UNIVERSITY of RWANDA

COLLEGE OF BUSINESS AND ECONOMICS

ANALYSIS OF DELAY FACTORS AND SUCCESS OF COMMERCIAL BUILDING PROJECTS IN RWANDA

Case of NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies.

By

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MAY 2021

DECLARATION

I, Yvette INGABIRE hereby declare that this thesis entitled ***"Analysis of Delay Factors and Success of Commercial Building Projects in Rwanda; case of NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies"*** is my work and has not been presented in any other university. All the sources I have used or quoted have been indicated and acknowledged by complete references.

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Signature……

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APPROVAL SHEET

This thesis entitled ***"Analysis of Delay Factors and Success of Commercial Building Projects in Rwanda; case of NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies"*** written and submitted by Yvette INGABIRE in partial fulfilment of the requirements for the degree of Master of project management, is hereby accepted and approved.

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The thesis is accepted in partial fulfilment of the requirements for the degree of Master of Business Administration.

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DEDICATION

The almighty God,

My family members,

My lecturers from all levels,

My dissertation's supervisor, and

My friends as well as my colleagues

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My special gratitude goes to my parents, brothers and sisters for their encouragement and moral support while I was conducting this study. Thanks to Almighty God for his enormous love, guidance, protection and blessing towards me while doing this study.

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Yvette INGABIRE

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LIST OF ABBREVIATIONS/ ACRONYMS

ARCOM : Arkansas College of Osteopathic Medicine

CAA : Civil Aviation Authority

CBP : Commercial Building Projects

CEO : Chief Executive Officer

CHIC : Champion Investment Corporation

CTG : CardioTocoGraphy

E&C : Engineering and Construction

EPC Africa : Engineering, Procurement and Construction Africa

GDP : Growth Domestic Product

KCC : Kigali Conventional Center

KCT : Kigali City Market, Kigali City Tower

MIC : Muhima Investment Company

RII : Relative Importance Index

RIW : Rail Industry Worker Program

SPSS : Statistical Package for Social Sciences

UIPE : Uganda Institution of Professional Engineers

USA : Uganda Society of Architects

USA : United States of America

UTC : Union Trade Center

Operational Definition of Variables

Construction of Commercial Building

The construction of commercial building contains three phases namely conception, designing and Construction. Timely completion of these projects remains an indicator of successful construction process.

A construction project remains commonly to be successful when it is completed on time, within budget, in accordance with specifications and to stakeholders' satisfaction. Construction period is often used as a benchmark to assess the overall performance of the project (Dvir, and Shenhar, 2003).

Projects

Projects are an attempt using specific inputs, to create a better situation for the beneficiaries. It should also be emphasized that projects are designed based on a linked set of hypotheses and assumptions and that, therefore, they are nature somewhat "risky" ventures in that their particular approach may not have been tried before (Paul, 2005)

ABSTRARCT

The study is all about analysis of delay factors and success of commercial building projects in Rwanda; case of NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies. Data collection techniques were questionnaires, and documentary review; while methods of data analysis were descriptive statistical methods and linear regression analysis. Target population was 127 people while sample size was 96 respondents. Findings on frequently delay's factors of commercial building projects of construction companies in Rwanda were presented in table 4.2 to 4.10 confirming delay's factors of success of commercial building projects of construction companies; contractors related factors; technical equipment factors; owner related factors; environmental factors; design related factors; material related factors; project related factors; and interpersonal related factors affecting commercial building projects of construction companies in Rwanda. The results on the indicators of development of commercial building projects of construction companies in Rwanda were shown on table 4.11 to 4.16 said the indicators are cost performance; time performance; quality performance; clients' satisfaction; health and safety; and functionality. Findings on the relationship between delay's factors and development of commercial building projects of construction companies in Rwanda on table 4.17 to 4.35 show table 4.17 confirming there is a positive significant correlation between consultant related factors and clients' satisfaction with ($r= 0.076$, $p > 0.01$). The findings revealed that there is a positive and low correlation between contractors related factors and cost performance with ($r= 0.322$, $p<0.01$); time performance with ($r= 0.232$, $p<0.05$); health and safety with ($r= 0.250$, $p<0.05$); functionality with ($r= 0.320$, $p<0.01$) for commercial building projects. The results revealed that there is a positive and strong correlation between technical equipment factors and cost performance with ($r= 0.566$, $p<0.01$); positive and low correlation between technical equipment and time performance with ($r= 0.267$, $p<0.01$); and health and safety with ($r= 0.306$, $p<0.01$); positive and strong correlation between technical equipment and functionality ($r= 0.593$, $p<0.01$) for commercial building projects. As conclusion, the objectives were realized, the research questions were responded; problem of the study was solved; research hypotheses were verified where all six null hypotheses were rejected by saying that there is different delaying factors affecting success of commercial building projects in Rwanda.

