

Influence of Project Management Practice on Performance of Public Housing Projects in Rwanda

Harouna Nshimiyimana, Abednego O. Gwaya, Titus Kivaa

Abstract: *Project management is a kind of innovative practice that aims at achieving specified objectives through efficient use of resources. Considering the alarming number of failed construction projects around the world, the purpose of this study was to investigate the influence of project management practice on performance of public housing projects in Rwanda. The Government institution named Rwanda Housing Authority (RHA) has been mandated to manage all public housing projects, thus this study focuses on projects under this organization's management. This study used both a descriptive cross-sectional survey research design and the correlational research design, with a target population of fifty-seven (57) employees of RHA who are directly deployed under the department in charge of construction project management with further reference made to their job profiles. Data were collected using questionnaires upon questionnaire filtering approach, and the data analysis was done using Microsoft Excel and is presented using tables, and regression equations. This study findings revealed that respondents have knowledge on project management practice and its paramount importance on projects performance.*

Keywords: *Project Management Practice, Public Housing Projects, Project Performance.*

I. INTRODUCTION

A. Overview

All over the world, projects are initiated, designed and implemented through contracts bidding clients, consultants and contractors aiming to achieve specific goals mostly in line with economic development, human welfare improvement, investments, environmental protection, etc. Project management has a wide scope, but special attention and care are always put on execution of projects through contract management practice. Construction projects being those consuming huge budgets with very complex execution procedures are also prone to jeopardy.

As a matter of fact, Clough and Sears (2000) carried out a study which discovered that the construction business possesses the second highest failure rate of any business, exceeded by restaurants [1].

Project Management and administration involves making decisions and the timely flow of information and decisions to enable completion of the project as required by the contract documents. This is important to the client, contractor and Consultant not only to determine that the work is proceeding

in conformity with the contract documents, but also because it allows a final opportunity to detect any inaccuracies, ambiguities or inconsistencies in the design [4]. But this may not be applicable to unbendingly designed projects. Rigidly designed construction projects lead to poor performance or worse to total failure.

Although Pinto and Mantel (1990) are of the view that it is difficult to define exactly what constitutes a failed project, the Project Management Book of Knowledge according to Project Management Institute (2004) posits that the success or failure of a project is measured by the difference between what is expected of a project both during and after its completion and the actual observed performance of the project when it is put to use. Project success has been defined as the degree to which goals and objectives of a project are met [5].

This study has been long overdue due to the fact that public projects have been causing losses of billions of francs to the Rwandan Government suspected to be caused by improper project management practices. For instance, a total seventy (70) contracts with a value of 48,605,709,515 Rwandan francs recently failed [3].

Subsequently, upon failure of various government Ministries to execute successfully projects, sometime during the year 2017, among many other resolutions adopted, as a response to the Office of Auditor General's report, the Government of Rwanda opted to withdraw all building projects from Ministries and transfer them to Rwanda Housing Authority (RHA) expecting better results. Among transferred project we count construction of referral, provincial and District hospitals and construction of education facilities withdrawn from both the Ministry of Health and the Ministry of Education. Obviously, there are still some rooms for improvement especially on contract management practice to meet the Cabinet expectations within Rwanda Housing Authority. There are still some failures even though the institution was praised to be the most suitable entity by the National Leadership Retreat to help the nation to achieve the so desired performance of construction projects and expected output [7].

On the other hand, failure to respond to environmental forces can also affect the suitability of the output the project hopes to produce [2]. However, the advantage of contractual flexibility has been largely overshadowed by reports emphasizing that poor performance of the industry can be linked, either directly or indirectly, to contract management practices which lead to delays and mismanagement of variations [3]. Likewise, project measures, such as plans, processes, organizations,

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contracts management and information systems, should be ideally those that can function either in expected conditions or to changed conditions if we take into consideration all changing parameters of the industry.

This research helps the trusted institution to master the art of construction project management practice through figuring out required adjustments for enhancement when it comes to handling each phase or stage of construction contracts execution. This research also comes up with a list of tools that can contribute to contract management and point out other research areas that may be of a paramount importance for Rwanda Housing Authority overall performance.

