UNIVERSITY of RWANDA

COLLEGE OF SCIENCE AND TECHNOLOGY

SCHOOL OF ENGINEERING

DEPARTMENT OF CIVIL, ENVIRONMENTAL AND GEOMATICS ENGINEERING

EFFECT OF CONTRACT MANAGEMENT ON THE PERFORMANCE OF FEEDER ROADS CONSTRUCTION PROJECTS

RESEARCH REPORT FOR POST GRADUATE STUDIES FOR THE AWARD OF MASTERS OF SCIENCE IN HIGHWAY ENGINEERING AND MANAGEMENT

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October 2020

DECLARATIONS

I declare that this research hereby presented is my authentic work and to the best of my knowledge has never been presented for the award of any degree in any University.

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SUPEVISOR'S APPROVAL

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ABSTRACT

This research whose title is the "Effect of Contract Management on the Performance of Feeder Roads Construction Projects" had the general objective which consisted of assessment of the effects of contracts management issues on the performance of feeder roads construction projects in Rwanda. Contracts management factors which were considered in this research were the financial management and time management issues together with the projects management team characteristics; these factors were considered by this research as the independent variables and the performance of feeder roads construction projects measured in matter of project completion duration, respect of planned budget, quality and durable products, and completion without variation in planned scope was considered as this research's dependent. This research has tried to demonstrate how the contract management issues influence directly the feeder roads construction projects performance. The target population was composed of three groups; the first was composed of staff of feeder roads projects under Rwanda Transport Development Agency (RTDA), the second was composed of personnel of the department of Monitoring and Audit in Rwanda Public Procurement Authority (RPPA) which is a government agency in charge of monitoring contracts management countrywide, and the third group was composed of entrepreneurs operating in feeder roads construction as categorized by RPPA. Specially prepared questionnaire was used as a tool to collect data and statistics software was used for data processing and analysis. After data collection, analysis and discussion of the results, it has been found that the contracts management should be given much importance and attention since it has direct effects on feeder roads projects performance. The management of project's budget coupled with its appropriate disbursement, project's implementation time management and characteristics of the appointed management team were found to be the backbone of the effective and efficient projects contracts management in this research. Referring to the research findings, conclusions and recommendations were formulated.

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LIST OF ABBREVIATIONS AND ACRONYMS

AF	: Additional Financing
FY	: Financial Year
GoR	: Government of Rwanda
MINAGRI	: Ministry of Agriculture and Animal Resources
MININFRA	: Ministry of Infrastructure
NFRPS	: National Feeder Roads Policy and Strategy
RPPA	: Rwanda Public Procurement Authority
RTDA	: Rwanda Transport Development Agency
UC	: Unclassified
US	: United States

CHAPTER ONE: INTRODUCTION

1.1. Background to the Study

Countrywide, whoever has ever worked or has participated in construction projects has noticed that most of projects overrun their planned budget and time. Poor planning, poor management, funds and their disbursement issues, lack of equipment, unskilled personnel, interference within government institutions, dependence on donors and long negotiations in case of scope variation are often cited as causes of poor performance in matter of time, budget and quality of constructed infrastructure. Not only in Rwanda, but also in almost all the countries in the region, the same issues in similar projects are frequent. In a study conducted by David (2015), on Factors that affect completion of projects of roads construction in Nairobi City County considering the case study of Kenya Urban Roads Authority (KURA), his conclusion was that the competency of the project manager, technology used in the project, project financial resources and equipment that is used in project have great influence on the completion of the project of road construction. Project technology being the major contributor of road construction project completion and project funds greatly influencing the road construction project completion.

Another research conducted by Aloysius & Benon, (2017), on Monitoring the Contractor and Performance of Projects of Road Infrastructure in Uganda with a model for management, it was found that there is a need to build strong contract management strategies for effective delivery and performance of road infrastructure. These strategies should focus on the contractor's performance and contract management team or controllers. Hiring skilled staff will enforce the appropriate monitoring of contract practices. During the monitoring of contract some of the management features and applications such as knowledge transfer, policy development, planning, effective communication technique, payments, management of records, contractor assessment, inspections and audits and dispute management should be emphasized. This research concluded that if these contract monitoring features are well applied, there is an increase of chance to get a reliable road infrastructure project that will ascertain a sound business success and effective service delivery.

Project performance can be measured in different angles, such as completion time, respect of budget and scope, stakeholder's satisfaction, quality of deliverables, etc. However, for a project to perform well, a proper management is mandatory, budget and schedule are to be emphasised on by skilled and responsible personnel with the capacity and power of making decisions regarding the project. In a study conducted by Akampurira (2018), on The Effectiveness of Contract

Management on Contractors' Performance, it was found out that contract management has a significant positive effect on contractor's performance and therefore a well-structured contract management plan can enhance contractors' performance. It was also found out that poor performance of contractors has been caused by various factors including lack of capacity and necessary personnel to execute the contract, undefined specifications, scope of works and terms of reference for the required products, works, and services, corruption and conflict of interest and the study also established that poor contractors' performance can be mitigated through ensuring that the right people are put in place to manage the contract, proper supplier selection, ensuring that feedback and communications mechanisms are put in place and mechanisms for managing risks are also established.

Contract management has a significant impact on the project performance, the research conducted by Godfrey (2016), on Contract Management and Performance of Road Maintenance Projects: The Case of Arua Municipality concluded that giving attention to payment mechanism and control of variations to contracts (dimensions of contract administration) would result in significant improvement in the performance of road maintenance projects. The study also found a link between relationship management and performance of road maintenance projects in Arua Municipality. This followed a detailed consideration of various dimensions of relationship management during the study. It can therefore be concluded that addressing constraints of communication channels and dealing emphatically with disputes would result into significant improvement in the performance of road maintenance projects. Following an adequate consideration of various dimensions of contract closure, the study concluded that properly addressing gaps in final inspection, delayed payments and stakeholder involvement would result into significant improvement in the performance of road maintenance projects.

Like all other developing countries, there is an indication that Rwanda is increasing its capital spending, the efficiency of which will be determined by the Government's ability to manage infrastructure spending effectively. In his research Safari E., (2012), he analyzed the causes and impacts of disputes in the Rwanda Road Construction Sector and determining ways of reducing or addressing such disputes. He used to gather the opinion of people with expertise in the domain of his study through interviews and questionnaire, and as a result from his research he found that the ability, to resolve contract disputes quickly and effectively may be the difference between a project that is completed on time and failed capital investment that is completed only after many years of delay. In 2012 Rwanda government projected to work on 430km of road repair, which when no serious attention to all stages of the project preparation and execution, disputes may rise,

leading to failing the projects or causing big losses on citizens' taxes. Therefore, much should be done to combat the arising disputes on any road project so as to be cost effective and reduce losses that may arise from that negligence.

While researching on causes of delay in road construction projects Ibrahim M. et al., (2019), departed on the basic principle that Cost, time, and quality are the commonly known major measurement of project goals achievement. The research also referred to Ahmed et al., (2003), whose research had previously concluded that contractual time overruns in projects of construction are globally experienced. These delays do not come alone, but with additional financial resources. Time overruns affect negatively the clients, contractors, and consultants in terms of heightening in antagonistic correspondences, distrust, litigation, arbitration, cash-flow issues, and a generalized feeling of anxiety toward each other. In results of his research, Ibrahim found that this challenge is not only encountered in developed countries, it is also faced by most of the developing countries. A project cannot be considered as successful until it is implemented within the imposed cost, time, and quality limits. Despite the project stakeholders' awareness of project restrictions, one cannot be surprised to see a project for construction notwithstanding to achieve its goal within those specified restrictions.

Siborurema (2015) conducted a research on the effects of projects funding on their performance in Rwanda where he gathered opinion from different stakeholders involved in the projects funding and the related contracts management and found that the implementation of different public projects used to be delayed and take a long time to be completed than expected and multiple reasons have been behind the experienced extended time. Despite the invested resources and used strategies by the government to tackle the poor management of public projects, several projects in public sector still encounter management related problems. Divergent arguments state that the main cause of projects execution time overruns are due to their inappropriate allocated funds, the capacity and professionalism of regional and local contractors was questioned in some arguments and others have been doubting the trustworthiness of project planning and management team. He concluded that based on the arguments from various people among which public sector agents, entrepreneurs, high level leaders, decision makers, and civil society, where despite diverging arguments the research participants were right as their opinions are interconnected and contribute to the performance of public projects especially viewed in terms of execution duration.

Not only in Rwanda but also in most African countries, the very first origin of issues in construction projects' contracts management which later affect their performance is the

insufficient information on the project, poor estimating and mistakes/exclusions which are interrelated. In a research conducted by Nicholas (2010), where he studied the causes of project overruns within road construction sector in Ghana and he found that there are hurried arrangements for most of the projects due to either political pressure or responsibility to use financial resources which must be spent within a specific period. The preparation of the projects is often inadequately done due to short time given to the Project Manager and his team to come up with the projects package. This practice results in project design flaws and exclusion which are discovered later during the construction and lead to the requirement of additional funds. Furthermore, the projects' package may be well prepared but financial resources may not be timely available. By the date the financial resources are finally availed, it would be too late to intervene. Estimation details are frequently lacking and estimates by similar projects comparison are opted for, whereas they cannot be reliable due to project uniqueness.

According to the report of the Ministry of Agriculture and Animal Resources (2013), on rural feeder roads maintenance implementation framework, the implementation of feeder roads construction projects has been a challenge from their planning to their completion. The clients having different feeder roads that need to be created or rehabilitated within restricted financial resources, prioritization and allocation of the financial resources to different feeder roads construction projects becomes difficult and some projects had to be implemented within several financial years or the contractors needed to have their financial resources to implement them and were paid within several financial years. With frequent feeder roads degradations which require maintenance within a short time after their construction or rehabilitation, the feeder roads construction projects that are implemented in several financial years face the issue of requiring maintenance works at their portions where the construction started whereas the works for the entire projects are not completed yet. This makes it difficult for the clients to hire new contractors for maintenance works whereas the other contractors have not definitively handed over the initial constructed roads, leaving therefore the clients with no other options than waiting for the definitive handover of the constructed roads before immediately hiring contractors for maintenance of the degraded roads even though they are shortly definitively handed over.

In its report for the financial year 2017-2018, Rwanda Transport Development Agency (2018) concluded that the issues of failure of some feeder roads projects can be associated to the geography of Rwanda characterized by hilly landscape especially in western, northern and southern regions which use to have abundant precipitations and where during the rainy season

feeder roads construction becomes difficult due to frequent roads' side banks failure due to landslides and erosions. Associated to these unpredicted events, the scopes of construction works use to change and the entire projects baselines also change. Additional works are generated, in extreme cases scopes are redefined, additional resources are required and projects implementation periods are usually extended. Whatever the changes may be, the worst case is the requirement of additional funds which are normally not available since the clients are not the direct funder of the projects and need to request the additional funds together with no objections on additional contracts from the funder which is normally the government or the donors.

Following the frequent management issues which were arising in feeder roads construction projects, in 2011 the government of Rwanda established the Feeder Roads Development Program in an attempt to overcome the situation. However, during its implementation, coordination issues arisen on who does what amongst the stakeholders? As an intermediary measure, the Ministries of Infrastructure, Agriculture and Animal Resources and Development Partners established a temporary coordination framework while awaiting the Feeder Roads Policy and Strategy to be put in place. According to the Ministry of Infrastructure (2017), while establishing the National Feeder Roads Policy and Strategy, the need of this policy was hinged on the fact that there were: coordination issues during implementation of the Feeder Roads program due to the big number of actors whose roles were not well spelt; initial consideration of linkage of farm to market roads which did not recognize the different portions of road classes traversed to access the targeted markets; no framework for prioritization of investments, maintenance and institutional arrangements; inadequate institutional capacity in decentralized entities; inefficiency in planning, prioritization and collaboration among stakeholders; no sustainable financing mechanism for development and maintenance then for the future expanding network and traffic.

The Ministry of Infrastructure (2017), in the National Feeder Roads Policy and Strategy, stated once again that with the growing crop production, the population of rural areas faced a problem of transportation of their produces to the market, the government realized that the rural feeder roads needed to be increased and the existing needed to be rehabilitated and widened to ease the transportation of crop to the market or transformation factories. Without a policy and regulations governing the rehabilitation and construction of feeder roads, there was an increasing challenge to maintain and protect the assets to ensure a longer life and higher level of service from the investments in rehabilitation. Until now, nationwide, maintenance needs and costs are increasing. There is an urgent need to estimate the average annual maintenance burden and realistic scenarios

about traffic growth, engineering solutions and costs. Finance is the critical gap on the pathway to sustainability of feeder road asset management and maintenance. The financial requirements for construction, rehabilitation and maintenance of the targeted feeder roads go far beyond the current allocated budget from the traditional sources of funding.

Ian (1995) conducted a research on Management and Financing of Roads. He found that part of the causes of roads inappropriate maintenance policies are due to the context within which the roads management is done. Roads projects are often not considered as integral component of market economy and due to that fact their management emphasize is biased. The specific cost of roads is not clarified, roads expenditures are funded from general tax revenues, and roads management body does not apply any tough market discipline. Roads are seen and managed as a service provided to the society. Road users pay user charges and taxes, and the collected funds are mixed with general tax revenues and so managed. Instead of being funded from user charges, roads are funded through allocation of budget which is determined as a component of the annual budgetary process. All these issues lead to the same destination: toward road management body that are not efficient. Few road management bodies in African countries manage financial resources belligerently enough to meet the value for money. Due to the management of roads based on annual budget allocations, the management bodies deliver poor quality services. This is thoroughly explained by the excessive use of force account work, clumsy operation of government plant pools, and inexistent interest in labor-based working techniques. These aspects characterize the management bodies that do not follow any market regulation and have disinterested managers who do not care about accountability for results.

In his research on the effects of risk management at project planning phase on performance of construction projects in Rwanda, Lawrence (2015) concluded that the main source of the disputes in feeder roads construction projects is poor planning for risk management where the authorities in charge of their management act only when problems appear. Furthermore, the planned activities use to be initiated without having sufficient budget as the managers frequently claim to be working under pressure where they are requested to show results within limited budget which is untimely disbursed by the financing agencies and this generates disputes due to delay of payment of contractors' invoices. According to Rwanda Public Procurement Authority's research on monitoring of different public project implementation found that most of public agencies in charge of entering in contract with different contractors do not set an official team for the management of specific projects and this result in poor management of public projects

implementation generating therefore losses of public funds supposed to be efficiently used. Whatever the cause of issues may be, an appropriate planning and contracts management together with an effective communication through recognition of each contracting party's responsibilities can help in handling the most commonly encountered problems.