Key Words: *Delay Factors; success, Commercial Building, Projects*

CHAPTER ONE: INTRODUCTION

I.1 Background of the Study

Construction industry developed famous as one of the important industries throughout the Globe. It is one of the funders for a country's growth domestic product (GDP). In USA, the engineering and construction (E&C) industry has needed a robust year, where E&C firms have been positioned as active participants in commercial real estate's building which are smart, and connected future (Michelle, 2018).

In European countries like England, construction manager remains the key person in construction and generally representing the contractors, their contributions towards the successfulness of construction projects were undeniable, particularly during the construction phase. Given that construction phase exploits a lot of resources (manpower, materials, money, and machines), a competent construction manager is needed in order to manage those resources and geared up to achieve project objectives without delays of project completion (Ibrahim, 2010).

Construction of commercial building involves three phases namely conception, designing and Construction. Timely completion of these projects is an indicator of successful construction process. A construction project remains commonly successful when it is finished on time, within budget, in accordance with specifications and to stakeholders' satisfaction. Construction period is often used as a benchmark to assess the overall performance of the project. Generally, a project is successful once it has been completed as per the time frame proposed before the start of the project (Dvir and Shenhar, 2003).

Time required to complete a certain construction project is often more than specified time in Contract. These delays or overruns depend on many factors, such as technical factors,

environmental factors, resources management factors and interpersonal factors. Usually, majority of project delay occurs during construction phase, where unforeseen factors (environmental concerns and restrictions, ground conditions, etc.) are always involved. Construction delays lead to increase in overall project cost, henceforth completing projects on time is beneficial to all parties involved in projects.

Construction of commercial building remains an important industry to determine the growth of economy in any country around the globe. This is because construction projects include many stakeholders and therefore boost the economic activities for the development of a country. Normally, the construction projects have a defined period of time during which all construction activities would be completed. However, it is rare that the construction project meets the completion time. Construction project management mentions to as the proper planning, good coordination of activities, and control of a project from conception to the completion of the entire project. This comprises understanding of the client's need in terms of quality, cost and time (Dvir and Shenhar, 2003).

Project planning is ineffective, the chances of monitoring, evaluation and control being effective may be slim (Federal Government of Nigeria, 2009). In addition to that, a relationship between resources, new ideas, monitoring and evaluation of the project progress define the end result. It is in that case, a project manager safeguards that skilled and experienced people are properly selected and used at the right time to maximize the benefits for the customer. Even though much effort can be put in the proper management of construction projects, there is still delays affect the completion of the project at the right time (Josephson and Lindstrom, 2007).

In the last two decades, in Kigali; the capital city of Rwanda, commercial buildings have been raising and many construction companies played great role in the effective and successful completion of all the construction processes. Even though experienced contractors bid for the construction activities, many construction projects in Rwanda overruns the completion time. Some commercial building construction projects in Kigali city experienced a wide range of delays. A typical example is the case of Union Trade Center (UTC), Kigali City Market, Kigali City Tower (KCT), Kigali Conventional Center (KCC), Kigali Height, Down town market, MIC, CHIC, M & M Plaza, Makuza Plaza, among many (Anita Anyango, 2019).

I.2 Problem Statement

Delays are among the most frustrating issues in a construction project. They not only cause your company to incur more costs, but also affect your reputation by giving a perception that you can't deliver projects on time. More to that, it is likely that untimely completion of the project leads to contractual penalties if the delay caused your client to lose money (Assbeihat, 2016).

A global analysis of construction projects has been conducted to review the main factors of delays in Rwanda. A statistical analysis conducted on commercial building projects since 2010 to 2020 for 15 projects conducted, none of them meet the deadline as per the schedule. It was observed that 15% of these projects were cancelled and 75 % needed more time to be added for the project to be completed (Chandu *et al.*, 2016).

