Hypothesis) $H_{01}$:** There is no significant relationship between competencies of project manager and timely completion of county road construction projects in Kakamega County, Kenya. **Alternative Hypothesis) $H_{A1}$:** There is significant relationship between competencies of a project manager and timely completion of county road construction projects in Kakamega County, Kenya. Results; project manager's competency; β = 0.458 (0.062) *significant at p<0.05*. ***Verdict;*** we rejected the null hypothesis (**$H_{01}$**) and accepted the alternative hypothesis (**$H_{A1}$**) that there is significant relationship between competencies of a project manager and timely completion of county road construction projects in Kakamega County, Kenya.

**Second, null Hypothesis) $H_{02}$:** There is no significant relationship between project financing structure and timely completion of county road construction projects in Kakamega County, Kenya. **Alternative Hypothesis) $H_{A2}$:** There is significant relationship between project financing structure and timely completion of county road construction projects in Kakamega County, Kenya. **Results;** project financing structure; β = 0.230 (0.066) *significant at p<0.05*. ***Verdict;*** we rejected the null hypothesis (**$H_{02}$**) and accepted the alternative hypothesis (**$H_{A2}$**) that there is significant relationship between project financing structure and timely completion of county road construction projects in Kakamega County, Kenya.

**Third, null Hypothesis) $H_{03}$:** There is no significant relationship between project cost overruns and timely completion of county road construction projects in Kakamega County, Kenya. **Alternative Hypothesis) $H_{A3}$:** There is significant relationship between project cost overruns and timely completion of county road construction projects in Kakamega County, Kenya. **Results;** project cost overruns; β = 0.473 (0.114) *significant at p<0.05*. ***Verdict;*** we rejected the null hypothesis (**$H_{03}$**) and accepted the alternative hypothesis (**$H_{A3}$**) that there is significant relationship between project cost overruns and timely completion of county road construction projects in Kakamega County, Kenya.

**Fourth, null Hypothesis) $H_{04}$:** There is no significant relationship between project lead time and timely completion of county road construction projects in Kakamega County, Kenya. **Alternative Hypothesis) $H_{A4}$:** There is significant relationship between project lead time and timely completion of county road construction projects in Kakamega County, Kenya. **Results;** project lead time; β = 0.354 (0.146) *significant at p<0.05*. ***Verdict;*** we rejected the null hypothesis (**$H_{04}$**) and accepted the alternative hypothesis (**$H_{A4}$**) that there is significant relationship between project lead time and timely completion of

county road construction projects in Kakamega County, Kenya.

## CONCLUSIONS AND RECOMMENDATIONS

First, the study concluded that competencies of a project manager such as client's managerial capability, professional/work experience in road construction projects, manager's technical competency significantly influence timely completion of road construction projects. Secondly, a well stipulated and authorized project financing structure can really boost timely completion of road construction projects. Thirdly, effective management of project cost overruns in terms of good construction site management and quality material supplies/control can significantly influence timely completion of road construction projects. Fourthly, effective management of project lead time parameters such as delivery rates, duration of critical paths, time frame for delivery of orders, rectifications, payments or claims can significantly influence timely completion of road construction projects.

First, the study recommended that road construction companies must employ competent and experienced project managers to enhance timely completion of road construction projects. Secondly, road construction project funders must craft a well-defined project financing structure that enhances timely completion of road construction projects. Thirdly, to effectively manage project cost overruns, project managers must ensure there is secure construction site management and quality material supplies/controls to guarantee timely completion of road construction projects. Lastly, to effectively control long project lead time construction project managers must ensure high construction material delivery rates, short duration of critical paths, shortened time frame for delivery of orders, rectifications, payments or claims so as to enhances timely completion of road construction projects.

### Areas for further studies

A similar study can be replicated to assess the perceptions of user satisfaction of county road construction projects. Secondly a comparative study can be done on various counties to compare determinants of timely completion of road construction projects in the targeted counties.

## REFERENCES


Adenuga, O. A. (2013). Factors affecting quality in the delivery of public housing projects in Lagos State, Nigeria. *International Journal of Engineering and Technology*, *3*(3), 332-344.

Aichouni, M., Ait Messaoudene, N., Al-Ghonamy, A., & Touahmia, M. (2014). An empirical study of quality management systems in the Saudi construction industry. *International Journal of Construction Management*, *14*(3), 181-190.

Ali, A, Alinatwe, M., & Alimanzur, K (2008). An Assessment of clients' performance in having an efficient building process in Uganda; *Journal of Civil Engineering and Management,* 14(2), 593-599.