1.2. Problem Statement

According to the annual report for the Financial Year 2018-2019 by Rwanda Public Procurement Authority (2020), there were many challenges in contracts management, especially for large contracts under which fall the roads construction projects, there had been the change of design due to incomplete designs or client's new requirements, where the different projects' designs were changed during their implementation and resulted in change of scope of works, then leading to the implementation time overrun. The challenges also included the budget constraints faced by the procuring entities where the contracts were signed with the assurance of budget but later the promised budgets were not disbursed on time, this was indicated by the big number of pending invoices and delayed payments which sometimes led to the suspension of contracts implementation. Poor planning and unavailability of supervising firm was also stated among the challenges encountered in contracts management where some procuring entities signed contracts for execution of roads construction works without having a contract with a supervising firm and this led to the delayed commencement of works and planned implementation time overrun. Change of construction site where the contracts were awarded without confirmation of availability of the sites, facts that led to the change of designs and increased the contracts amounts; lack of technical and financial capacity on the side of the contractors which led to the projects implementation delays and delayed expropriation issues where procuring entities signed contracts without completing the expropriation activities were also mentioned among challenges in contracts management.

A study conducted by Ismail (2014), on budget overrun issues in construction projects of southern part of Malaysia, concluded that budget management is a very crucial issue in achieving the project completion within the estimated budget for the undertaken projects. In this research which used descriptive study, the majority of experts that participated in the study confirmed that they faced budget overrun issues either in large or small scale projects, the main cause being the underestimation of projects cost, material cost, construction cost and plant & equipment cost; but

the most crucial cause was found to be the cash flow forecasting, tender budgeting/estimating and elemental cost plan.

In the research conducted by Haroon (2017), on Empirical Evidence of Extension of Time in Construction Projects, it was concluded that estimating realistic projects durations and schedules is extremely important for analyzing delays and tracking progress of construction projects. Reviewing the available resources for construction projects prior to preparation of realistic schedules is very important. Furthermore, it was found that construction planning and schedules are commonly not realistic and completion time for contracts is arbitrary assigned. Moreover, construction schedules are not efficiently tracked and over watched during the project implementation and this leads to the underperformance of the projects. It was concluded that the claims for time extension use to arise due to unrealistic schedules.

Chigara (2013), conducted a study on an analysis of cost management strategies employed by building contractors on projects in Zimbabwe and found that despite the existence of the management strategies applied by the contractors, in most cases the project end with cost and time overrun. It was concluded that this can be inferentially explained by a host of challenges which affect the construction project management practice especially their resources. Several challenges with respect to resources management were related to labor, materials and organizational problems that significantly affect the resources management practice. In an effort to improve the effectiveness of construction project management strategies, the study suggested that attention should be given to the problem areas related to labor, materials and organizational problems through the engagement of experts in resources management personnel or upgrading the ingenuity of the staff through conventional training, refresher courses or participation in seminars and regular review of resources management systems and strategies.

Despite the rules and regulations in place, contractors are recruited for execution of works of roads construction and consultants are hired to supervise the projects implementation. However, during the implementation, problems related to contract management begin to arise, if they are not due to changes in scope of works, they result from delay in payment or decision making. Untimely procurement of construction materials on behalf of the contractor and poor monitoring of critical activities on behalf of supervisors together with inaction of the project administration are commonly met in several roads construction projects. Briefly, the above issues can be grouped into the budget and time management jointly and the management personnel characteristics which are the main components that use to generate disputes in contract management and lead to poor project performance. In most researches conducted in Rwanda or in the region, each component

separately or a combination of two was studied vis à vis the project performance. The effects of these components together on project performance viewed in matter of completion time, respect of budget without deviating from the planned scope are worth to be studied and that is the purpose of this research.

1.3. Objective of the Study

1.3.1. Main objective

This research had as main objective the assessment of the effects of contracts management issues on the performance of feeder roads construction projects in Rwanda.

1.3.2. Specific objectives

Even though the factors related to contract management are many, this research will focus on the following specific objectives:

1. To assess the effect of financing on feeder roads construction projects' performance;
2. To analyze the effect of implementation time management on feeder roads projects' performance;
3. Assessment of effects of feeder roads construction management team characteristics on their performance.

1.4. Research Questions

For this research the questions to be responded to will be based on its specific objectives as follows:

- Do financing related issues have an impact on feeder roads construction project's performance?
- Does the implementation time affect the performance of feeder roads construction projects?
- Do the contract management team characteristics affect the performance of feeder roads construction projects?

1.5. Justification of the Study

The researcher's carrier being oriented in engineering sector especially highway engineering, domain under which falls feeder roads construction, interests in deep understanding of management of issues related to feeder roads construction projects management in general and

especially contracts management, became the motivation to conduct a research on management of issues impeding the smooth implementation of contracts for feeder roads construction projects.

As a future specialist of highway engineering projects, understanding what really matters in roads construction especially feeder roads projects which are nowadays being and will continue to be undertaken for several years, learning from what has been done for projects implementation success, understanding the mistakes that have been made and applicable techniques to avoid them in the future carrier have motivated the researcher to research on management of issues in contracts related to feeder roads construction projects.

1.6. Significance of the Study

Since this research will be among the first conducted on the selected issues, it is expected to provide useful recommendations to the personnel involved in the feeder roads construction projects contracts management. Engineers that will be involved in feeder roads contacts management will have an idea of what is awaiting them in their carrier through the results and recommendations of this research as they will be prepared and strive to look for anticipated solutions to possible issues that may arise in the contracts they will be managing. The government officials can use the results of this research and consider its recommendations to make appropriate decisions for the future similar projects' contracts management. The issues that will not be assessed in this research will be the objectives of research for other researchers who will be interested in this sector and some researchers can find the gap in this research and try to conduct further researches with different hypothesis to complete or criticize it.

1.7. Scope of the Study

This research was conducted only in Rwanda. The problem that were studied were exclusively regarded in context of Rwandan feeder roads construction contracts management and the selected issues as described in the research specific objectives were considered. The research has also considered the government and private personnel directly involved in feeder roads construction projects. This research findings and conclusions were presented and some recommendations were formulated based on findings.

1.8. Organization of the study

This research is organized in five chapters; the first chapter concerned the introduction where the problem at the center of the study was explained, the objectives of the study was set and detailed,

research questions were formulated, the study was justified, its significance stated and its scope fixed. The second chapter dealt with literature review, setting the research conceptual framework and the research gap was determined. The third chapter concerned the research methodology where the research design, population, sampling method, data collection technique, data presentation and analysis techniques, operation definition, research validity & reliability and ethical consideration were explicitly defined. The fourth chapter dealt with data presentation, analysis and discussion of the results; whereas the fifth chapter concerned the research conclusion and recommendations.

CHAPTER TWO: REVIEW OF LITERATURE

2.0. Introduction

In this chapter, different literatures were reviewed, research reports by researchers who conducted their researches in the domain of roads construction projects management were consulted so as to have an idea on what they found and concluded. Reports of institutions in charges of roads construction in Rwanda were reviewed in order to learn what is already known and what has been done to address the challenges encountered in roads construction projects especially feeder roads. Not only research reports from Rwanda but also from other location globally were consulted with the aim of comparing their finding, conclusion and recommendations to those of local researchers and learning from the global experience in the domain of roads construction projects management.

2.1. Definition of key terms

Financial Management: planning and control of efficient use of project allocated resources and their timed disbursement to ensure the continuity of the project implementation without interruption.

Time management: control of planned project baseline through monitoring of execution of its components, especially timing for their start and their completion with focus on activities on critical path which determines the project time.

Project management team characteristics: qualification of team members, their experience related to the projects, their power of decision making, their responsibilities in the institution and in the projects and their behaviors, motivation, and interest in the project.

Project performance: is the project achievement of desired results within the planned budget, scope and time

THEORETICAL REVIEW

Referring to the policy on feeder roads construction projects that was developed by the Ministry of Infrastructure in 2017 and the law governing the public procurement in Rwanda; hiring contractors for the execution of feeder roads construction projects must be done through public procurement. Since such projects are considered as big projects, the project initiator needs to hire a consulting firm for the design and another one for supervision. However, in practice as mentioned in the annual activity report of Rwanda Public Procurement Authority for the fiscal

year 2018-2019, some projects' initiators or procuring entities failed to hire the supervising firms on time so as to start providing the needed services at the same time as the contractors who were hired for execution of related works whereas the supervising firm must act as the initiators' agents for management of such projects. Furthermore, the hired agents for feeder roads projects management have no power of making decisions concerning the projects and in several cases the projects initiators left the management tasks to their hired agents and failed to make important decisions. Such agency relations between projects initiators and their hired agents for management played a hindering role in the projects performance due to delayed decisions while quarrelling about who should make the decision between the project initiators and their management agents and this has generated different management issues as mentioned in some of the conducted researches.

The research conducted by Gashuga (2016), on effect of funds management on project performance in Rwanda, found that, cost estimating, raising funds, financial resources oversight, and allocating budget have a considerable impact on the project performance. However, the used methods in the preparation of budget are supposed to make sure that effective management of funds is done. All departments should work together to make sure that, management functions are clear so that planning is duly coordinated. Budgets are prepared to anticipate a future flow of funds as result of putting a specific plan in place. Budget should reflect the desired future activities of the project given available resources and opportunities at hand. In relation to the cost and expenses used, the study concluded that managers of the projects should analyse the cost and expenses that occurred during implementation process compared to the budget allocated for works, goods and services in operations plan, even though some project managers humanize corruption and irregularities through budgeting, appropriate budgeting is a very important tool in project management.

While conducting a research on effects of risk management methods on project performance in Rwandan construction industry, Aimable (2015), concluded that the fact that the techniques used for management of risks have an influence on project's goals in terms of quality, time and cost, risk management needs to be an open and compos mentis proceeding throughout the project life cycle. This research also had the aim of examining the role played by used risk management techniques in meeting the desired project performance in construction industry and the level to which the stakeholders contribute to the risk management techniques through the different stages of the project in an effort to meet the specified performance and found that as per the project

stakeholders, the risk management techniques are tightly connected to the project performance as far as quality, time and financial resources are concerned. Almost all of the risk management techniques need to be applied throughout different stages of the project and entrepreneurs veer to be the most dynamic with a vast influence on the risk management proceeding.

According to the research conducted by Kaburame (2017), on Timely completion of construction project is one of the criteria of the success in project, on the other hand many of Road construction project encounter time overrun and it became common issue in Rwanda Road construction Projects and this affect project performance. Through this study, Time Management Techniques and high influential factors for improving road construction performance were established in order to minimize or reduce delays. The study further, established that Time Management Techniques is the most important criteria with respect to the project performance as it has been ranked the first compared to the Critical Success Factors with time management. It is concluded that the Critical Path Method, a technical tool employed in the planning and control of activities positively impacts on road project delivery time, probably as a result of its capacity to identify key construction activities of a project. Special attention and much effort are needed for all stakeholders operated in road industry, especially for Clients, (Owners) for implementing and selecting suitable and effective time management techniques which is very helpful in controlling road projects time performance through the support of Critical success factors in term of time management.

David & Augustin (2018) conducted a research on sustainability analysis of road construction projects in Kigali City-Rwanda and concluded that all actors in road construction projects need to be more aware of sustainable construction as specific as it would apply to their responsibilities. Jointly with awareness, “Sustainability Analysis” by way of “ranking” or preliminary “appraisals” in project planning stage needs to be a requirement before project execution with empowerment of internationally renowned rating systems. Furthermore, for incorporation of the sustainability conceptualization in the construction field for Rwanda, it was perceived that making sustainable options and new construction should not be done separately or occasionally. A scheme of procedures that can be adopted for sustainable modus operandi can be further elaborated; some impediments can be faced professionally or administratively but with strive and constructive will altogether, shall expectantly foster the performance of sustainable road construction in Kigali City.

Related Literature

Normally a project is said to be successful if it respects the scheduled budget, time and quality. According to Maurice et al (2015), after conducting a research on effects of delayed payment of contractors on the completion of infrastructural projects found that in different sub-Saharan African countries most of projects especially roads construction projects use to overrun the scheduled time and such delays imply requirement of additional funds, and concluded that well timed payment of contractors for completed component of works is paramount for guaranteeing the uninterrupted progress of works and finalisation of infrastructure projects within the contracted period, allocated financial resources, and specified quality. Payment of contractor's invoices will doubtlessly avert cost and time overruns, which may have important wavelet effect, especially in low-income economies, such as Sub-Saharan African countries. In this point of view, payment of contractors needs to be planned the right way by launching suitable attenuating course of action against possible risks, such as delayed expenditure of financial resources by external funders, retarded acceptance of payment of contractors' invoices, political encroaching, as well as financial embezzlement by employers, among others. Alleviating the like risks, however, require the joint participation of all actors at the national, project, and community levels. Community partaking and involvement of civil society are exceptionally paramount for influencing figureheads to hasten budget acquiescence and fund disbursement proceedings. At the project level, community involvement needs to be stirred to strengthen liability in steering and managing project financial resources by accounting agents. Coherence of financial management system at the project level needs to be contemplated by precise filing of returns to relevant authorities to facilitate well timed disbursement of funds for succeeding project stages. Efficient project managers need understand that cash flow is the dynamic force of infrastructure projects, without which delay, abandonment, and future dissipation of resources becomes inescapable.

In his research on Critical factors influencing implementation of road projects in Kenya, Nelly (2019), found that project management deep understanding and ability to use its techniques by feeder roads contracts managers is tremendously necessary as the problems related to such projects in which huge public funds are invested concern the entire world. Referring to other researches he found that different researchers have similar findings and particular findings depending on countries' situations. In a survey of West Bank in Palestine, Mahamid (2011) indicated that the most appalling factors that affect time delay in roads construction projects from owners' frame of mind are poor communication between construction parties. It was also found

that delivering project success is more difficult than delivering project management success, because it predictably involves aspects which may be beyond the control of the project team. With these second order controls, both goals and methods are prone to change; whereas project management success may be achieved by holding goals constant but changing practices to meet the predetermined goals. Kaliba et al (2009) found that the major causes of delays in construction projects in road construction projects in Zambia were delayed payments, financial deficiencies on the part of the client or the contractor. Contract modifications, economic problems, material procurement problems, and changes in design drawings, staffing problems, unavailability of equipment, poor supervision, and construction mistakes.