In Kigali city, Champion Investment Corporation (CHIC building), Down town commercial buildings, Muhima Investment company (MIC), M&M Plaza, Makuza Plaza and many others are the commercial buildings have been completed; but there is also high number of cancelled and delayed commercial buildings projects which are very significant around the city. Therefore this

study intends to investigate on which the delay factors are affecting success of commercial building projects in Rwanda, especially those constructed by NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies.

I.3 Objective of the Study

This study has two categories objectives including general objective and specific objectives.

I.3.1 General Objective

Main objective of the study is the analysis of delay factors and success of commercial building projects in Rwanda. This was achieved through the following specific objectives.

I.3.2 Specific Objectives

The specific objectives of this project are in four folds:

i. To identify frequently delay factors pertaining for commercial building projects of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd
ii. To evaluate indicators of success of commercial building projects delays of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd
iii. To analyze the relationship between delay factors and success of commercial building projects of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd
iv. To evaluate the consequences of delay for success of commercial building projects of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd

I.4 Research Questions

To achieve the research objectives above, the following research questions are answered during this study.

i. What are frequently delay factors pertaining to commercial building projects of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd?
ii. What are indicators of success of commercial building projects delays of construction companies of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd?
iii. What is the relationship between delay factors and success of commercial building projects of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd?
iv. What are the consequences of delay for success of commercial building projects of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd?

1.5 Research Hypotheses

This study verified the following six null hypotheses below.

Ho1: There is no significant influence of delay's factors on cost performance in commercial building projects of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd

Ho2: There is no significant influence of delay's factors on time performance in commercial building projects of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd

Ho3: There is no significant influence of delay's factors on quality performance in commercial building projects of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd

Ho4: There is no significant influence of delay's factors on client's satisfaction in commercial building projects of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd

Ho5: There is no significant influence of delay's factors on health and safety in commercial building projects of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd

Ho6: There is no significant influence of delay's factors on functionality in commercial building projects of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd

1.6. Significance of the Study

This research intended to guide stakeholders in different construction projects to make a clear analysis on different factors that cause delays before biding for a certain project.

Academically, this project is expected to be used as the source of information for further researches in the field of civil engineering project management. It can also serve as a guide for all construction parties with effective management in construction projects to achieve a competitive level of quality and a time effective project.

This research also establishes an allocation of responsibilities for each individual that result in delays in construction projects. It also highlights the importance of acknowledging the most significant factors and their causes leading to the delay overarching issues in order to achieve a successful implementation of construction projects.

1.7 Limitations and Delimitations of the Research

The study has encountered different limitations where time constraint is hold, this means the time provided for conducting the research project was short to get the required information that requires enough time because of pandemic of COVID 19 that limited gatherings.

Language problem was an issue where some records were prepared in French language whereas the study results must be in English, matching the two systems being another constraint.

The study was delimited on the content, geographical and time scopes. The study was an inspiring of project management that intends to analysis of delaying factors and success of commercial building projects in Rwanda.

The research collected information at selected construction companies in Rwanda including NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies.

These companies were chosen because all of these companies' commitment are to delivering the quality by walking with their clients at every project phase, from strategy formulation through design, project management and implementation right through to support and upgrades. Customer satisfaction drives every aspect of their commercial contractor.

However, the period of this study was five years that's to say from 2015 to 2019. It was chosen because we evaluated the constructions projects from stated companies that faced some delays of their construction projects between 2015 and 2019; and the factors that caused those delays in previous years.

1.8. Brief Description of Thesis Structure

This research project was subdivided into five chapters. First chapter dealt with introduction. It presented background of the study, statement of problem, research objectives, research questions,

justification/significance of the study, limitations and delimitations of the study, and brief description of thesis structure.

Second chapter came up with literature Review. It identified the theoretical review, conceptual review, empirical review and conceptual framework.

Third chapter was research methodology. It showed the research design, study population identification, sampling procedure, data collection, operational definition of variables, methods of data analysis, and ethical considerations.

Chapter four was analysis and interpretation of results. Fifth chapter was the summary of the findings, conclusion, and recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter looks at what has already been published by some accredited scholars and researchers who wrote on related study. It identifies the theoretical review, theoretical conceptual review, empirical review and conceptual framework.