Ameh, P. and Osegbo, T. (2011). Significant factors causing delay of building construction projects in Malaysia, *Engineering Construction and Architecture Management 14*(2), 192-206.

and cost overruns in power projects in Kenya: A case study of Kenya Electricity Generating Company Ltd. *International Journal of Project Management*, 31(9), 7-15

Arditi, D. & Mochtar, K. (2016). Trends in productivity improvement in the US construction industry, *Construction Management and Economics, 18*(1), 15-27.

Arditi, P., & Mochtar, O. (2016). Identification of critical factors affecting construction labor productivity in india using AHP. *International Journal of Engineering and Advanced Technology*, *5*(6), 212-220.

Asante, S. K. B. (2016). *Implementing the New Partnership for Africa's Development (NEPAD): challenges and the path to progress*. Ghana Academy of Arts and Sciences.

Assaf, S.A. & Al-Hejji, S. (2014). Causes of Delay in Large Construction Projects. *International journal of project management*, *24*(4), 349-357.

Austen, U., Furneaux, C. W., Brown, K. A., & Gudmundsson, A. (2008, November). Engineering asset procurement: operationalising complex adaptive system theory. In *2008 First International Conference on Infrastructure Systems and Services: Building Networks for a Brighter Future (INFRA)* (pp. 1-6). IEEE.

Axon, N. (2013). Sources of risk and uncertainty in UK smart grid deployment: An expert stakeholder analysis. *Energy*, 161(4), 1-9.

Brown, A. & Adams, J. (2016), Measuring the effect of project management on construction outputs: a new approach, *International Journal of Project Management,* 35(1), 56-62

Brown, S., Venkatesh, V., & Bala, H. (2013). Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems. *MIS quarterly*, 21-54.

Chan D. & Kumaraswamy, M. M. (2012). Compressing construction durations: lessons learned from Hong Kong building projects, *International Journal of Project Management,* 40(4), 30-35

Chan, O, & Kumaraswamy. F. (2012). Critical analysis of partnering research trend in construction journals. *Journal of management in engineering*, *28*(2), 82-95.

Cheung, S. O., Suen, H. C., & Cheung, K. K. (2004). PPMS: a web-based construction project performance monitoring system. *Automation in construction*, *13*(3), 361-376.

Chinyio, E., & Olomolaiye, P. (2010). Introducing stakeholder management. *Construction stakeholder management*, 5(5),1-12.

Cooper, R., & Schindler, P., S. (2010). *Business Research Methods*. Oxford university press.

Eliyahu, P., &Goldratt, O. (2004). *Critical chain: A business novel*. Routledge.

Enshassi, A., Mohamed, S. &Abushan, S. (2009). Factors Affecting the Performance of Construction Projects in the Gaza Strip. *Journal of Civil Engineering and Management, 15*(3), 269-280.

Fugar, F. D., & Agyakwah-Baah, A. B. (2010). Delays in building construction projects in Ghana. *Construction Economics and Building*, *10*(1-2), 103-116.

Fugar, F.D.K. & Agyakwah-Baah, A.B. (2010). Delays in building construction projects in Ghana, *Australasian Journal of Construction Economics and Buildings10* (1/2):103-116.

Gemuenden, H. G., & Lechler, T. (2015). Success factors of project management: the critical few-an empirical investigation. In *Innovation in Technology Management. The Key to Global Leadership. PICMET'97* (pp. 375-377). IEEE.

Ghattas, R. T. (2018). *Stakeholder Perceptions of How to Diminish Cost Overruns in Large, United States Government-Financed Construction Projects Under Earned Value Management: A Multiple Case Study* (Doctoral dissertation, Northcentral University).

Guerin, P. (2012). *Current risk management applications in Turkish construction industry*, an unpublished Master thesis, Gaziantep University, Gaziantep.

Gwadoya. J. (2001). Factors influencing timely completion of community initiated tea buying centres construction projects in Kisii County, Kenya. *Unpublished MA Project, University of Nairobi*.

Jeffrey, M. (2011). An Analysis of the extent and nature of thefts of equipment within the construction industry report No 1 MEL ref 2001-002 prepared for the Civil Contractors Federation-NDW OAMPS Insurance Brokers Ltd Hire and Rental Industry Association. *Journal of Project Management. 24* (4),349-57.

Gituro, W., & Mwawasi, S. (2017). Time and cost overruns in road construction projects in Kenya under Kenya National Highways Authority. *ORSEA Journal*, *6*(1), 56-64

Kaming, P.F; Olomolaiye, P.O. Holt, G.D & Harris, F.C. (2009) Factors Influencing Construction Time and Cost Overruns on High-Rise Projects in Indonesia. *Construction Management and Economics, 15*, 83-94.