B. Problem Statement of the Research

Two decades ago, Rwanda was facing many problems related to contract management of public construction projects. In 1997, the Government established a centralized public institution known as National Tender Board (NTB) with the aim of overcoming the rising procurement and projects management issues. At the beginning, this institution was given the responsibilities of undertaking the procurement processes, monitoring different projects implementation and handling contracts management issues [10].

However, though all procurement of projects were given to the NTB, the rest of projects activities or phases were given to Ministries and other implementing entities. But, with this approach in place, it was impossible to avoid the blame game issue in case of project failure. Thereafter, the Government decentralized procurement to ensure that a given project is managed by same entity from initiation to its closure. Nonetheless, it was not yet established in the Rwandan context whether or not effective project management practice of construction projects automatically leads to satisfactory performance of public construction projects.

This makes it rational for this research to investigate the influence of project management practice on project performance in public institution. As a matter of fact, East Africa governments have lost hundreds of millions of tax-payers' money through cancellation of contracts, unfinished projects, poor service or product delivery, litigations, corruptions and extended contract periods in the last eight years without major improvement [11]. Rwanda is not immunized against this failure. For instance, costs incurred due to cancellation of contracts, or unfinished projects have been left unexplained by many public institutions when summoned by the Parliament. Furthermore, the procuring entities still face the problem of explaining the reasons of their request for additional contracts to be able to pay the contractors for the unplanned additional works locally known as addendum. In most cases chief budget managers say that they came across unusual circumstances which couldn't be anticipated yet corruption perception index reports show that poor contract practices give huge room for corruption. The reasons for this failure are still unknown; hence, this research intends to investigate those reasons with a limited scope on project management practice herein equivalent to project implementation.

In the above context, this research was proposed to explore the relationship between project management practice and public housing projects performance in Rwanda bearing in

mind that this study's findings can also be applied abroad.

II. LITERATURE REVIEW

The term Contract Management refers to the procedures that allow a Contracting Authority to verify that the Contractor is executing the Project in accordance with the terms of the Contract, providing the services/ supplying the products or constructing the public works that have been set forth by the Tender documents, at the time and in the quantity defined in the Contract but also with the quality and the cost that have also been defined in it. According to Chiappori and Salanie (2003) as cited by Salim (2013) the underlying principle of the principal-agency theory is that there should be a clear understanding of the needs of the principal and ability of the agent to meet these needs competently. Principal must closely monitor agents' performance; create reward structures that reinforce desired performance. Indeed, when procurement contract is well defined and planned, the principal and agents find it easy to meet needs of each other in an efficient way resulting into timely execution of the contract [13].

In case of this study, contract management practice is equivalent to project implementation or execution. When project management team roles and responsibilities and Key Performance Indicators are well defined, the principal and agents will find it easy to meet needs of each other in an efficient way resulting into timely execution of the contract in predetermined performance level. Moreover, the Principle-Agency theory is concerned with the conflicting goals between the principal and agent in obtaining their respective objectives and is focused on mechanisms related to obtaining information. Thus, all contract management issues (contract planning, contract pricing, contract award, contract structure, cost reimbursement, contracts administration, contract centralization or decentralization, level and type of surveillance) have their basis in agency theory and the principal-agent problem [14].

A. Project Management practice

A contract is the foundation of the establishment and maintenance of a favorable relationship between the contractor and contracting authority. It also forms a basis for the acceptance of the project deliverables hence ensuring the achievement of value for money. If a contract fails to address the relevant issues required in the agreement, such as, word ambiguities, it becomes hard for the contracting company to base a positive working relationship with the contractor [15].

Despite that, certainly there are activities that the contracting company can carry out upon awarding a contract to boost the contractor's performance and subsequently achieve effectiveness during the contract implementation, the major procedures in project management related to execution of all kinds of construction contracts are discussed herein.

B. Negotiate & award contract

Negotiation is about reaching agreement on the essential terms of the contract and the deliverables under the contract.



It can be a form of trading where both parties are seeking something from the other; there is an exchange of offers, concessions and bargaining. For collaborative relationships the focus will be on gaining a win-win solution. For tactical relationships the approach will be more competitive. Once the negotiation has completed key activities include accurately documenting what was agreed upon, debriefing both successful and unsuccessful suppliers, and effectively communicating the outcome to affected stakeholders and the wider market [16].