Similarly, as any other projects, feeder roads construction projects usually use the techniques of project management. However, the research conducted by Ting (2009), on project Management Development in Malaysia, found that the development of knowledge and the application of project management techniques remains a challenge. Especially in feeder roads construction projects the persistent matter is that despite understanding and mastering the techniques of feeder roads construction, one may ask at what extent do the engineers and engineering personnel working on feeder roads construction projects understand the seriousness and the limit provided by fruitful and well-timed application of project management skills in the setting up competitive environment of construction and engineering and how much do they know about project management and the tool and techniques it has to offer in realizing the project on time and within the budget and quality specified. The researcher also wondered if these engineers do understand their roles as project managers, in managing and controlling the elements of the projects, not only in big scaled, complex, multibillion jobs but in all construction projects.

As far as Rwanda is concerned, according to the Infrastructure sector annual report for FY 2015/16 by the MININFRA (2016), the encountered challenges in past years in roads construction projects in general are but not limited to landslides for completed projects and during implementation which caused delays on projects completion and called up numerous emergency works; delays in providing no objection and funds disbursement from the development partners and legal opinions from stakeholders; pockets of expropriation issues that delay implementation of different projects; especially associated with lack of land tittles, complaints and noncompliance by some land owners; extensive procurement procedures associated with appeals which delayed the implementation of different programs/projects; payments that have been delaying for so long than usual; budget constraints which led to partial execution of some projects or cancellation; poor

studies for some projects, unexpected additional works, delays to start works by some contractors and suspension of works at times which delayed projects implementation; weakness in contract management that has delayed execution of projects as aligned to set targets; storm water management issues resulting in high level pollution risks due to erosion and wastewater discharges; poor collaboration and coordination between stakeholders especially the implementing agencies, that hindered smooth progress of certain projects, more importantly on the execution of earmarked funds to their budgets. From these challenges the Ministry of Infrastructure admitted that lessons were learned these are but not limited to establishing good collaboration and partnership with different stakeholders especially in planning process and Sector Working Group Meetings; outsourcing extra budget through targeting external funders mainly financing minor projects which is of paramount as it greatly supplement additional ordinary budget requirements; improved coordination and communication that has contributed to effective implementation of projects; private sector involvement greatly that has contributed to the successful implementation of different projects; strong Monitoring and Evaluation system which is believed to help in the successful projects implementation; anticipated procurement process which contributes to the timely projects execution without delays; increased ownership by projects implementers and stakeholders that has raised projects execution rate.

While assessing Critical Success Factors for Road Construction Projects in Ethiopia, Mebrhit (2018) concluded that forming a project management team and applying appropriate procurement system contributes tremendously to the success of project implementation. This cannot be excluded from feeder roads construction projects, as multi skilled personnel and efficient procurement method for different goods and services related to feeder roads construction projects, together with effective communication, close monitoring and supervision within a common understanding and same vision of goals regarding the specific projects, constitute the backbone of any projects implementation success. Furthermore, a project team brings about a better coordination and integration among stakeholders. A project team that represents all stakeholders in a road construction project solves integration problem among the different objectives of the actors by creating a platform of mutual goal and understanding. This also helps to prevent conflicts, and in case of disputes to solve the issues quickly. It also improves the information flow process by cutting short long bureaucratic lines to get decision and approvals. A project team that stays throughout the road project life cycle is vital since it lubricates the interface between different stages of a road construction project. In other words, it decreases fragmentation between

design and construction phases of the management process. Adopting a relevant procurement and contract scheme is vital to address issues that result from large number of stakeholders involved in roads construction projects. It also helps to address other important factors such as outcome, managing claims, principles of modern road administration, risks associated with cost overrun, public finance deficiency and promoting private participation.

Even though Rwanda has been improving its roads network during the last two decades, the issues in feeder roads construction contracts management are persistent and need a close collaboration of different stakeholders. It is still a challenge to reach the desired quality and complete different feeder roads construction projects within the budget and time. Always expensive maintenance works follow shortly after completion of feeder roads construction projects due to poorly constructed roads or unpredicted roads conditions deteriorating events. However, making appropriate and quick decisions to handle those issues is still a big issue and that leads to worsening the feeder roads condition requiring therefore huge amount of financial resources for rehabilitation of destructed roads infrastructure. Effective measures to sustain the constructed feeder roads are highly needed and should involve all the sector's stakeholders.

Empirical Review

While researching on Rural Road Maintenance and Improvement, by using descriptive method, Chris (1994), found that feeder roads construction projects may be well planned and structured with studies and budgets available. However, only planning and availing resources for their implementation may not be sufficient for the best performance of such projects. A close monitoring and evaluation of feeder roads construction projects' deliverables will ensure their expected performance. Many rural road programs in the past were unable to demonstrate to what extent objectives and targets had been met, thus limiting accountability and opportunities for lesson learning. This problem arose partly because development objectives and expected benefits of rural road programs were only vaguely defined, and not expressed in terms of quantifiable indicators. While this note recommends the use of prioritization criteria which permit local participation in decision-making, this should not preclude a clear definition of the objectives of rural road programs, or the calculation of expected benefits according to the selected criteria. Where possible, economic benefits should be calculated using measures of vehicle operating costs or producers' surplus. Past monitoring problems are also partly due to the difficulty of maintaining reliable data on rural road condition, traffic, and serviceability. As there are few examples of

successful monitoring and evaluation, some experimentation may be required to find feasible and sustainable monitoring methods which match local capabilities and provide meaningful indicators of road service level and availability throughout the year. Incentives for monitoring may need to be strengthened in project design and annual reviews, and independent audits should be considered to verify reports on a sample basis.

Timothy & Yona (2018), in their research conducted in Kenya on the Influence of Contractors' Financial Capacity on Performance of Road Construction in Kakamega County, through descriptive method, concluded that road construction companies should possess a reliable minimum operating financial resources and should only be awarded contracts based on their financial capabilities and technical resources at their disposal. However, contractors could improve their working capital by forming public private partnerships with funders who can be willing to fund colossal infrastructure construction projects. On one side, construction firms could establish a bank for construction industry that could provide them with access to loans at optimum interest rates to stir their working capital. On the other side, the government needs ensure consistent expenditure of financial resources. To overcome the challenges of retarded payment; the government needs to come up with a policy that sets timelines for payment of fees due to the contractors and suppliers of goods and services. This policy needs also prescribe penalties for retarded payments and should apply on goods and services supplied to both the government and the private sector projects owners. To ascertain that project funding does not affect successful finalisation and performance of road construction project, sufficient finances need to be reserved for the project prior to its start. This will guarantee that shortage in financial resources unsteady flow of funds is avoided. During the estimation, experienced engineers need to be hired to prepare estimates, so that estimates and the project cost do not vary much. Stakeholders, funder needs also support the project construction, in order to prevent stoppage of financing as the project proceeds.

The conclusion to the research conducted by Aftab et al (2014), on Time Management Practices in Large Construction Projects, by using descriptive method, stated that time management is important in any construction project. Without proper time management, many problems will occur such as extension of time or time overrun. Some of the researchers describe time overrun as delay and some of them describe that the time overrun is an effect from the construction delay, no matter what it was described, time overrun become the most general problem in construction industry worldwide. Time overrun occur when the actual progress of a construction project is slower than the planned schedule. Delay or time overrun will affect all parties involved in the

project. It will affect the profits which would be obtained if the project can be completed on the schedule. But due to the time overrun, contractors will have to spend more money on labour, plant and may lose the opportunity to get the next project. Hence, effective time management is very important and crucial to achieve successful completion of construction projects.

A research conducted by Qi et al (2008), on change management in construction projects, descriptive method was used and found that changes are inevitable in construction projects. And during a construction project, many decisions have to be made, often based on incomplete information, assumptions and personal experience of the construction professionals. Change is a common denominator in all construction projects, though the size, scope, and complexity of projects may vary significantly from case to case. Change management is a critical problem faced by the construction industry. The effort of managing change orders has imposed a huge burden on project management. Changes are identified as the major cause of project delay, cost overruns, defects, or even project failure. More seriously, playing games on changes cause serious ethical problems and disputes in the industry.

Atul & Pimplikar (2014), when conducting their research, they used descriptive method and studied the Role of Project Management Consultancy in Construction Project, they concluded that the project management team manage the project by application of their knowledge, skills, and experience at various stages. However, project management team has to face various challenges like design issues, constructability issues, long lead material issues, inter contractor coordination issues, engineering issues, safety issues, etc. These issues could be tackled by a well organised approach of the project management team. This also includes adopting the various types of tools of higher management like reporting dashboard, round table progressive review and conduction of brainstorming sessions, training on various fields, design – construction interface, daily quality audits, quality diligence & delivery sessions in team. In addition to above project management team is effective and efficient only when it is involved in total project life cycle from conception to closeout. Awareness of various processes involved in project management and detail study of multiple constraints of project like Time-Cost-Risk-Scope-Quality-Resource are an integral part of any project management.

When conducting a research on Critical Factors and their influence on Performance of Road Construction Projects in Kiambu County, Kenya, Joseph (2019) used descriptive method and found that project planning has a significant impact on performance of road construction projects.

In addition, the study found out that road construction projects in Kiambu County, Kenya were generally completed late and did not adhere to the set budgets. Furthermore, the said projects failed to adhere to the set quality standards and were often completed late. This could explain the poor state of the roads in the county. Project funding in terms of availability and adequacy of funds, speed of their disbursement and speed of approval of any overruns was also noted to positively influence the performance of road construction projects in Kiambu County, Kenya. Project monitoring and evaluation was noted to have a significant influence on performance of road construction projects in Kiambu County, Kenya. Further, the study found out that for budgets to be adhered to, project managers should ensure that appropriate remedial actions are taken to close any gaps identified from the monitoring and evaluation reports.

A research conducted by Johnson (2016), on Factors Influencing Performance of Contractors in The Road Construction Sector: Case of Selected Contractors in Kenya, by using descriptive method, concluded that operating capital helps construction companies to work efficiently with no financial problems of payment of immediate liabilities, acquisition of raw materials and payment of remuneration, wages and make payment without delay. The study also established that engagement of skilled man power enables the construction company to achieve overall goals of the company as skilled staffs delivered quality work. Furthermore, the study revealed that coordination in departmental heads in a construction firm improves firm productivity, fast and effective communication between managers and stakeholders accelerates the road construction process and performance. The research findings noted that one role of client assistance is to ensure involvement of stakeholders and/or project beneficiaries throughout the project cycle, as it was considered paramount in achieving project success. The study furthermore revealed that client support services helped to curb irregular funds disbursements and thereby reduce on project delays and/ or stalling of road construction projects. The study also confirmed that prompt payments and approvals is considered very crucial in easing timely project completion and that insufficient support leads project costs overrun, disputes, arbitration costs, litigation and project abandonment.

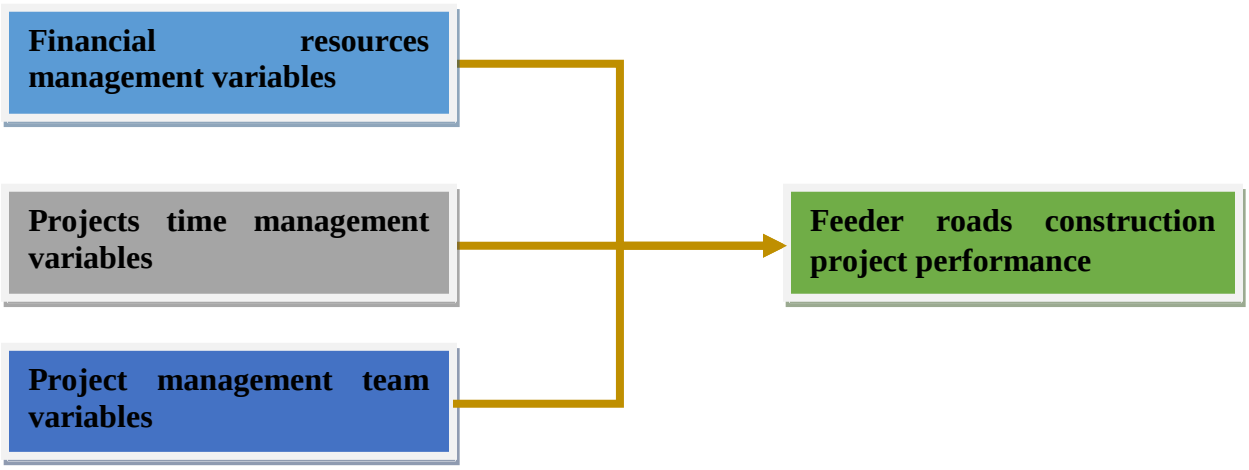
Ezekiel (2017), when conducting a research on Factors influencing road projects performance in Kenya: A Case of road contractors in Machakos County, by the mean of descriptive method, found that the four main factors that influenced performance of road projects in Machakos County included capital availability, management skills, organisational structure and technical skills. Although road contractors had access to capital, it was accessed mainly from local commercial

banks. A lot of bureaucracy was involved in the disbursement of funds that led to delays and inconsistencies in road projects implementation. The main challenges facing implementation of road projects were incremental weather conditions, inadequate skilled labourers, inadequate equipment, delayed payments and unforeseen ground conditions and political interference. However, it was revealed that well finance programmes, ground exploration, adequate allocation of budgets, complying with the contracts and continuous training and transfer of knowledge would help counter these challenges.

Densford (2018), in his research on Project management practices and performance of road infrastructure projects done by local firms in the lake basin region, Kenya, through descriptive method, concluded that project resource mobilization has a significant effect on performance of road infrastructure projects undertaken by local firms. Financial, physical and technical resources have a significant effect on performance of road infrastructure projects. To aid acquisition of financial and technical resources, public-private partnership and government guarantee will play an important role. This will improve performance of road infrastructure projects undertaken by local firms. This research also concluded that project monitoring and evaluation affects the performance of road infrastructure projects undertaken by local firms. Conducting M&E activities regularly has a positive impact on performance of road infrastructure projects undertaken by local firms. Hence, there was need to allocate adequate financial resources for M&E activities and recruitment of staff with relevant skills.

Nokulunga (2018), conducted a research on Challenges faced by stakeholders in the road construction projects in the Gauteng province of South Africa, where descriptive method was used and found that Community unrest such as strikes, stoppage of project by business forums, councillors interruptions disrupt the project spending more time on negotiations of the community grievances delay project and sometimes total abandonment of project sites is the biggest threat to road construction projects. Moreover, the existing services and land proclamation also pose a huge challenge to delivering a project on time; it needs to be taken into consideration during early stage of the project. Therefore, proper planning and good communication with the various communities and different department must take place especial during the preliminary stage, and transparency, honesty must be key to every individual who is involved in the project. Furthermore, any challenges found in roads construction might be eliminated to the future projects by lesson learned, by planning for the upcoming project properly and also by identifying possibility risk at the early stage of the project.