Kanda, E., Muchelule, Y., & Mamadi, S. (2016). Factors Influencing Completion of Water Projects in Kakamega County, Kenya.

Keng, T. (2011). Study of quality management in construction projects. *Chinese Business Review*, *10*(7).

Kerzner, G. (2016). *Managing Aviation Projects from Concept to Completion*. Routledge.

Koskela, L., & Howell, G. (2002, August). The theory of project management: Explanation to novel methods. In *Proceedings IGLC* (Vol. 10, No. 1, pp. 1-11).

Kothari, S. P. (2007). Econometrics of event studies. In *Handbook of empirical corporate finance* (pp. 3-36). Elsevier.

Lenin, P., Krishnaraj, L., Prasad, D. N., & Kumar, V. P. (2014). Analysis of Improper Material Management Affecting Cost in Construction Projects. *International Journal for Research in Applied Science and Engineering Technology*, *2*(5), 2321-9653.

Levy, S. M. (2007) *Japanese Construction: An American Perspective*. Van Nostrand Reinhold, New York.

Ling, F. Y. Y., Low, S. P., Wang, S. Q., & Lim, H. H. (2009). Key project management practices affecting Singaporean firms' project performance in China. *International Journal of Project Management*, *27*(1), 59-71.

Madhavi, T. P., Mathew, S. V., & Sasidharan, R. (2013). Material management in construction–a case study. *International journal of research in engineering and technology*, *2*(13), 400-403.

Mane, M. P. N., Gupta, A. K., & Desai, D. B. A Review Paper on Onsite Material Management for Construction Projects.

Melton, J. (2008). *Construction delays: Understanding them clearly, analyzing them correctly*. Butterworth-Heinemann.

Mugenda, O. M., & Mugenda, M. AG (2003). *Research Methods: Quantitative and Qualitative Approaches, Nairobi: African Centre Technology Studies press (ACTS)*.

Nakitare, A. B. (2016). Factors Influencing Completion of Construction Projects Funded by Constituency Development Fund (CDF) In Secondary Schools: The Case of Kwanza Constituency-Trans Nzoia County, Kenya. *Journal of International Development* 21(6): 781-786

Nakitare, S. (2016). The impact of cost sharing on internal efficiency of public institutions. *Educational Research Review 4*(5), 272-284.

Oglesby, C.H., Parker, H. W. & Howell, G. A. (2009). *Productivity Improvement in Construction*. McGraw-Hill, New York.

Patil, O., and Pataskar, P. (2015)). Factors affecting material management on construction site. *International Research Journal of Engineering and Technology*, *4*(1), 474-478.

Phillips, R., Freeman, R. E., & Wicks, A. C. (2003). What stakeholder theory is not. *Business ethics quarterly*, *13*(4), 479-502.

Project, M. I. (2017). *Guide to the project management body of knowledge: Pmbok guide*. S.l.: Project Management Inst.

Saunders, M., Lewis, P., & Thornhill, A. D. R. I. A. N. (2007). Research methods. *Business Students 4th edition Pearson Education Limited, England*.

Schwable, L. (2009). Causes of delay and cost overruns in construction of groundwater projects in a developing country; Ghana as a case study. *International Journal of project management*, *21*(5), 321-326.

Smith, T., & Walmsley, Y. (2009)). A sectoral review of risks associated with major infrastructure projects. *International Journal of Project Management*, *17*(2), 77-87.

Takim, R. (2009). The management of stakeholders' needs and expectations in the development of construction project in Malaysia. *Modern Applied Science*, *3*(5), 167-175.

Talukhaba, A. (1999). An investigation into factors causing project delays in Kenya: A case study of high rise building projects in Kenya, *Unpublished Ph.D thesis University of Nairobi.*

UNDP (2014). *Handbook on Monitoring and Evaluation for Results*. New York: UNDP.

UNRWA, (2010). *Projects completion reports*, UNRWA, Gaza.

World Bank, (2017). Devolution Without Disruption—Pathways to a Successful New Kenya. Nairobi*: World Bank.*

Zeb, A., Malik, S., Nauman, S., Hanif, H., & Amin, O. S. (2015, June). Factors affecting material procurement, supply and management in building projects of Pakistan: a contractor's perspective. In *International Conference on Innovations in Civil and Structural Engineering Held in Istanbul, Turkey*.