It is essential to record the exact terms of the negotiated agreement and reflects these in the contract. It is good practice to have an independent officer check and sign the contract. There should be a separation between the person signing the contract and the person who will have day-to-day responsibility for contract management. Most agencies adopt the 'one-up' system, where a manager at the next level up signs the contract [17]. In Rwanda, all relevant constructions works are executed under a supervising firm as obliged by the legal framework. This also allows you to prove transparency and transfer liability in awarding such contracts.

C. Contract monitoring and acceptance management

Contract management starts with contractor monitoring and works acceptance management. This is vital in enabling the contracting organization to ascertain that the contractor is undertaking his or her duties and fulfilling his or her obligations in compliance with the contract provisions. This also allows the contracting organization to pinpoint any issues or problems in advance that could arise and offer timely solutions. Particularly, the outline of contract monitoring and acceptance management includes: monitoring, controlling, and evaluating the contractor's performance; evaluating the quantity and quality of services, works, or products delivered; and identifying and handling risks [9].

D. Variation Handling in Project Management

A variation, sometimes referred to as a variation instruction, variation order or change order, is an alteration to the scope of works in a contract in the form of an addition, substitution or omission from the original scope of works [18].

Almost all projects deviate from the original design, scope and definition. Whether small or large, projects inevitably depart from the original tender design, specifications and drawings prepared by the design team. This can be because of technological advancement, statutory changes or enforcement, change in conditions, geological anomalies, non-availability of specified materials, or simply because of the continued development of the design after the contract has been awarded.

In large civil engineering projects variations can be very significant, whereas on small building contracts they may be relatively minor. Variations may include: Alterations to the design; alterations to quantities; alterations to quality; alterations to working conditions; and alterations to the sequence of work. Variations are an inevitable aspect of every project. Very few projects are completed without any changes being requested or implemented. Unfortunately, the sheer diversity of variations can make it difficult to predict in

advance which issues, if any, might arise during a project's lifespan. Every project is subject to the inevitable fluctuations in unit prices, timetables or last-minute changes from a client. Experienced project managers and contractors will plan to make sure these variations can be accommodated without losing time or money on the job. The most common variations to projects are due to: Client revisions requested during the project; Cost-cutting due to unforeseen financial problems; poorly defined or un-detailed project objectives, scale and scope.

Legislative changes, third-party issues or new demands resulting in replacement of materials or products and changes of schedule resulting from bad weather or inadequate workforce or sub-contractors. The following are tips to handle Project variation in order to keep your projects profitable: Manage expectations and communicate changes; Keep everything documented; Make sure you have a clear financial overview. Therefore, companies need to be far more prudent with their finances and this section considers five ways that variation orders in various projects can be managed: Plan in advance; check the figures as often as possible; monitor sub-contractor behavior; be prepared for late costs and avoid presume variations will deliver a profit.

Variations may be valued by: agreement between the contractor and the client; the cost consultant; a variation quotation prepared by the contractor and accepted by the client or by some other method agreed by the contractor and the client. Valuations of variations are often based on the rates and prices provided by the contractor in their tender, provided the work is of a similar nature and carried out in similar conditions [19].

Moreover, Saxena (2008) also emphasizes that firms that strive for success also ensure that they have a provision for execution of changes. The contracts', specific and general conditions, are set together with other Tender Documents at fairly an early stage of the project. This is imperative because then, possible risks or other issues that may arise next are not relatively different. This is the main reason why contracts should provide for the probability that require change and therefore, they must establish mechanisms and procedures by which the appeals for change will be made, reviewed, and either rejected or accepted. Finally, for contract management to be successful, the parties need to take initiatives and preventive actions.

E. Contract Closure

The final activity of contract management is contract closure. The contract closure is an administrative procedure, which is aimed at consolidating that both parties, Contractor and Contracting Authority, have fulfilled their contractual obligations and there are no unexecuted tasks or other types of pending issues. This entails the control and certification practices that both contracting parties have honored their contractual responsibilities as well as activities involved in evaluating degree of successful contract execution and achievement of expected results [20].

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The project owners should also notify all stakeholders that the contract has been completed; Release the resources (human resources, machinery, equipment, materials and infrastructures) of the Contracting Authority that were utilized in the execution of the contract; Provide the Contractor with a Good Performance Certificate as long as it is requested by him/her; Return to the Contracting Authority of its assets that were made available to the Contractor in the context of execution of the contract and check that these have not suffered damages (Gupta, Karayil and Rajendran, 2008).