2.1 Theoretical Review

This study refers and uses the theories like competence motivation theory, stakeholder theory and goal setting theory.

2.1.1 Competence Motivation Theory

Competence motivation theory is a conceptual framework designed to explain individuals' motivation to participate, persist, and work hard in any particular achievement context. The central thesis of the theory is that individuals are attracted to participation in activities at which they feel competent or capable.

Theory can be used by researchers and practitioners in sport and exercise psychology fields to identify why and how children, adolescents, and adults can be encouraged to participate and to exert effort in these achievement contexts (Horn, 2004).

In the following entry, research and theory on competence motivation within the physical domain are reviewed. This begins with a brief historical overview of the theory and its constructs. Following that, the results of the research on the following segments are summarized: (a) correlates of competence motivation, (b) developmental trends in perceived competence, and (c) the impact of significant others on competence motivation (Elliot, and Dweck, 2005).

Competence motivation theory is useful for our study where it clarifies on when individuals are attracted to participate in activities at which they feel competent or capable at construction projects

in Rwanda. Based on the research and theory to date, enhanced perceptions of competence can be achieved when individuals experience success at optimally challenging tasks and when they receive positive, encouraging, consistent, and information-based feedback from significant others within that environment where the projects of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd were implemented in Kigali-Rwanda.

2.1.2 Stakeholder Theory

Stakeholder theory was developed by Mitroff in 1983 and later advanced by Freeman in late 1983. Theory postulates that the relationship between project stakeholders and the organization is one that is designed to create value for the stakeholders. Theory explains how to manage the various interests of the legitimate stakeholders that exist in a project. There are stakeholders who have contractual obligations and derivatively legitimate stakeholders whose relationship to the project is derived from their ability to affect the project work, organization or other stakeholders (Kolesnikov, 2014).

Implementation of megaproject deliverables is critically dependent upon stakeholder management skills. The need to achieve project objectives that fully address stakeholder expectations throughout the project life-cycle is of priority concern to the project team. However, one major task that needs to be undertaken in developing a project's strategic aims is to identify stakeholders in order to develop a project brief that best addresses their often-conflicting range of needs and wishes. Theory is based on the principle that project managers must connect into the organizational grid, identify key stakeholders and their value propositions in a project and manage them.

In the context of this study, megaproject managers are unlikely to deliver project success without paying attention to the expectations and needs of key influential project stakeholders. Stakeholders may cumulatively exert a significant impact on the perception of project success. A project does

not meet expectations of influential stakeholders is not likely to be regarded as successful, even if it remains within the original time, budget and scope (Kolesnikov, 2014).

It is therefore this theory is very useful for current study because it helps us to manage the various interests of the genuine stakeholders that existed construction projects of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd in Kigali-Rwanda. In stakeholder theory, we found that some stakeholders have contractual obligations and derivatively appropriate stakeholders whose relationship to the project is derived from the ability to affect the project construction work, organization or other stakeholders in Rwanda. Therefore, the need to achieve project objectives fully address stakeholder expectations throughout the project life-cycle is of priority concern to the project team in Rwanda.

2.1.3 Goal Setting Theory

Goal-setting theory refers to the effects of setting goals on subsequent performance. In 1960's, Edwin Locke put forward the Goal-setting theory. This theory states that goal setting is essentially linked to task performance (Tosi and Latham, 1991). It states that specific and challenging goals along with appropriate feedback contribute better task performance. Edwin Locke found that specific, difficult goals are performed better than general and easy goals. People are motivated to work when they have a goal. This is related to the concept of goal setting theory which presupposes that an individual is committed to the goal (Dela and Bernardo, 2013).

According to goal-setting theory for current study is widely utilized in the construction industry because productivity per day of any trade is based on a certain output of work. For example, masons/block layers need to lay a certain number of blocks to account for the day's work and pay of NITSAL International Construction, Epitome Architects Rwanda Ltd and EPC Africa Companies Ltd in Kigali-Rwanda.