CONCEPTUAL FRAMEWORK



For this research, the project performance will be measured in matter of completion on time, respect of planned budget, quality and durable products and completion without variation in planned scope.

Research Gap

The existing conducted researches in the similar domains were conducted with the objective of analyzing the effects of financial management, time and scope management, projects planning and projects budget on the construction projects performance in matter of deliverables. Feeder roads construction projects seem to have common and particular issues related to unpredicted events that occur during the projects implementation. As far as Rwanda is concerned, reports have been made by authorities in charges and presented the existing situation, progressive improvement, learned lessons, new challenges etc. However, the issues related to the power limitations and responsibilities of such projects' direct management teams were almost not addressed. Except blaming the poor management either on by the projects initiators or contractors, the real causes of mismanagement which lead to poor performance of feeder roads construction projects were not identified. The issues of bureaucracy in crucial decision making were left behind. The issues of management team composition and characteristics, powers and responsibilities in combination with communication, financial, planning, budgeting and management of scope and schedule are yet to be addressed in deep so as to make sound conclusion which can be referred to while making related decision in future similar projects.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0. Introduction

This research intends to establish the relationship of the problems encountered in feeder roads construction project performance and the issues related to financial resources management, project time management and characteristic of the teams involved in management of such projects. Those three sectors have been chosen because they use to generate disputes between projects owner and contractors and do not spare the assigned supervisors.

3.1. Research Design

This research has used descriptive data. A questionnaire was addressed to the people involved in feeder roads construction projects with sufficient experience in the domain. After data collection, they were analyzed using statistical software and the test technique that was used is Chi Square testing method to determine the real causes of issues and disputes in feeder roads construction project contracts management that lead to poor performance of most of such projects or abandonment of some of them. The research was designed as qualitative since the collected data are opinions from the respondents based on their practical experience in the domain of the research.

3.2. Study Population

The study population was composed of personnel of Feeder Roads Project which is currently operating under Rwanda Transport Development Agency (RTDA) as an initiator of all the feeder roads construction projects nationwide; personnel of Rwanda Public Procurement Authority (RPPA) in the department of Monitoring and Audit since the personnel of this department are in charge of monitoring and auditing different public projects including feeder roads construction and sometimes participate in disputes management as mediators. In addition, to these groups some of the contractors operating in the feeder roads construction projects were randomly chosen and given the same questionnaire as the other party involved in such projects which this study has focus on. A total population of 213 people was considered and details of this population are given below in sampling.

3.3. Sampling

The population of this research being composed of people in different categories, the sampling method was clustering. The sampling had three clusters where people were chosen randomly from

each. In each cluster people such as engineers, project managers, financial and budget managers were targeted and people such as secretaries, guards, assistants, front desk attendants, etc. were excluded since they are likely to provide biased data as they do not have expertise in the domain and sometimes do not have access to useful information. From each cluster, the sampling was random and has used the following formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where (e) is the confidence level; (N) is the target population and (n) is the sample size.

The sample size was determined by summing up the number of people to be questioned from each cluster i.e. clusters from RTDA (55), RPPA (20) and contractors (138) in the domain of feeder roads construction as registered and categorized by RPPA today. The total population is 213 people and the sample calculated using the above formula and considering the confidence interval of 5% or 0.05 is 139 people.

3.4. Data Collection

Primary Data collection was done by using a questionnaire where respondents were given statements and state if they strongly agree, agree, disagree, strongly disagree or have no opinions. Those statements were derived from this research's objectives and were strictly related to financial resources management, time management, characteristic of projects management teams and feeder roads projects performance.

3.5. Data Presentation and Analysis

After data collection, they were presented in form of tables detailing the number and percentages of respondents for each statement. The statements that most of respondents have agree with were considered and those that were rejected were discarded. Statistical testing method was Chi Square to test the acceptability bases on P Values (Probability values). The Software that was used is MathBeans. Based on the results, conclusion and recommendations were formulated.

Chi-Square test

To make decisions on the research hypotheses, Chi-Square test was used and for calculation of Chi-Squares and generation of related tables, online Java based software called ***"Mathbeans"*** was used. It can be found on the following link

http://www.physics.csbsju.edu/stats/contingency_NROW_NCOLUMN_form.html, consulted on 5th July 2020.

The formula used to calculate the Chi-Square X^2 is the following:

$$X^2 = \frac{\sum(O - E)^2}{E}$$

To apply this formula, the expected values are calculated by multiplying the row total by column total divided by the grand total (N).

Below is the example for calculating: the expected values:

Table 3.1. Calculation of expected values for Chi-Square Test

	Category I	Category II	Category III	Row Totals
Sample A	a	b	C	a+b+c
Sample B	d	e	F	d+e+f
Sample C	g	h	I	g+h+i
Column Totals	a+d+g	b+e+h	c+f+i	a+b+c+d+e+f+g+h+i=N

Source: Mathbeans Project: National Science Foundation DUE-9950473

To calculate the expected values for each cell in the table and we can do that using the row total times the column total divided by the grand total (N). For example, for cell (a), the expected value would be:

$$\frac{(a + b + c)(a + d + g)}{N}$$

After calculating the Chi-Square, the degree of freedom and the corresponding probabilities are to be calculated so as to make conclusion on hypotheses being tested.

The degree of freedom is obtained by applying the following formula:

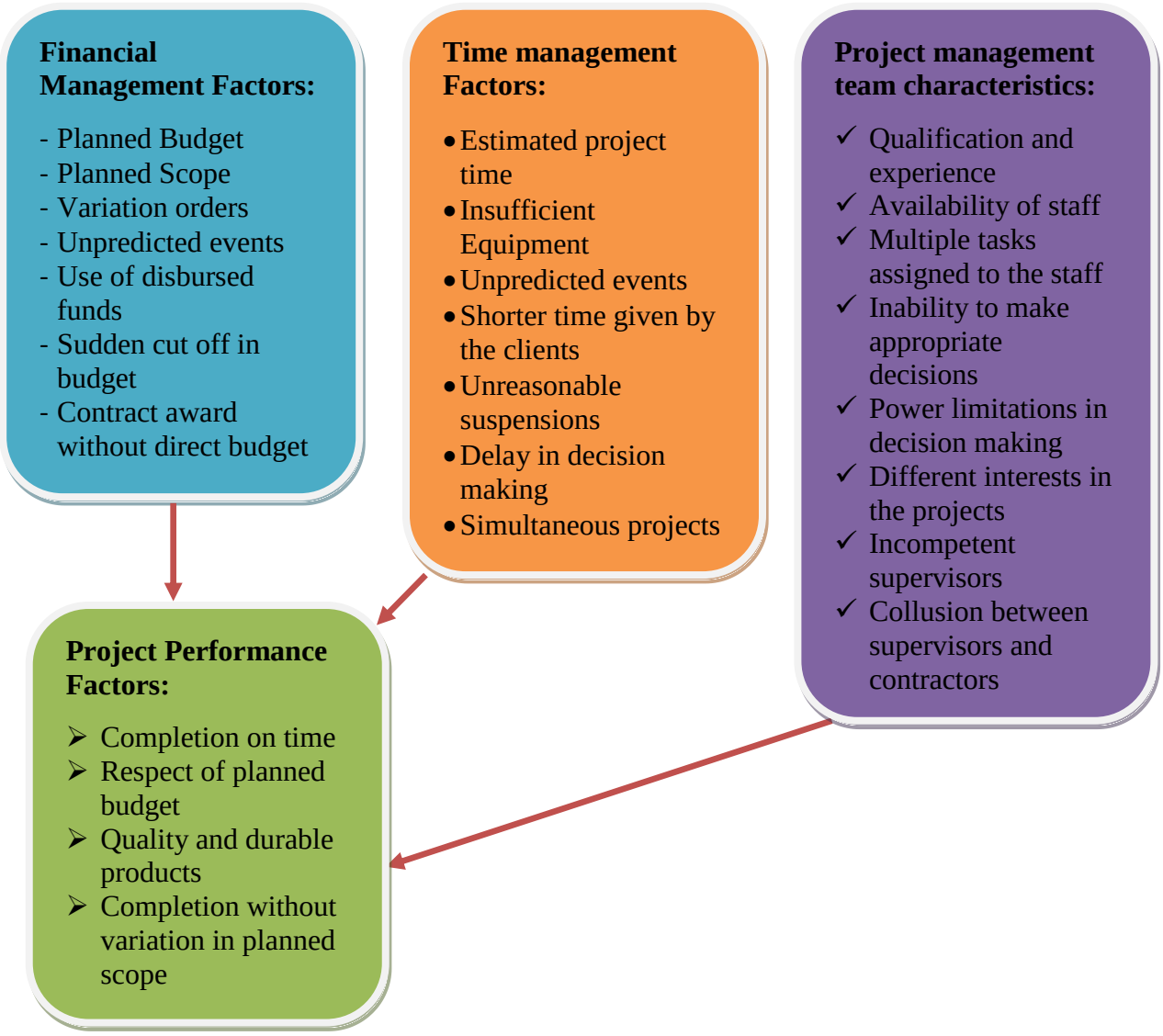
$$(r - 1)(c - 1)$$

Where r and c are respectively the number of rows and number of columns

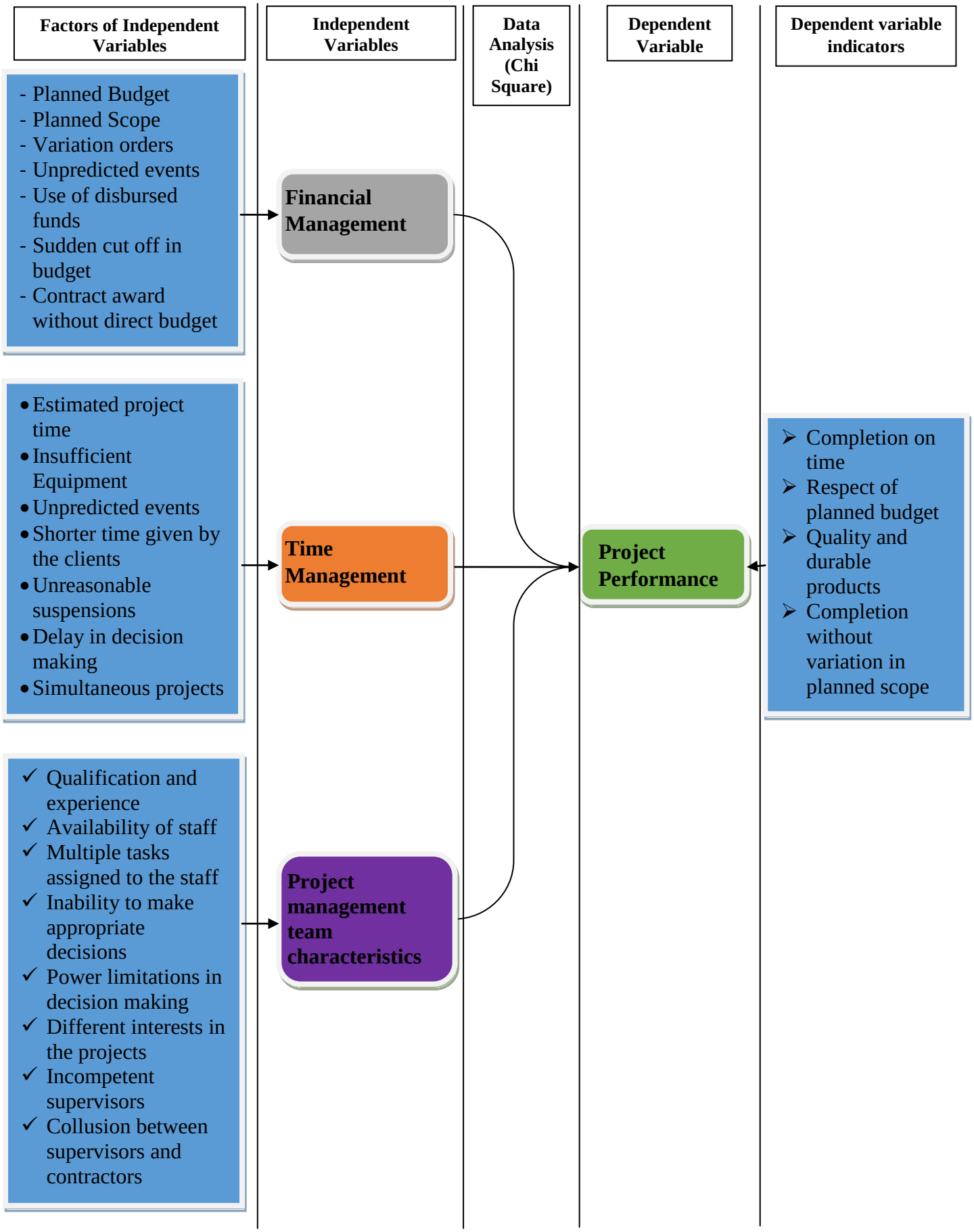
The mentioned software, by applying these formulas generates all these needed values. In this research, null hypotheses were assumed and conclusions made based on the results generated by this software from the entered collected raw data.

3.6. Operation definition

The research had inputs that were considered; for feeder roads construction projects the inputs were financial resources management, time management and characteristics of projects management teams and the expected output was project good performance. In this research, factors related to the financial resources management, time management and characteristics of the projects management teams were examined and their impacts on the projects performance was established. The following model illustrates the way this research was conducted and factors that were considered for each of the above inputs and expected output.



From the above illustration the following model was used in data analysis after collection, editing and reduction of primary data. After data analysis through Chi Square statistical tool result interpretation and conclusion was done depending on the results from the above analysis.


Factors of Independent Variables
Independent Variables
Data Analysis (Chi Square)
Dependent Variable
Dependent variable indicators
- Planned Budget
- Planned Scope
- Variation orders
- Unpredicted events
- Use of disbursed funds
- Sudden cut off in budget
- Contract award without direct budget
Financial Management
• Estimated project time
• Insufficient Equipment
• Unpredicted events
• Shorter time given by the clients
• Unreasonable suspensions
• Delay in decision making
• Simultaneous projects
Time Management
✓ Qualification and experience
✓ Availability of staff
✓ Multiple tasks assigned to the staff
✓ Inability to make appropriate decisions
✓ Power limitations in decision making
✓ Different interests in the projects
✓ Incompetent supervisors
✓ Collusion between supervisors and contractors
Project management team characteristics
Project Performance
➢ Completion on time
➢ Respect of planned budget
➢ Quality and durable products
➢ Completion without variation in planned scope

3.7. Validity and Reliability

This research has targeted experts in the domain of feeder roads construction projects, the target population being composed of people with accurate and unbiased information, they have provided valid and reliable data and as they operate nationwide, the results from this research can be generalized and the conclusion and recommendations that were formulated can be considered for all similar projects.