F. Problems related to poor contract management

Ineffective contract management has been proven that it may bring about the following: Decisions are not taken at the proper time thus allowing potential risks to appear, the Project implementation described in the contract is underestimated by the contractor both in terms of time and human resources required, leading eventually to deviations from the initial. The Contractor executes the Project based on the understanding that he has formulated himself regarding the contract requirements, without realizing the actual goals and results expected from the execution of the Project planning and possibly to exceeding the initially estimated budget [21].

The Project is implemented at low rate, increasing the possibility for new risks to appear in the implementation of the Project. The handling of problems that arise during the execution of the Contract is not conducted timely and effectively, which usually leads to tension between the Contracting Authority and the Contractor. In addition, communication between the Contracting Authority and Contractor is limited, and this increases the possibility for misunderstandings, misinterpretations and the drawing of incorrect conclusions. Besides, the Contractor's performance is not evaluated throughout the execution of the contract thus not fully or adequately implemented. The payments that are made and the amounts paid do not correspond to the works that have been done [22].

The opportunities to improve value for money are lost, the variations in the contract are not realized in accordance with a specific and agreed fashion. While services and public works are delivered/ accepted without meeting the acceptance criteria that had been set for them [21].

G. Project performance

The project performance is the accomplishment of a given project measured against preset known standards of accuracy, completeness, cost, and speed. In a contract, project performance is deemed to be the fulfillment of an obligation, in a manner that releases the performer from all liabilities under the contract. In fact, projects by their very definition have a start point and an end.

The reason we do projects is to make a difference and usually the difference we're trying to make is to make result, especially in business, better (Costello, 2008). For this research, project performance will be summarized on three dependent following variables:

- Physical/Quality performance
- Financial Performance
- Time Performance

For On-time & On-budget perspective, we compare the

time taken to accomplish the project against the time planned (allowed) and then compare the money spent to accomplish the project versus the planned budget at the beginning. A project that is performed using the allowed budget and allowed time or less is said to be efficient when all the expected outcomes were achieved, and hence its performance is better than a project performed using more budget and time than allowed budget and time, and hence its performance is said to be ineffective. But this only make sense if the project goal did not change during performance [23].

III. MATERIALS AND METHODS

A. Research design

This research used both a descriptive cross-sectional survey research design and the correlational research design. In addition, a correlation research design was employed in order to establish the relationship between project management practice and project performance. Even though this research adopted both quantitative and qualitative approaches, the general nature of this study's aim is to quantify the extent to which project management practice influences performance of public housing projects in Rwanda. Nevertheless, qualitative approach will also be used to seek in-depth information from employees of Rwanda Housing Authority (RHA) via open ended questionnaire.

The researcher was informed that there are only 57 staff in charge of construction project management within the institution though the number was supposed to be 65 but there were still some vacant posts at the time of data collection. Thence, the data collection opted for census sampling upon identification of the 57 staff, top management inclusive.

According to Yin, (2003), evidence for case studies may come from six sources: documents, archival records, interviews, direct observation, participant-observation and physical objects. Data of this research were collected through primary means. Primary data involve information collected by the researcher directly through instruments such as questionnaire and interview guide (Amin, 2005). The primary sources included survey through questionnaires which were administered to respondents.

B. Regression Method

In the analysis of data, the Regression Analysis was used as the statistical procedure to accurately analyze collected data. The analysis was undertaken using Microsoft Excel. Regression analysis is a statistical technique used to describe relationships among variables. The simplest case to examine is one in which a variable Y, referred to as the dependent or target variable, may be related to one variable X, called an independent or explanatory variable, or simply a regressor [25].

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + \epsilon_i$$

where:

Y = Public Project Performance (Dependent variable)
 β_0 = Constant & ϵ_i = Error term
 $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \dots$ = Coefficients



- X1=Contract negotiation and award
- X2=Contract Monitoring and acceptance management
- X3=Variation handling
- X4=Contract Closure

Before estimating the model, a scatter diagram will be drawn, to show if any correlation exists between the variables. The regression results will be evaluated using the standard statistics. The hypotheses will be tested using student t-test (at 5 % significant level or with 95% confidence), to determine whether we should accept or reject the null hypotheses which will be subjected to test. In this way, the research will push for comparison of t-value (critical value) and the computed value.