2.2 Theoretical Conceptual Review

2.2.1 Causes of delaying factors of Constructions Projects

Study conducted on delays in construction projects: case of Jordan. The study was aimed at identifying the major cause of delays in Jordanian residential construction sector, and to assess the relative importance of these delays. The author stated that delays not only affect the overall cost of the project but also negatively affect the economic development of a country. In this research, drawings open conversion system has been employed to classify the delays causes, whereas the collection of data were conducted through questionnaires.

This research revealed that for consultant the most affecting critical delay causes are poor planning and scheduling of the project by the contractor, financial difficulties faced by the contractors and too many changes order from the owner. For contractors: it was observed that the financial difficulties faced by the contractors followed by the change of order by the owners and shortage of manpower. Contrarily, the owners viewed delays causes as a result of poor planning and scheduling of the projects by the contactors, financial difficulties faced by the contractors and unskilled manpower. The author concluded that the contractor related factor is the most affecting factor followed by too many changes of order by the owner (Sweis, and shiboul, 2008).

Among of the top 10 factors from the contractors, consultants point of view the first two critical factors which are (1) rain and (2) flood can be categorized among the external factors. It was recommended that plan of action and scheduling should be done taking care of rainy season and the list of activities suitable in rainy season should be provided. The other remaining factors such as (3) impact on people's land; (4) award the project to the lowest bidder; (5) frequent equipment breakdowns; (6) poor site arrangement, management, and supervision; (7) poor ground condition

and terrain; (8) poor qualification of the contractor technical staff and project teams; (9) late progress payment; and (10) low productivity labor, can be alleviated through adequate measures and effective planning.

Delay in payment was the sole factor associated with the owner listed in the top 10. This shows that once the contract indicates a payment plan there is not any delay in payment. It was also requested that before the execution of the project the owner should avail the fund for construction activities. The impacts of ground condition and the acquisition of land on the project need to be properly studied and managed to reduce these impacts on the three project objectives. In acquiring land for road projects, a qualified external consultant can be hired to provide a fair assessment of the land value of the affected community (Santoso *et al.,* 2012).

This was observed that among the 70 factors, nine of them are critical and need to be addressed using the proposed mitigation measures. The author ranked the nine critical factors as follows: (1) Delays in supply of materials, (2) Natural disaster, (3) Financial difficulties, (4) dispute at sites, (5) poor site management, (6) inexperienced contractors, (7) rapid changes in design, (8) error in time estimation and (9) shortage of skilled labor.

The author also provided corresponding mitigation measures as follow: (1) sufficient material should be stored on the site, (2) proper arrangements in floods and heavy rainy areas, (3)sufficient fund should be allocated for the project, (4) coordination between labor and management, (5) qualified and experienced engineers should be appointed, (6) contactors should be awarded on merits, (7) frequent design changes should be awarded, (8) sufficient field data should be investigated (9) skilled labor should be hired (Sohu *et al.,* 2017).

It was recorded that there are ten major delay factors that affect delays in construction. These are the delay in payments, poor cash flow, poor contractor supervision, insufficient communication between parties, delay in instruction, underestimation of contract time, poor professional management, variations, inadequate skill and experience of contractor staff and poor site management. The author proposed mitigation strategies among which having a clear vision at design and planning stages, and engaging competent consultants, and involving financially stable contractors, close supervision of the works by all parties, timely payments, timely decision making, good communication flow, construction staff be of proven competence and to have regular site meetings are the best ones (Henry and Henry, 2013).

Ten critical causes were (1) contractor's improper planning, (2) contractor's poor site management, (3) inadequate contractor experience, (4) inadequate client's finance and payments for completed work, (5) problems with subcontractors, (6) shortage in material, (7) labor supply, (8) equipment availability and failure, (9) lack of communication between parties, and (10) mistakes during the construction stage. The author also highlighted six main effects of delay among which, (1) time overrun, (2) cost over- run, (3) disputes, (4) arbitration, (5) litigation, and (6) total abandonment was respectively ranked to be the most.

The study has also established an empirical relationship between each cause and effect. The contractor and owner were found to have opposed views, mostly blaming one another for delays, while the consultant was seen as having an intermediate view. The study showed there must be a collective work between the three parties to reduce the rate of delay in projects, and showed that the delay depends on the type and size of the project (Sambasivan & Soon, 2007).