3.8. Ethical Consideration

This research is solely for academic purpose. Respondents were not required to provide personal information for the sake of their privacy, only general information was provided. Other questions in the questionnaire were related to the research. No harm was done to the respondents or their institutions. Safety of respondents and their dignity was given priority in this research. The provided personal information cannot be disclosed to anyone without their consent. Respondent were not forced to respond if they did not want to, since it was their right to participate to this research or not without providing their reasons.

CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSION

4.1. Introduction

The chapter four, which consists of findings presentation according to the data collected on field and results discussion by comparing them with the questions on variables of the research, for every considered key variable collected data are presented and directly accompanied by their examination and argumentation of related outcomes. To ascertain that the data provided by the participants to the research are accurate and valuable, while choosing the research population, participants with the following characteristics were targeted:

Table 4.1. Grouping of research participants by age groups

S/N	Age Group	Number of participants
1	18-25	0
2	25-35	51
3	35-45	57
4	45-55	23
5	55-Above	8
Total		**139**

As per the data in the table 4.1., it is clear that the participants to the research had the minimum age of 26 years. The participants were mature enough to be able to provide data that could be relied on.

Table 4.2. Ranking of research participants as per education level

S/N	Education Level	Number of participants
1	Ordinary Level	0
2	Secondary Level (A_2)	0
3	Diploma Holder (A_1)	7
4	Bachelor (A_0)	109
5	Masters	23
6	PhD (Doctor)	0
7	Professor	0
Total		**139**

Considering the data from the table 4.2., the participants to this research have got sufficient skills through education and are able to provide useful and reliable data, since they are entrusted to understand the matters dealt with in this research. Their education level varies between Diploma Holders to Masters with the highest number of respondents being engineers with Bachelor level.

Table 4.3. Stratification of participants as per experience in the field

S/N	Experience (Years)	Number of participants
1	0 – 5	0
2	5 – 10	49
3	10 – 15	53
4	15 – 20	21
5	20 – 25	13
6	25 – Above	3
Total		**139**

The data in the table above indicates that the participants have enough experience in the domain of roads construction projects management and are capable of providing trustworthy information. Most of respondents had an experience varying from 5 to 25 years with the highest number of respondents being 53 with an experience of 10 to 15 years in the domain of roads construction. The respondents have updated and accurate information since all of them were still active and still facing challenges in roads construction projects management. The information they provided can be reliable for making this research conclusion and recommendations from which young generations of professional in the domain can learn and improve the way of similar projects planning and management.

4.2. Presentation of results and their analysis

The results presentation referred to the research objectives. Tables were used to present data from the questionnaire and these tables are followed by analysis of data through Chi-Square Test as the objective of this research was to analyze the relationship between its research's variables. The results, their analysis and interpretation are illustrated below. To analyze the data trough Chi-Square, the significance level of 0.05 (i.e. $p > 0.005$) was considered as it is the conventionally accepted one.

4.2.1. Feeder roads projects financial management issues and their effect on their performance

The feeder roads projects financial management was the first independent variable of this research. The common influencing elements of the financial management were set in the questionnaire and the participants to the research were supposed to opine about each of them based on their experience and knowledge by confirming whether they strongly agree, agree, disagree, strongly disagree or have no opinion. The participants were also expected to provide their own elements thought to influence financial management that were not included in the

questionnaire. The results provided by the participants to this research are shown in the following table.

Table 4.4. Factors that influence the feeder roads projects financial management and impede their performance as per the number of participants

Factors	Strongly agree (1)	Agree (2)	Disagree (3)	Strongly Disagree (4)	No Opinion (5)
The planned budget is not sufficient compared to the works to be executed.	39	63	37	0	0
The scope of works uses to be poorly defined and there are additional works that were not planned for cost wise.	94	38	0	0	7
There are variation orders which generate addition works requiring additional financial resources.	17	93	11	10	8
There are unpredicted events that cause the changes in scope and quantities requiring additional financial resources.	73	59	7	0	0
The contractor uses the disbursed financial resources for other purposes than what they are supposed to be used for.	8	23	42	19	47
There are sudden cut off in the planned budget and contractors are not paid as per contracts.	19	75	38	7	0
Clients sign contract for works without directly having the budget or having smaller budget than the contract amount.	39	62	21	0	17

For results presentation, the data sets and influencing factors were symbolized as follows:

The influence level of the influencing factors was presented in consideration of whether the participants to the research opined by strongly agreeing, agreeing, disagreeing, strongly disagreeing or stating that they had no opinion; the following notations were used: SAG standing for strongly agree, AG standing for agree, DAG standing for disagree, SDAG standing for

strongly disagree and NO standing for no opinion. The influencing factors were notated by letters F1, F2, F3, F4, F5, F6 and F7; in their descending order in the Table 4.4.

The influence level of each influencing factor on feeder roads projects financial management as per the percentages of research participants who strongly agreed, agreed, disagreed, strongly disagreed or had no opinions is illustrated in the following table.

Table 4.5. Influence level of factor influencing the feeder roads projects financial management as per the percentages of research participants

	SAG (%)	AG (%)	DAG (%)	SDAG (%)	NO (%)
F1	28.1	45.3	26.6	0.0	0.0
F2	67.6	27.3	0.0	0.0	5.0
F3	12.2	66.9	7.9	7.2	5.8
F4	52.5	42.4	5.0	0.0	0.0
F5	5.8	16.5	30.2	13.7	33.8
F6	13.7	54.0	27.3	5.0	0.0
F7	28.1	44.6	15.1	0.0	12.2

The following figure is the illustration of the data presented in the table above:

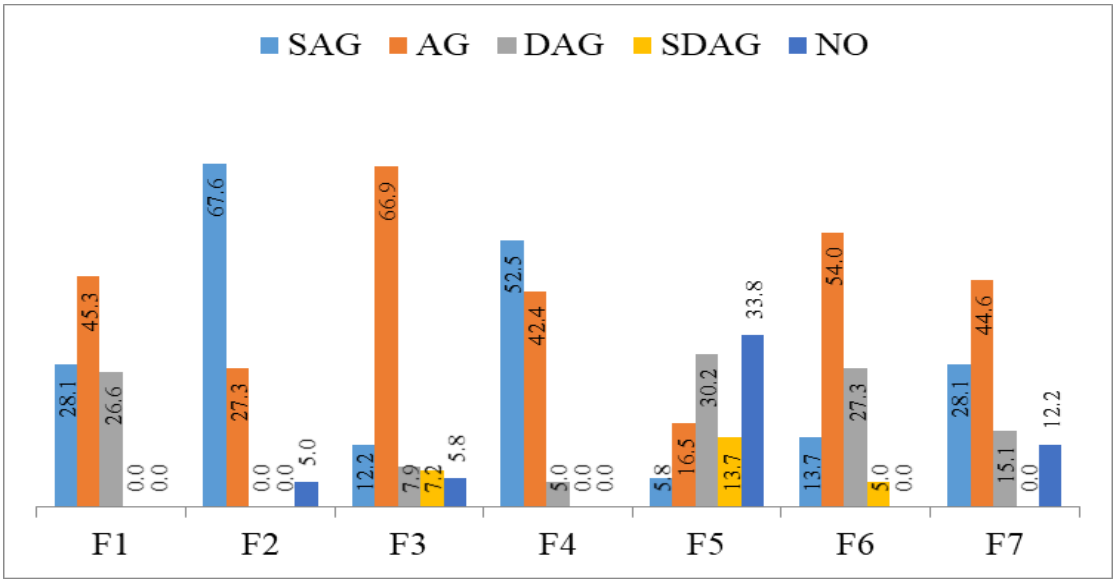


Figure 4.1. Levels of factors influencing the feeder roads projects financial management presented as from respondents

As shown in the Figure 4.1., the research participants ranked the influencing factors as per their influence levels on feeder roads projects financial management. The influence of factors was ranked by the research participants in descending order by strongly agreeing, agreeing, disagreeing, strongly disagreeing and stating that they had no opinions.

The outcomes of the study on the factors that influence the feeder roads projects financial management as shown above, the research participants stated the issues related to financial management are mainly generated by the poor definition of scope of works to the extent that there are additional works that were not planned for cost wise; in addition to that, there are unpredicted events that cause the changes in scope and quantities requiring additional financial resources, as per 95% of the respondents, as per 79.1% of the respondents, there are variation orders which generate addition works requiring additional financial resources and this factor comes in second place among influencers of feeder roads projects financial management. 73.4% of respondents confirmed that the planned budget which is often not sufficient compared to the works to be executed follows the above factors in influencing feeder roads projects financial management and this factor is followed by the fact that the clients sign contracts for works without directly having the budget or having smaller budget than the contract amount and this practice uses to generate financial management issues as confirmed by 72.7% of the respondents. The sudden cut off in planned budget which delays the payment of contractors as per contracts influences also the feeder roads projects financial management as confirmed by 67.6% of respondents. The remaining factors was confirmed by less than 50% of respondents and seemed to have less influence on the feeder roads projects financial management. The following figure illustrates the level of influence of each considered factor on the financial management for feeder roads construction projects.

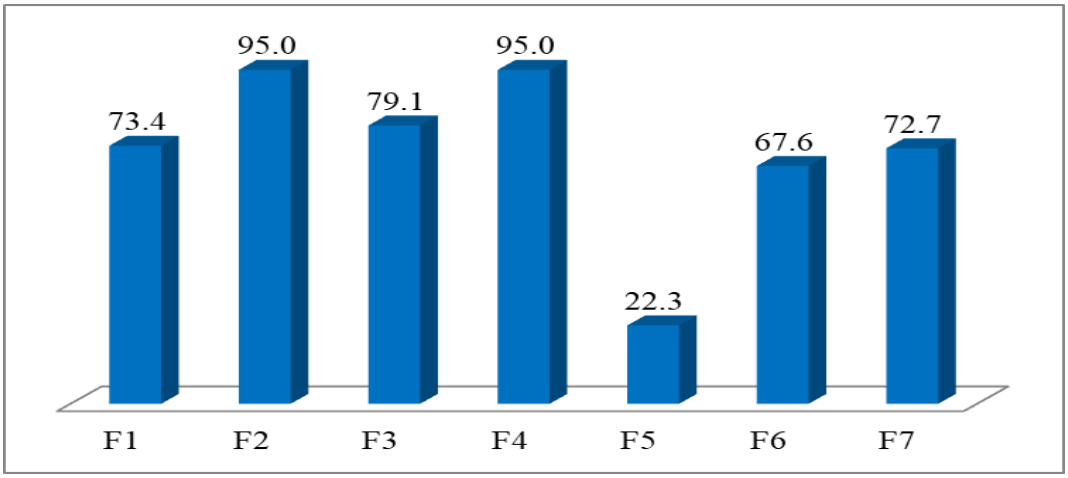


Figure 4.2. Main factors influencing the feeder roads projects financial management

4.2.1.1. Test of hypothesis on feeder roads projects financial management

As this research's first objective was to assess the effect of financial management on feeder roads construction projects' performance; the research used Chi-Square to test if the selected factors influence the feeder roads projects financing and affect their construction performance. The four columns i.e. where research participants strongly agreed, agreed, disagreed or strongly disagreed were taken into consideration whereas the column where they had no opinion was not considered since the participants who had no opinions could not provide useful information as they stood nowhere concerning this hypothesis.

For this research's first objective, the hypothesis related to the question on this objective is the following:

Null Hypothesis (H_o): Feeder roads projects financial management does not affect their construction performance.

These results as produced by Mathbeans provide the basis for making decision on whether to accept H_o or reject it and accept H_1

Data: Contingency table

	SAG	AG	DAG	SDAG	
F1	39	63	37	0	139
F2	94	38	0	0	132
F3	17	93	11	10	131
F4	73	59	7	0	139
F5	8	23	42	19	92
F6	19	75	38	7	139
F7	39	62	21	0	122
	289	413	156	36	894

Expected: Contingency table

	A	B	C	D
F1	44.9	64.2	24.3	5.60
F2	42.7	61.0	23.0	5.32
F3	42.3	60.5	22.9	5.28
F4	44.9	64.2	24.3	5.60
F5	29.7	42.5	16.1	3.70
F6	44.9	64.2	24.3	5.60
F7	39.4	56.4	21.3	4.91

Chi-Square = 351

Degrees of Freedom = 18

Probability = 0.000

The results of the Chi-Square test, shows that its value is 351 where the degree of freedom is 18; the related probability value is too small and closely neighboring zero. Due to this probability value that is less than 0.05 which is referred to as the conventionally accepted significance level, the Null Hypothesis (H_o) was rejected and the Alternative Hypothesis (H_1) accepted instead. It means that according to the test results, the factors considered in this research influence the feeder roads projects financial management and affect their construction performance. The management explanation is that for appropriate management of financial resources these factors should be focused on during the feeder roads construction projects planning and implementation, failing to do so, the project managers will have difficulties to execute the projects within the planned budget and the smooth projects implementation will be compromised. However the best the project managers will be, the project budget will have to be modified or adjusted and that will not happen without generating projects financial management issues.

4.2.2. Feeder roads projects time management issues and their effect on their performance

The feeder roads projects time management was the second independent variable of this study and referred to the management of time for feeder roads construction works. The time management concerns the monitoring of works progress, decision making during the execution of works, suspensions and breaks recording and management of additional time. The feeder roads construction time is sometimes not realistic and includes the periods during which roads construction works cannot be executed such as rainy season. For this research, influencing factors of project time management were set in the questionnaire and the participants to the research were expected to opine about each of them referring to their experience and knowledge by confirming whether they strongly agreed, agreed, disagreed, strongly disagreed or had no opinion. In addition, the participants were supposed to provide their own factors thought to have an influence on feeder roads projects time management which were not included in the questionnaire. The results provided by the participants to this research are shown in the following table.