IV. DATA ANALYSIS AND RESULTS

The study results show that project management practices significantly influence public housing projects in Rwanda.

A. Findings on Respondents

The study sought information on the respondents' education background, age bracket, sex, as well as the number of years the respondents had been working with Rwanda Housing Authority. The information obtained confirmed the suitability of the respondents to answer the questions on project management and performance of public institutions.

B. Findings on Influence of Independent Variables on Dependent Variables

The project performance was evaluated in terms of physical, financial and Time performance considered as dependent variables for this research, whereas the project management practice was divided into four components namely: contract negotiation and award; contract monitoring and acceptance; variations handling and contract closure considered as independent variables. This research evaluated the effect of each of the 4 components of contract management practice on physical, financial and Time performance using a 5-point Likert Scale ranging from 1= Fully-Disagree; 2=Strongly-Disagree; 3=Disagree; 4=Agree; 5=Strongly-Agree.

A standard deviation of less than 0.5 has shown that the answers provided were closer to the mean or homogenous, while the stand value of greater than 0.5 would indicate heterogeneous answers or very different answers to the statements. Descriptive statistics show respondents 'views on each statement reflecting the effect of each component on project performance. Thereafter the regression model was used to conclude data analysis.

C. The effect of contract negotiation and award on project performance

Statistically, the first objective of this study was to describe the extent to which contract negotiation and award affect project performance through assessment of related null and alternative hypotheses. As P (0.0197) is greater than F critical (0.0195), thence the null hypothesis was rejected. The majority of the respondents agreed to the following about influence of contract negotiation and award on Rwanda Housing Authority project performance: Political pressure and availability of required expertise scored 4.65 and 4.32 respectively thus confirming that they affect project

performance. The standard deviation was found to be 0.40 that is smaller than 0.5 and this proves homogeneity of feedback from respondents.

The fitted model from this analysis is shown below:

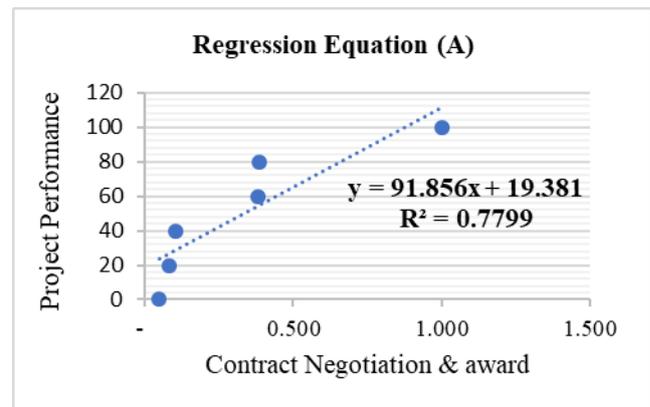


Figure 1: Contract Negotiation and Award Regression

D. The effect of contract monitoring and works acceptance on project performance

The second objective of this study was to describe the extent to which contract monitoring and works acceptance affect project performance through assessment of related null and alternative hypotheses. As P (0.0151) is greater than F critical (0.0141), thence the null hypothesis was rejected. However, this does not necessary lead us to confirming the alternative hypothesis before assessing other statistical parameters as per the best practices. The majority of the respondents agreed to the following about influence of contract monitoring and works acceptance on RHA project performance: Delays affect project performance and Payments affect project performance scored 4.73 and 4.59 respectively. The standard deviation was found to be 0.37 that is smaller than 0.5 and this proves homogeneity of feedback from respondents.

The significance value was at 0.01415 which is less than 0.05. Therefore, the regression model is statistically significant in predicting how contract monitoring and works acceptance influences the performance of public housing projects carried out in Rwanda. Because F computed is 16.6757 which is greater than the F critical, this implies that the whole model was significant.

The coefficients show that contract Monitoring and Works Acceptance (X₂) is significant (with significance level of 2% as the p-value = 0.01969 that is with 95% confidence level in influencing the performance (financial, time and physical performance) of public projects carried out by Rwanda Housing Authority (Y). The fitted model in a format of regression equation displays a positive influence of project management practice on performance of public housing projects. This goes with second alternative hypothesis upon rejection of the null one. Moreover, respondents recommended very serious organization of continuous professional development (CPDs)

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with special focus on construction law and contract monitoring and works acceptance in line with both the approved national standards and in compliance with the legal framework.

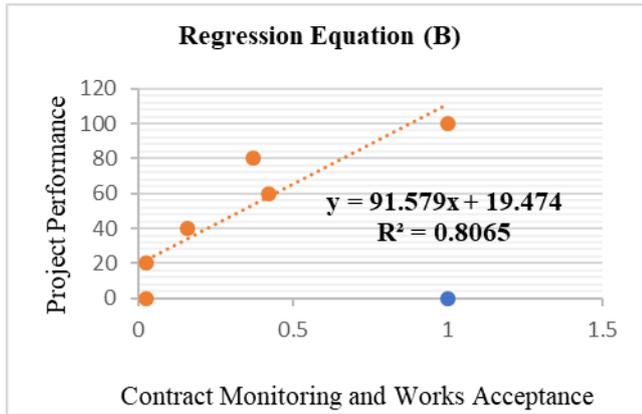


Figure 2: Contract Monitoring and Work Acceptance Regression Equation

E. The effect of contract variations handling on project performance

The third objective of this study was to describe the extent to which Variations Handling affects project performance through assessment of related null and alternative hypotheses. As P (0.07584) is greater than F critical (0.06780), hence the null hypothesis was rejected. However, this does not necessary lead us to confirming the alternative hypothesis before assessing other statistical parameters as per the best practices. Introduction of new items and Change of technology scored 4.65 and 4.67 respectively thus confirming that they affect project performance. The standard deviation was found to be 0.37 that is smaller than 0.5 and this proves homogeneity of feedback from respondents.

The significance value is at 0.006780 that is less than 0.05. Therefore, the regression model is statistically significant in predicting how Variations Handling influences the performance of public housing projects carried out in Rwanda. Because F computed is 24.8246 which is greater than the F critical, this implies that the whole model was significant. This means that the simple linear model with Variations Handling as the only independent variable is significant.

The coefficients show that Variation Handling (X_3) is significant (with significance level of 0.7% as the p-value = 0.007584 that is with 95% confidence level in influencing the performance (financial, physical and time performance) of public projects carried out by Rwanda Housing Authority (Y). The fitted model from this analysis is shown below:

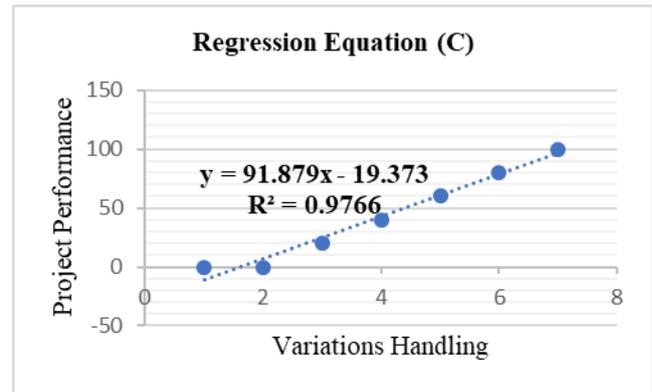


Figure 3: Variations Handling Regression Equation

F. The effect of contract closure/termination on project performance in RHA

The fourth objective of this study was to describe the extent to which contract closure affects project performance through assessment of related null and alternative hypotheses. The standard deviation was found to be 0.47 which is smaller than 0.5 and this proves homogeneity of feedback from respondents. As P (0.0197) is greater than F critical (0.0195), hence the null hypothesis was rejected. However, this does not necessary lead us to confirming the alternative hypothesis before assessing other statistical parameters as per the best practices. The majority of the respondents agreed to the following about influence of contract closure on RHA project performance: Incomplete works and snags scored 4.65 and 3.74 respectively thus confirming that they affect project performance.