Table 4.6. Factors that influence the feeder roads projects time management and hinder their construction performance as per the number of participants

Factors	Strongly agree (1)	Agree (2)	Disagree (3)	Strongly Disagree (4)	No Opinion (5)
The estimated time for projects implementation is not realistic compared to the volume of required works.	83	29	27	0	0
The contractors do not have required machinery and equipment to execute works on time.	38	82	19	0	0
There are unpredicted events and situations which are not considered during the time estimation.	9	107	16	7	0
Clients are under pressure and tend to give shorter time to contractors for feeder roads projects implementation.	73	37	21	0	8
There are frequent uncontrolled suspensions of works by the contractors without reason and the clients do not react at all.	9	71	51	8	0
The clients do not make required decisions on arisen pending issues and the contractors wait for long before decisions.	11	103	16	9	0
Contractors have many projects and use to give less importance to smaller projects and concentrate the resources on the bigger ones.	8	21	53	39	18

For easy results presentation, the data sets and influencing factors were symbolized as follows:

The influence level of influencing factors was presented in consideration of whether the participants to the research opined by strongly agreeing, agreeing, disagreeing, strongly disagreeing or stating that they had no opinion; the following notations were used: SAG to mean

strongly agree, AG to mean agree, DAG to mean disagree, SDAG to mean strongly disagree and NO to mean no opinion. The influencing factors were notated by T1, T2, T3, T4, T5, T6 and T7; in their descending order in the table 4.6.

The influence level of each influencing factor on feeder roads projects time management as per the percentages of research participants who strongly agreed, agreed, disagreed, strongly disagreed or had no opinions is illustrated in the following table.

Table 4.7. Levels of Factor's influence on the feeder roads projects time management as per the percentages of participants

	SAG (%)	AG (%)	DAG (%)	SDAG (%)	NO (%)
T1	59.7	20.9	19.4	0.0	0.0
T2	27.3	59.0	13.7	0.0	0.0
T3	6.5	77.0	11.5	5.0	0.0
T4	52.5	26.6	15.1	0.0	5.8
T5	6.5	51.1	36.7	5.8	0.0
T6	7.9	74.1	11.5	6.5	0.0
T7	5.8	15.1	38.1	28.1	12.9

The data presented in the table above are illustrates by the following figure:

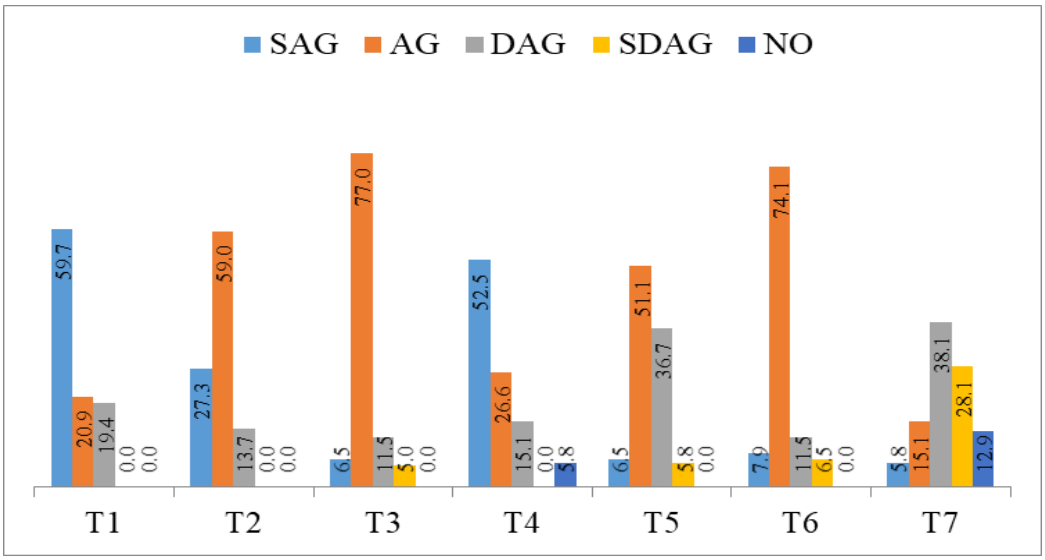


Figure 4.3. Levels of factors influencing the feeder roads projects time management presented as from respondents

Referring to the figure 4.3., the research participants ranked the influencing factors per their influence levels on feeder roads projects time management. The influence of factors was ranked by the research participants in descending order by strongly agreeing, agreeing, disagreeing, strongly disagreeing and stating that they had no opinions.

As per results from respondents, 86.3% of respondents confirmed that the issues related to the feeder roads projects time management in first place are due to fact that the contractors do not have required machinery and equipment to execute works on time, 83.5% of respondents confirmed that in the second place comes the unpredicted events and situations which are not considered during the time estimation, the third place is taken by the delayed required decisions on arisen pending issues where the contractors use wait for long before decisions are made; this was confirmed by 82% of the respondents; 80.6% of the respondents gave the fourth place to the fact that the estimated time for projects implementation is not realistic compared to the volume of required works, whereas the clients working under pressure and tend to give shorter time to contractors for feeder roads projects implementation occupied the fifth place among the influencers of feeder roads projects time management as confirmed by 79.1% of respondents. The frequent uncontrolled suspension of works by the contractor without reason and non-reaction of the clients bon such suspensions also influences the feeder roads projects time management as ascertained by 57.6% of the respondents. The other factor was confirmed by less than 50% of respondents and seemed to have less influence on the feeder roads projects time management. The following figure illustrates the level of influence of each considered factor on the time management for feeder roads construction projects.

Figure 4.4. Main factors influencing the feeder roads projects time management

4.2.2.1. Test of hypothesis on feeder roads projects time management

As the second objective of this research was to analyze the effect of implementation time management on feeder roads projects' performance, the research used Chi-Square to test whether the given factors influence the feeder roads projects implementation duration and affect their construction performance. Once again, the four columns i.e. where research participants strongly agreed, agreed, disagreed or strongly disagreed were taken into consideration whereas the column where they had no opinion was not considered since the participants who had no opinions could not provide useful information as they stood nowhere concerning this hypothesis.

For this research's second objective, the hypothesis related to the question on this objective is the following:

Null Hypothesis (H_o): Feeder roads projects time management does not affect their construction performance.

These results as produced by Mathbeans provide the basis for making decision on whether to accept H_o or reject it and accept H_1

Data: Contingency table

	SAG	AG	DAG	SDAG	
T1	83	29	27	0	139
T2	38	82	19	0	139
T3	9	107	16	7	139
T4	73	37	21	0	131
T5	9	71	51	8	139
T6	11	103	16	0	130
T7	8	21	53	18	100
	231	450	203	33	917

Expected: Contingency table

	A	B	C	D
T1	35.0	68.2	30.8	5.00
T2	35.0	68.2	30.8	5.00
T3	35.0	68.2	30.8	5.00
T4	33.0	64.3	29.0	4.71
T5	35.0	68.2	30.8	5.00
T6	32.7	63.8	28.8	4.68
T7	25.2	49.1	22.1	3.60

Chi-Square = 434.

Degrees of Freedom = 18

Probability = 0.000

The results of the Chi-Square test, shows that its value is 434 where the degree of freedom is 18, the related probability value is too small and closely neighboring zero. Because of this probability value that is less than 0.05 which is referred to as the conventionally accepted significance level, the Null Hypothesis (H_o) was rejected and the Alternative Hypothesis (H_1) accepted instead. It means that according to the test results, the factors taken into consideration by this research influence the feeder roads projects time management and affect their construction performance. The management explanation is that for an effective management of construction time for feeder roads, these factors need to be focused on during the projects planning and related contract negotiation, otherwise, the project managers will face challenges to implement the projects within the planned time and the scheduled projects implementation will not be met. Whatever the project managers will do, they will experience the time overrun; the contracted implementation time will be short and additional time will be unavoidable. However, additional time will not be granted to the contractor without generating projects time management issues.

4.2.3. Feeder roads projects management team characteristics and their effects on their performance

The feeder roads projects management team characteristics was the third independent variable of this study and referred to the assignment given to the management team, their decision-making capacity, qualifications and other tasks assigned to them that impede their performance in the feeder roads projects. By management team, one should understand the client staff, contractor's staff and the projects supervisors. The management team for feeder roads construction projects use to disagree when it comes to poor performance of the projects that they are assigned to manage. They use to blame each other for failure to achieve the whole project as planned or some of its components. For this research, influencing factors of feeder roads management team composition were set in the questionnaire and the participants to the research were supposed to opine about each of them based on their experience and knowledge by confirming whether they strongly agreed, agreed, disagreed, strongly disagreed or had no opinion. Furthermore, the participants were expected to provide their own factors thought to have an influence on feeder

roads projects management team composition which were not included in the questionnaire. The results provided by the participants to this research are shown in the following table.

Table 4.8. Factors that influence the feeder roads projects management team assignments that interfere with their construction performance as per the number of respondents

Factors	Strongly agree (1)	Agree (2)	Disagree (3)	Strongly Disagree (4)	No Opinion (5)
Qualified and experienced staffs are proposed by the contractors in the contract but do not work on the projects.	124	0	6	0	9
Less qualified and experienced staffs are assigned to projects and make mistakes that affect the projects performance.	63	61	15	0	0
The staffs supposed to be permanent on sites are not there in full time and mistakes are made during their absence.	0	86	27	26	0
The clients staffs assigned to manage these projects have other many duties and do not concentrate on them.	62	64	6	0	7
The clients do not have or have less experienced staffs that are unable to make appropriate decisions;	21	67	19	23	9
The clients staff assigned to manage these projects have no decision making power and their superiors sometimes do not give importance to their advices.	38	78	12	11	0
Both the clients and contractors' staffs use to concentrate on their own interests in the projects and compromise the projects performance.	41	77	9	12	0
The clients use to hire incompetent supervisors who	21	65	12	0	41

do not do their assignment properly to ensure the projects performance.					
The contractors and their assigned supervisors have shared interests and collude to serve their interests unbeknownst to the clients, and lead to poor performance of the projects.	11	31	76	0	21

For reduced results presentation, the data sets and influencing factors symbolized as follows:

The influence level of influencing factors was presented in consideration of whether the participants to the research opined by strongly agreeing, agreeing, disagreeing, strongly disagreeing or stating that they had no opinion; the following notations were used: SAG to mean strongly agree, AG to mean agree, DAG to mean disagree, SDAG to mean strongly disagree and NO to mean no opinion. The influencing factors were notated by MT1, MT2, MT3, MT4, MT5, MT6, MT7, MT8 and MT9, in their descending order in the table 4.8.

The influence level of each influencing factor on feeder roads projects management team assignments as per the percentages of research participants who strongly agreed, agreed, disagreed, strongly disagreed or had no opinions is illustrated in the following table.

Table 4.9. Levels of Factor's influence on the feeder roads projects management team assignments as per the percentages of participants

	SAG (%)	**AG (%)**	**DAG (%)**	**SDAG (%)**	**NO (%)**
MT1	89.2	0.0	4.3	0.0	6.5
MT2	45.3	43.9	10.8	0.0	0.0
MT3	0.0	61.9	19.4	18.7	0.0
MT4	44.6	46.0	4.3	0.0	5.0
MT5	15.1	48.2	13.7	16.5	6.5
MT6	27.3	56.1	8.6	7.9	0.0
MT7	29.5	55.4	6.5	8.6	0.0
MT8	15.1	46.8	8.6	0.0	29.5

MT9	7.9	22.3	54.7	0.0	15.1

The data presented in the table above are illustrates by the following figure:

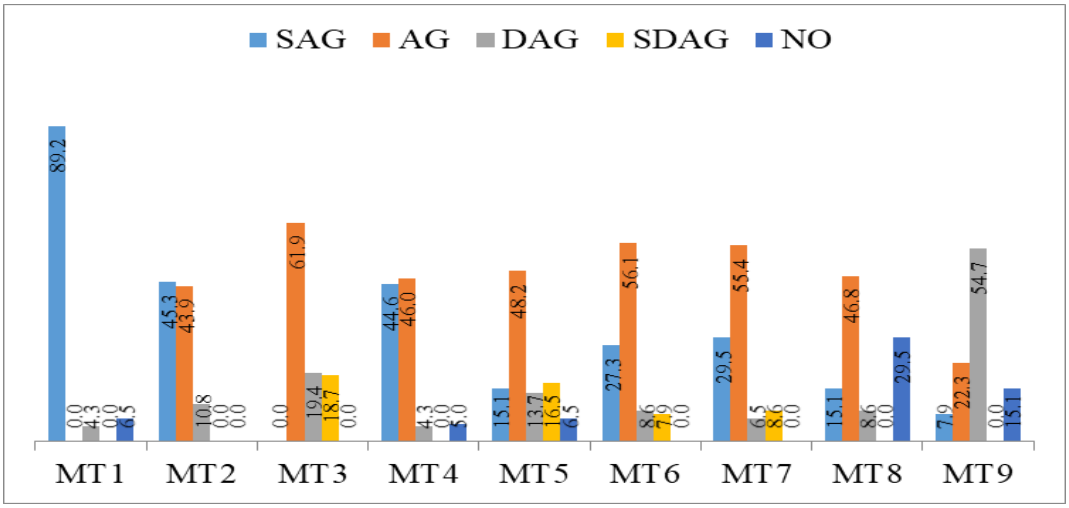


Figure 4.5. Levels of factors influencing the feeder roads projects management team assignments presented as from respondents

Referring to the figure 4.5., the respondents classified the influencing factors per their levels of influence on feeder roads projects management team assignments. The influence of factors was ranked by the research participants in descending order by strongly agreeing, agreeing, disagreeing, strongly disagreeing and stating that they had no opinions.

According to the results from respondents, 90.6% of respondents confirmed that the assignments of the feeder roads projects management team are influenced in first place by the fact that the clients staffs assigned to manage these projects have other many duties and do not concentrate on them. 89.2% of respondents confirmed that in the second place of influencers of the assignment of projects management team, comes the fact that qualified and experienced staffs are proposed by the contractors in the contract but do not work on the projects and the fact that less qualified and experienced staffs are assigned to projects and make mistakes that affect the projects performance. The fact that both the clients and contractors' staffs use to concentrate on their own interests in the projects and compromise the projects performance took the third place among the influencers of the assignments of feeder roads projects management team as confirmed by 84.9% of respondents, whereas the fact that the clients staff assigned to manage these projects have no decision making power and their superiors sometimes do not give importance to their advices was give the fourth place as confirmed by 83.5% of respondents. The fact that the clients do not have or have less

experienced staff which is unable to make appropriate decisions was confirmed by 63.3% of respondents as one of the influencers of feeder roads projects management and 61.9% agreed that the fact that the staffs supposed to be permanent on sites are not there in full time and mistakes are made during their absence and the fact that the clients use to hire incompetent supervisors who do not do their assignment properly to ensure the projects performance, compromise the feeder roads projects management. The remaining factor was confirmed by less than 50% of respondents and seemed to have less influence on the assignment of feeder roads projects management team. The following figure illustrates the level of influence of each considered factor on the management team assignments for feeder roads construction projects.

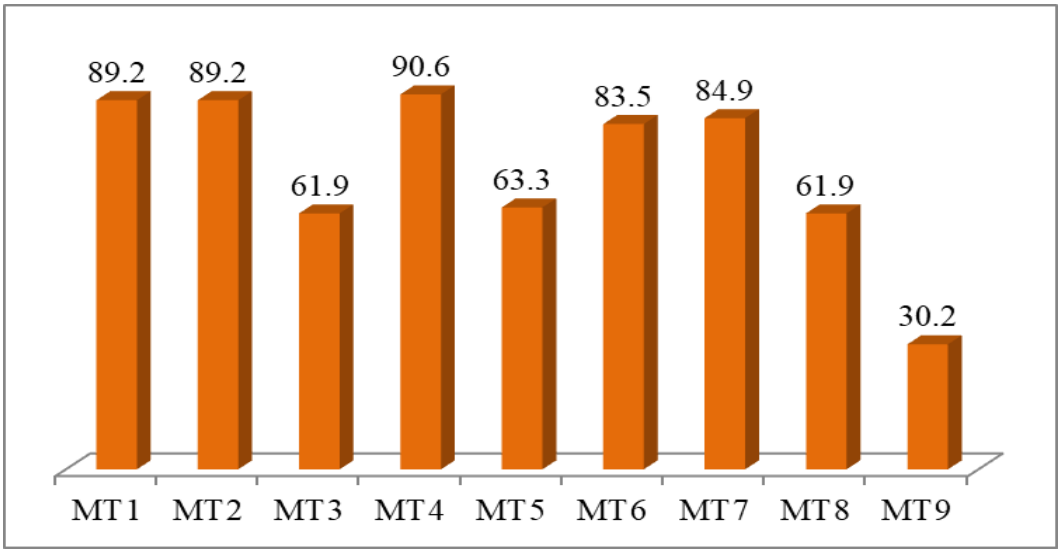


Figure 4.6. Main factors influencing the feeder roads projects management team assignments

4.2.3.1. Test of hypothesis on feeder roads projects management team characteristics

As the third objective of this research was to assess the effects of feeder roads construction management team characteristics on their performance, the research used Chi-Square to test whether the given factors influence the feeder roads projects management team assignments and affect their construction performance. Once again, the four columns i.e. where research participants strongly agreed, agreed, disagreed or strongly disagreed were taken into consideration whereas the column where they had no opinion was not considered since the participants who had no opinions could not provide useful information as they stood nowhere concerning this hypothesis.

For this research's third objective, the hypothesis related to the question on this objective is the following:

Null Hypothesis (H_o): Feeder roads projects management team characteristics do not affect their construction performance.

These results as produced by Mathbeans provide the basis for making decision on whether to accept H_o or reject it and accept H_1

Data: Contingency table

	SAG	AG	DAG	SDAG	
MT1	124	0	6	0	130
MT2	63	61	15	0	139
MT3	0	86	27	26	139
MT4	62	64	6	0	132
MT5	21	67	19	23	130
MT6	38	78	12	11	139
MT7	41	77	9	12	139
MT8	21	65	12	0	98
MT9	11	31	76	0	118
	381	529	182	72	1164

Expected: Contingency table

	A	B	C	D
MT1	42.6	59.1	20.3	8.04
MT2	45.5	63.2	21.7	8.60
MT3	45.5	63.2	21.7	8.60
MT4	43.2	60.0	20.6	8.16
MT5	42.6	59.1	20.3	8.04
MT6	45.5	63.2	21.7	8.60
MT7	45.5	63.2	21.7	8.60
MT8	32.1	44.5	15.3	6.06
MT9	38.6	53.6	18.5	7.30

Chi-Square = 666.

Degrees of Freedom = 24

Probability = 0.000

The results of the Chi-Square test, shows that its value is 666 where the degree of freedom is 24, the related probability value is too small and closely neighboring zero. Based on this probability value that is less than 0.05 which is referred to as the conventionally accepted significance level, the Null Hypothesis (H_o) was rejected and the Alternative Hypothesis (H_1) accepted instead. It means that according to the test results, the factors taken into consideration by this research

influence the feeder roads projects management team assignments and affect their construction performance. The management interpretation is that if these factors emphasized on during the projects management roles attribution, it will be difficult for the project management team to perform well since its management will not be efficient enough to achieve the project goals. Whatever the best the project managers will try to do, there will be disputes between the project stakeholders and the project will be completed with difficulties and delays or its implementation will turn into a total fiasco.

4.2.4. Feeder roads projects performance

The feeder roads performance was considered as dependent variable in this research and the considered indicators of performance are projects implementation completion time, variation of the projects costs, quality of constructed feeder roads and variation of scope of works. These indicators were considered as they are closely related to the considered independent variables which are financial management, time management and project management team characteristics. In this research the dependent variables were implicitly cited and respondents were asked to provide their opinion on their impact on the indicators of the feeder roads project performance by confirming whether they strongly agree, agree, disagree, strongly disagree or have no opinion. Once again, the research participants had the option of adding other factors different from those set in the questionnaire. The following table details the results as they were provided by the participants.

Table 4.10. Factors that are indicators of feeder roads projects performance and affected their financial and time management and their management team characteristics

Factors	Strongly agree (1)	Agree (2)	Disagree (3)	Strongly Disagree (4)	No Opinion (5)
Extended Completion time beyond the planned implementation time	86	28	12	0	13
Increased cost which is higher than the planned budget (initial budget is not respected)	48	74	8	9	0
Low quality of constructed feeder roads which are not durable compared to the funds spent on them	52	69	9	0	9

Frequent variation in initial scope of works which lead to the alteration of the whole project baseline	0	72	61	6	0

For results presentation, the following codes were used:

The influence level of the influencing factors was presented in consideration of whether the research participants opined by strongly agreed, agreed, disagreed, strongly disagreed or stating that they had no opinion; and the following notations were used: SAG to mean strongly agree, AG to mean agree, DAG to mean disagree, SDAG to mean strongly disagree and NO to mean no opinion. The factors were symbolized by P1, P2, P3 and P4, in their descending order in the table 4.10.

The influence level of each influencing factor on the feeder roads projects performance as per the percentages of research participants who strongly agreed, agreed, disagreed, strongly disagreed or had no opinions is illustrated in the following table.

Table 4.11. Levels of Factor's influence on the feeder roads projects performance as per the percentages of participants

	SAG (%)	AG (%)	DAG (%)	SDAG (%)	NO (%)
P1	61.9	20.1	8.6	0.0	9.4
P2	34.5	53.2	5.8	6.5	0.0
P3	37.4	49.6	6.5	0.0	6.5
P4	0.0	51.8	43.9	4.3	0.0

The data presented in the table above are illustrates by the following figure:

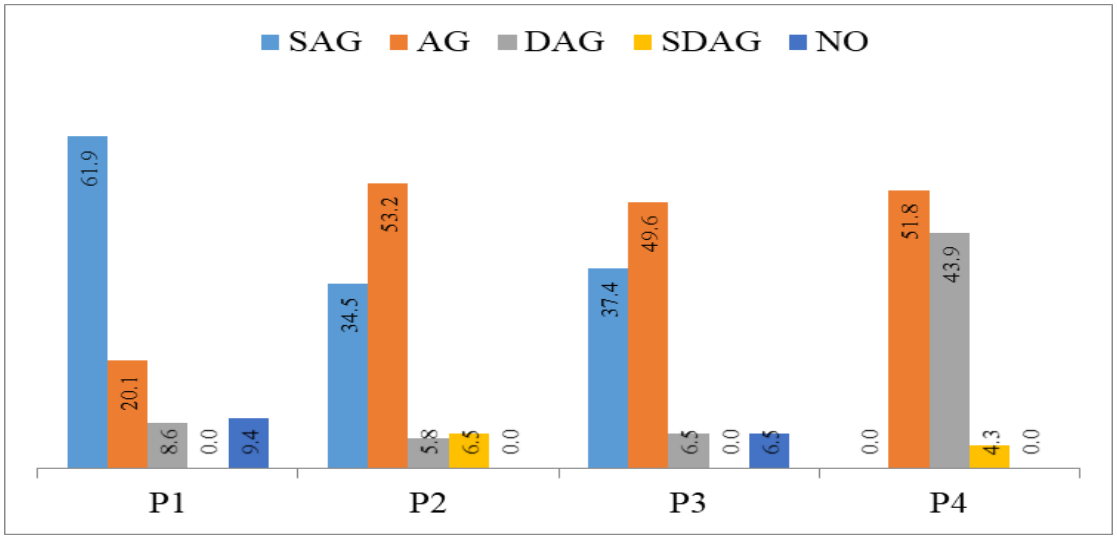


Figure 4.7. Levels of factors influencing the feeder roads projects performance presented as from respondents

With reference to the figure 4.7., the research participants classified the factors per their influence levels on the feeder roads projects performance. The influence of factors was ranked by the research participants in descending order by strongly agreeing, agreeing, disagreeing, strongly disagreeing and stating that they had no opinions.

As per the results from respondents, 87.8% of respondents confirmed that the increased cost which is higher than the planned budget, where the initial budget is not respected affects negatively the feeder roads projects performance in first place, the second place among the influencers of feeder roads projects performance is taken by low quality of constructed feeder roads which are not durable compared to the funds spent on them as ascertained by 87.1% of research participants, whereas in third place, there is the extended completion time beyond the planned implementation time with confirmation from 82% of respondents, whereas the fourth place is occupied by frequent variation in initial scope of works which lead to the alteration of the whole project baseline as confirmed by 51.8% of research participants. The following figure illustrates the level of influence of each considered factor on the feeder roads construction projects performance.

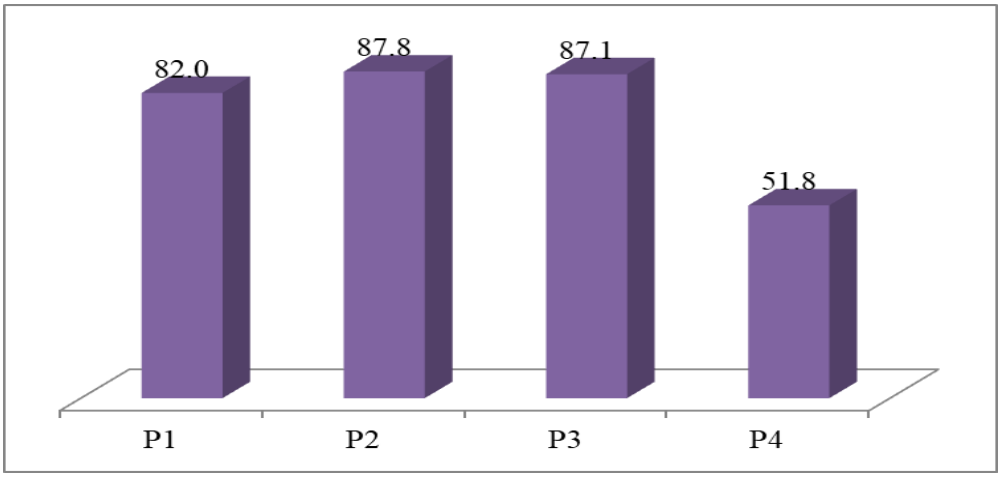


Figure 4.8. Main Factors influencing the feeder roads projects performance

4.2.4.1. Test of hypothesis on the feeder roads projects performance

The main objective of this research was to study the effects of contract management on feeder roads construction projects' performance and the use of Chi-Square to test whether the given factors influence the feeder roads projects performance or not, the four columns i.e. where research participants strongly agreed, agreed, disagreed or strongly disagreed were taken into consideration whereas the column where they had no opinion was not considered since the participants who had no opinions could not provide useful information as they stood nowhere concerning this hypothesis.

For this research's main objective, the related hypothesis is the following:

Null Hypothesis (H_o): The contract management of feeder roads construction projects has no effect on their performance.

These results as produced by Mathbeans provide the basis for making decision on whether to accept H_o or reject it and accept H_1

Data: Contingency table

	SAG	AG	DAG	SDAG	
P1	86	28	12	0	126
P2	48	74	8	9	139
P3	52	69	9	0	130
P4	0	72	61	6	139
	186	243	90	15	534

Expected: Contingency table

	A	B	C	D
P1	43.9	57.3	21.2	3.54
P2	48.4	63.3	23.4	3.90
P3	45.3	59.2	21.9	3.65
P4	48.4	63.3	23.4	3.90

Chi-Square = 207.

Degrees of Freedom = 9

Probability = 0.000

The results of the Chi-Square test, shows that its value is 207 where the degree of freedom is 9, the related probability value is too small and closely neighboring zero. From this probability value that is less than 0.05 which is referred to as the conventionally accepted significance level, the Null Hypothesis (H_o) was rejected and the Alternative Hypothesis (H_1) accepted instead. This means that the test ascertained unequivocally that the given factors, which are also the indicators of feeder roads construction projects performance and closely linked to the dependent variables of this research; have important effects on the performance of feeder roads construction projects. The management explanation is that if the considered influencing factors for dependent variables are not emphasized on during the projects baseline preparation they lead to the poor performance of feeder roads construction projects. The considered indicators of performance in this research indicate such poor performances. As stated in chapter two, other researchers had found that roads construction projects, especially feeder roads commonly encounter challenges in their management. Their completion within the contracted time and budget is barely achievable and failing to do so is considered as poor performance. The previous researches in Rwanda had concluded that the financial related issues such as poor budget estimation and untimely disbursement of the allocated funds were the backbone of such poor performance; others went farther to add that such projects time mismanagement through delaying decision making and untimed communication of any project challenges also contributes to their poor performance. With this research, it was found that in addition to financial and time management issues, the project management team characteristics such as decision making power, organizational structure and hierarchy of power and responsibilities combined with bureaucracy and team members' personal behaviors and motives contribute to the poor performance of feeder roads projects in Rwanda and need effective and immediate joint actions from all the stakeholders.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter concerning the conclusion and recommendations is going to focus on the establishment of the relationship between considered factors for dependent variables and independent variables and the relationship of the dependent variables and the independent variable. Recommendations based on the established relationships of variables and their factors will be formulated and will target the feeder roads projects stakeholders. Recommendations on further research on the matter will also be formulated.