The coefficients show that contract closure (X_4) is significant as the p-value = 0.0714 that is with 95% confidence level in influencing the performance (Financial, physical and Time performance) of public projects carried out by Rwanda Housing Authority (Y). The fitted model from this analysis is shown below:

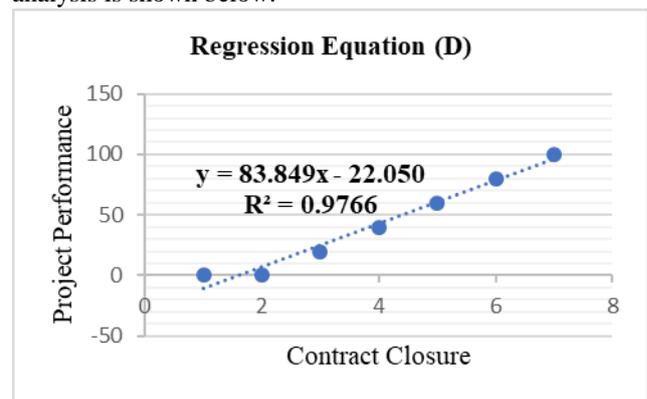


Figure IV.1: Contract Closure Regression Equation

G. Regression Analysis showing combined effect

In addition, the research conducted a multiple regression analysis to test relationship among variables namely contract management practice (independent) on the performance of public housing projects (dependent). The research applied the statistical package offered by Microsoft Excel and computed the measurements of the multiple regressions for the study.



The results in table above the correlation coefficient (R) that is equal to 0.960 implying that there is a strong relationship between contract management processes and public project performance in RHA. The coefficient of determination adjusted R square of 0.801 meaning that only 80.9% of the project financial performance in RHA are explained and determined by contract management practices used in this study namely: contract negotiation and award, contract monitoring and acceptance, variation handling and slightly contract closure. Therefore, this implies that other contract management practices not involved in the study (Managing the contractor relationship, Contract Administration and Dispute Resolution) contribute to 19.1% of the performance of the Rwanda Housing Authority projects when focus is put to execution of projects. Consequently, further study should be carried out to study the remaining contract management practices, which may also affect performance of public projects.

As per the table above, the significance value is at 0.02954 that is less than 0.05. Therefore, the regression model is statistically significant in predicting how contract management practice affects the performance of public projects carried out by Rwanda Housing Authority. Because F computed is 6.0257 which is greater than the F critical, this implies that the whole model was significant.

Table shows the multiple regression that was carried out to establish the existing relationship between performance of public projects and the four components of project management practice. The results show a positive relationship between contract management processes on financial performance as values of all coefficients are positives. If one tries to draw a model of projects performance (Y) it can be written as:

$$Y=24.03+348.13X_1+156.77X_2+274.329X_3+5.06X_4$$

V. CONCLUSIONS

Based on the study findings, the study has been able to achieve the preset objectives and concluded that effective contract management practice positively contributes significantly to public housing project performance at a 5% level of significance and 95% level of confidence.

Moreover, it is clear that there is a positive relationship between effective contract management components (contract negotiation and award, contract monitoring and acceptance, variation handling and contract closure) and financial, time and physical performance. Therefore, based on the study findings for each objective all the research questions were answered, all null hypotheses were rejected. Thus all alternative hypotheses supporting significant influence of proper contract management practice on performance of Public Housing Projects undertaken in Rwanda were confirmed.

In terms of the challenges involved in contract management, the study discovered that most of the respondents strongly agreed that unclear project scope; unrealistic timeline and budgets; and payment delays hampers contract management; statutory amendments; and difficulty in managing data in various locations hinders effective contract management in RHA.

The study also revealed that external factors leading to contract amendments are among others: geological anomalies, non-availability of specified materials; change in the project design after the contract has been awarded; project revisions requested during the project ; cost-cutting due to unforeseen financial problems; poorly defined or un-detailed project objectives, scale and scope; new demands resulting in replacement of materials or products; poor preparation of contract documents that do not properly describe the works actually required; changes of schedule resulting from bad weather or inadequate workforce or sub-contractors; statutory and Legislative changes, technological advancement; alterations to quantities and quality and the alterations to quantities and quality.

Nonetheless, (Zulu, 2007) in his publication on "Impact of Project Management on Project Performance: A Structural Equation Modelling Approach" concludes that an examination of the significance of the relationships suggests that not all postulated relationships were statistically significant. Based on the findings it can be generally concluded that project management variables impacting on project performance can be portrayed as a myriad of causal relationships both directly and indirectly impacting on project performance; this study found that the main stages of project management practice were all significant. However, as suggested by (Zulu, 2007), when broken down, some components in the first and the fourth stages of construction project management practice were found irrelevant to performance of public housing projects.

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