5.2. Conclusions

From the results of this research which tested hypotheses that were based on the selected objectives and have been ascertained by the respondents who participated in it; the feeder roads projects common contracts management issues which sometimes lead to disputes between clients and their contractors, result from the poor planning and mismanagement of their financial resources, mismanagement of their implementation time, and inefficient projects management teams. In fact, the planning of feeder roads projects does not consider the factors influencing their financial management during their implementation and that cause the requirement of additional funds. These malpractices in feeder roads planning and management of financial resources lead to their poor performance cost wise. The mismanagement of feeder roads construction projects' financial resources leads also to disputes between their stakeholders and an important time is wasted while waiting for solutions to those disputes. Furthermore, the delayed decisions lead to the feeder roads construction time overrun, which is an indicator of their poor performance. The feeder roads project management teams whose member are overloaded with other tasks become inefficient, in addition to the fact that they do not have decision making power. In case of challenges or disputes, the feeder roads projects managers blames each other instead of sitting and discussing the issues aiming to find a solution or mutual consensus on the what matters. Sometimes, each of the contracting parties focus on its interests and waste time in doing so instead of concentrating their energy in achieving the goals of the projects they are assigned to manage. All these lead nowhere else than to the feeder roads projects poor performance as their implementation time overrun, their cost increased and their quality compromised.

5.3. Recommendations

Feeder roads construction projects contracts management in Rwanda encounters different problems especially the variation in their costs and estimated construction period that uses to be extended beyond the plan. These problems hinder the attainment of the government's objectives and delay the general development. Despite that, appropriate measures can be put in place by involved feeder roads projects' stakeholders to tackle these challenges that use to compromise their good performance. The feeder roads projects stakeholders should strive to mitigate the impact of their contracts management on their performance with consideration of implementation time, cost and quality and lifetime of constructed feeder roads.

In fact, the planning of feeder roads projects should consider the factors influencing their financial management during their implementation; otherwise, revision of budget will be unavoidable and failure to implement such projects within the planned budget is one of the indicators of poor performance. Furthermore, if the financial resources of feeder roads projects are wrongly planned and mismanaged, that leads to the implementation time overrun together with delayed decisions on challenges that appear during their implementation; failing to complete the construction of feeder roads within the contracted time indicates the poor performance of such projects. This should be avoided, regardless of the effort and resources to be invested. However, during the preparation of feeder roads projects packages, the period during which they will be implemented should be thought about and realistic time should be allocated during their planning and contracting. The management team should be entrusted with the power of making decisions without going through bureaucratic procedures, efficient communication between stakeholders should be encouraged. The feeder roads projects managers on behalf of stakeholders should work hand in hand to handle any issues instead of blaming each other for wrongdoings during these projects implementation. These managers should also be relieved from some responsibilities so that they can concentrate their energy on the feeder roads projects they are entrusted to manage, since overloading them with tasks will decrease their concentration on them and that will lead to the poor performance of their projects.

5.4. Scope for further researches

The management of infrastructure projects under which falls the feeder roads projects has many features and challenges worth to be researched. The interested researchers should consider other factors variables that affect the similar project performance such as planning, funding policy,

stakeholders cooperation, project administration procedures, budget allocation requirements and practices, clients and contractors relations, communication, etc. they can also consider other factors for this research's variables for its enrichment. Further researches on the management of infrastructure projects will lay a brick to the process of building efficient management systems and policies.

REFERENCES

Aftab, H. M. et al., 2014, "Time Management Practices in Large Construction Projects", Faculty of Civil and Environmental Engineering, Universiti Tun Hussein Malaysia 86400 Parit Raja, Batu Pahat, Johor, Malaysia, IEEE Colloquium on Humanities, Science and Engineering.

Aimable, S. 2015, "Effects of Risk Management Methods on Project Performance in Rwandan Construction Industry", Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya.

Akampurira B. 2018, "The Effectiveness of Contract Management on Contractors' Performance", Kyambogo University, Kampala, Uganda.

Aloysius, B. & Benon, C. B. 2017, on "Contractor Monitoring and Performance of Road Infrastructure Projects in Uganda: A Management Model", Journal of Building Construction and Planning Research, 2017, 5, 30-44.

Atul, R. N. & Pimplikar, S. S., 2014, "Role of Project Management Consultancy in Construction Project", MAEER'S Maharashtra Institute of Technology, Pune university, India, IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-ISSN: 2278-1684, p-ISSN: 2320-334X, Volume 10, Issue 6 (Jan. 2014), PP 14-19.

Chigara, B. et al., 2013, "An analysis of cost management strategies employed by building contractors on projects in Zimbabwe", National University of Science and Technology, Bulawayo, Zimbabwe, International Journal of Sustainable Construction Engineering & Technology, Vol 4, No 2, 2013.

Chris, H. 1994, "Rural Road Maintenance and Improvement", World Bank Report, Washington, United States of America.

David, N. & Augustin, F. I. 2018, "Sustainability analysis of road construction projects in Kigali City-Rwanda", University of Rwanda, College of Science and Technology, Kigali, Rwanda.

David, N. W. 2015, "Factors Affecting Completion of Road Construction Projects in Nairobi City County: Case Study of Kenya Urban Roads Authority (KURA)", International Journal of Scientific and Research Publications, Volume 5, Issue 11, November 2015.

Densford, M. O. 2018, “Project management practices and performance of road infrastructure projects done by local firms in the lake basin region, Kenya”, Kenyatta University, Nairobi, Kenya.

Ezekiel F. W. 2017, “Factors influencing road projects performance in Kenya: A Case of road contractors in Machakos County”, University of Nairobi, Kenya.

Gashuga, D. 2016, “Effect of Funds Management on Project Performance in Rwanda”, International Journal of Scientific and Research Publications, Volume 6, Issue 10, October 2016.

Godfrey A. 2016, “Contract Management and Performance of Road Maintenance Projects: The Case of Arua Municipality”, Universal Journal of Management 4(10): 550-558, 2016.

Haroon, S. et al., 2017, “Empirical Evidence of Extension of Time in Construction Projects”, American Society of Civil Engineers.

Ian, G. H. 1995, “Management and Financing of Roads, An Agenda for Reform”, World Bank, Washington, United States of America.

Ibrahim, M. et al., 2012, “Causes of Delay in Road Construction Projects”, Journal of Management in Engineering.

Ismail, A. R., 2013, “Budget overrun issues in construction projects of southern part of Malaysia”, Universiti Tun Hussein Onn Malaysia.

Johnson, M. M.2016, “Factors Influencing Performance of Contractors in The Road Construction Sector: Case of Selected Contractors in Kenya”, University of Nairobi, Kenya.

Joseph, M. K. 2019, “Critical Factors and their influence on Performance of Road Construction Projects in Kiambu County, Kenya”, Kenyatta University, Nairobi, Kenya.

Kaburame, U. P. 2017, “Implementation of Time Management Techniques in Highway Projects for Improved Performance”, University of Rwanda, Department of Civil, Environmental and Geomatic Engineering, School of Engineering, College of Science and Technology, Kigali, Rwanda.

Lawrence, M. G. 2015, “Effects of Risk Management at Project Planning Phase on Performance of Construction Projects in Rwanda” Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya.

Maurice, P. O. et al. 2015, “Effects of Delayed Payment of Contractors on the Completion of Infrastructural Projects”, Chinese Business Review, July 2015, Vol. 14, No. 7, 325-336

Mebrhit, W. 2018, “Assessment of Critical Success Factors for Road Construction Projects in Ethiopia”, Department of Construction Technology and Management, Poly Institution of Technology, Mekelle, Ethiopia, Civil and Environmental Research, Vol.10, No.3, 2018.

MINAGRI, 2013, “Rural Feeder Roads Maintenance Implementation Framework”, Kigali, Rwanda.

MININFRA, 2016, “Infrastructure sector annual report for FY 2015/16”, Kigali, Rwanda.

MININFRA, 2017, “National Feeder Roads Policy and Strategy”, Kigali, Rwanda.

Nelly, J. 2019, “Critical factors influencing implementation of road projects in Kenya”, Jomo Kenyatta University of Agriculture and Technology, Kenya, Journal of Entrepreneurship and Project Management, Vol.4, Issue No.2, pp, 1 -23. 2019.

Nicholas, C. & Paul, D. B. 2010, “Causes of project cost overruns within the Ghanaian road construction sector”, Accra, Ghana.

Nokulunga X. M.2018, “Challenges faced by stakeholders in the road construction projects in the Gauteng province of South Africa”, Creative Construction Conference 2018, CCC 2018, 30 June - 3 July 2018, Ljubljana, Slovenia.

Qi, H. et al., 2008, “Change management in construction projects”, Institute for Research in Construction National Research Council Canada London, Ontario, CIB W78 2008 International Conference on Information Technology in Construction Santiago, Chile.

RPPA, 2020, “RPPA Annual Activity Report 2018-2019”, Kigali, Rwanda.

RTDA, 2018, “Annual Report Fiscal Year 2017-2018”, Kigali, Rwanda.

Safari, E. 2012, “Analysing the causes and Impacts of disputes in the Rwanda Road Construction Sector and determining ways of Reducing or addressing such disputes”, Academic Research Report, Kigali Institute of Science and Technology, Rwanda.

Siborurema, J. B. 2015, “Effects of Projects Funding on their Performance in Rwanda”, United Kingdom, International Journal of Economics, Commerce and Management, Vol. III, Issue 8, August 2015.

Timothy, A. & Yona, S. 2018, “Influence of Contractors’ Financial Capacity on Performance of Road Construction in Kakamega County, Kenya”, United States of America, American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS**)** (2018) Volume 00, No 1, pp 00-00.

Ting, S. N. & Khoo, H. K. 2009, “Project Management Development in Malaysia: A Case Study”, Department of Civil Engineering, Faculty of Engineering, University Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia.

World Bank, 2017, “Proposed additional Grant in the amount of US$68 million to the Republic of Rwanda for the Feeder Roads Development Project”, International Development Association Project Paper.

APPENDIX: RESEARCH QUESTIONNAIRE

TOPIC OF THE RESEARCH: EFFECTS OF CONTRACT MANAGEMENT ON PERFORMANCE OF FEEDER ROADS CONSTRUCTION PROJECTS

This research questionnaire is addressed to people involved in feeder roads construction projects from the planners, funders, implementers, controllers and regulators. The research is for academic purpose and will not be used for any other purpose without consent of the author.

CHARACTERISTIC OF RESPONDENT

1. What is your age:

18 – 25 ☐

25 – 35 ☐

35 – 45 ☐

45 – 55 ☐

55 – Above ☐

2. What is your experience in this field?

0 – 5 ☐

5 – 10 ☐

10 – 15 ☐

15 – 20 ☐

20 – 25 ☐

25 – Above ☐

3. What is your academic qualification?

Primary Education ☐

Secondary Education (A_2) ☐

Diploma Holder (A_1) ☐

Bachelor (A_0) ☐

Masters ☐

PhD (Doctor) ☐

Professor ☐

RESEARCH QUESTIONS

In this section, the respondent is expected to respond according to his knowledge and experience in this domain. Opinions are given and the respondent is supposed to tick the case that matches his response as per the below numbers:

1. Strongly Agree
2. Agree
3. Disagree
4. Strongly Disagree
5. No opinion

Question 1: Financial management issues that impede the performance of feeder roads construction projects are generated because:

Opinions	**1**	**2**	**3**	**4**	**5**
The planned budget is not sufficient compared to the works to be executed.					
The scope of works uses to be poorly defined and there are additional works that were not planned for cost wise.					
There are variation orders which generate addition works requiring additional financial resources.					
There are unpredicted events that cause the changes in scope and quantities requiring additional financial resources.					
The contractor uses the disbursed financial resources for other purposes than what they are supposed to be used for.					
There are sudden cut off in the planned budget and contractors are not paid as per contracts.					
Clients sign contract for works without directly having the budget or having smaller budget than the contract amount.					

If you have any other causes of financial management issues in feeder roads construction projects, please write them here (Optional):

……

……

Question 2: Time management issues hindering feeder roads construction projects appear because:

Opinions	1	2	3	4	5
The estimated time for projects implementation is not realistic compared to the volume of required works.					
The contractors do not have required machinery and equipment to execute works on time.					
There are unpredicted events and situations which are not considered during the time estimation.					
Clients are under pressure and tend to give shorter time to contractors for feeder roads projects implementation.					
There are frequent uncontrolled suspensions of works by the contractors without reason and the clients do not react at all.					
The clients do not make required decisions on arisen pending issues and the contractors wait for long before decisions.					
Contractors have many projects and use to give less importance to smaller projects and concentrate the resources on the bigger ones.					

If you have any other causes of time management issues in feeder roads construction projects, please write them here (Optional):

……

……

Question 3: Project management staff assignments issues that interfere with the performance of feeder roads construction projects are generated because:

Opinions	1	2	3	4	5
Qualified and experienced staffs are proposed by the contractors in the contract but do not work on the projects.					
Less qualified and experienced staffs are assigned to projects and make mistakes that affect the projects performance.					
The staffs supposed to be permanent on sites are not there in full time and mistakes are made during their absence.					
The clients staffs assigned to manage these projects have					

other many duties and do not concentrate on them.					
The clients do not have or have less experienced staffs that are unable to make appropriate decisions;					
The clients staff assigned to manage these projects have no decision making power and their superiors sometimes do not give importance to their advices.					
Both the clients and contractors' staffs use to concentrate on their own interests in the projects and compromise the projects performance.					
The clients use to hire incompetent supervisors who do not do their assignment properly to ensure the projects performance.					
The contractors and their assigned supervisors have shared interests and collude to serve their interests unbeknownst to the clients, and lead to poor performance of the projects.					

If you have any other causes related to feeder roads construction projects management staff issues in feeder roads construction projects, please write them here (Optional):

……

……

Question 4: For feeder roads construction projects, financial management, time management and inappropriate personnel involved in their management impact negatively the performance of such projects. Therefore, if these factors are not emphasized on, they lead to poor performance, which is indicated by:

Opinions	**1**	**2**	**3**	**4**	**5**
Extended Completion time beyond the planned implementation time					
Increased cost which is higher than the planned budget (initial budget is not respected)					
Low quality of constructed feeder roads which are not durable compared to the funds spent on them					
Frequent variation in initial scope of works which lead to the alteration of the whole project baseline					

If you have any other causes related to feeder roads construction projects management staff issues in feeder roads construction projects, please write them here (Optional):

……

……

Thank you for your time and participation in this research; your effort and help is highly appreciated.