It was observed in another study that all of total of 45 factors the top three influencing factors in causing delay in order of importance as: (1) delay in honoring certificates, (2) lack of experienced contractors for large projects (3) changes in the designs (4) lack of professional project management skills in construction projects (5) lack of skilled tradesmen to coop with the new technology in construction industry (Kwatsima,2015).

2.2.2 Success of Commercial Buildings Projects

Locating and leasing a space is only the first step to creating the perfect commercial real estate property for goals. Commercial real estate development is the next one. Rarely do commercial real estate spaces come exactly how owners and tenant's desire. Each organization has its own goals and an ideal layout for productivity.

There are many moving parts involved in successfully renovating and building commercial real estate to a tenant's specifications. The top commercial real estate developers handle every aspect of that development process and work closely with tenants to build the space they desire. Handling your commercial real estate development on their own, on the other hand, can quickly become time-consuming and expensive without professional experience. Each process of developing commercial real estate is slightly different based on the space and the tenant's specifications (Chris Gardner, 2019). Commercial real estate development services include:

Developing commercial real estate requires many different vendors: architects, construction companies, interior designers, facility managers and more. Don't stress about finding the perfect one's for them; let their professionals refer them to trusted vendors and guide them through the process of hiring them. Their team help them complete requests for proposals for any outside services they need. They also help to evaluate the possibilities and choose the one that is best for

project. Once their professionals are hired, they can manage them through the completion of development process.

Once the plans are all set in place, the most important part of commercial real estate development begins: the construction process. CEO and founder Chris Gardner have years of experience overseeing the build out of new commercial spaces, both his own and those of his clients. He helps you hire an appropriate construction company to complete the work on time and according to your budget. Let his professional experience make this process as easy as possible for you.

In order to safely and effectively move into a new commercial office space, proper preparation must be done. They must evaluate how they keep business operational during the move process, find appropriate professionals to handle the move and more. This is where a commercial real estate developer like CTG Real estate services comes in.

A professional with knowledge of the new space and how it differs from their current space can best manage their relocation process. They can manage their move-in process based on what works best for their business. Moving in general is a headache; moving an established office can be even more so. Save himself the stress with a professional like CTG Real Estate Services.

Decommissioning of their old space go hand-in-hand with move into a new space. Many tenants choose to hire the same professional for both services. This process returns old space to the terms of lease agreement. Their professional manage the removal of extra furniture, any repairs that need to be done and any final cleaning requirements of lease. Clearly, there are a lot of steps required in the commercial real estate development process but they may not all be necessary with space. Commercial real estate developers like CTG real estate services work with them to create a customized plan that works best for their needs (Chris Gardner, 2019).

2.3 Empirical Studies

Soomro (2019) study the causes of time construction of building projects in Pakistan. The main objective of the research was to identify main causes of time overrun in the construction of building projects and its possible mitigation measures. They used relative importance weight RIW to analyse collected data through questionnaire. The author highlighted the most affecting cause with respect to their relative importance weight. Financial issues faced by the contractors was ranked the first, then comes inexperienced contractors, followed by weather impact and delays in supply of materials at the site. Mistake in design, shortage of skilled labor, incomplete subcontractors and errors in time estimation were respectively ranked the least affecting parameters. The author proposed mitigation measures among which adequate funds to be used should be availed before the start of the project. This reduces delays caused by payment delays. Second, the expertise in selection of contractors and manpower is highly needed and proper planning in flood and rainy season. He also suggested that, appropriate materials, skilled labours and favourite sub-contractors should be used.

The work of (Wiguna & Scott, 2005) published at the 21st annual ARCOM conference 7-9, September 2005. University of London. They investigated on the nature of the critical risk factors affecting project performance in Indonesia building contracts. The primary aim of the study was to determine critical factors causing construction delays in Indonesia. The study employed questionnaires to collect data which was designed to assess risk levels in terms of time and cost. The respondent from 22 building projects constructed in East java and Bali province showed that high inflation, change in material price, owner's order change, poor design, weather conditions, delays of wages generally appeared to be the most critical factors. The author said that most of the aforementioned factors are incontrollable.

The study of (Hindawi, 2007) highlighted the main reasons of delay in construction projects in Iraq, a detailed questionnaire was developed for 78 causes of the delay and presented the to 27 respondents with expertise; These are: engineers, owner and contractors. The researcher placed degrees of the reasons and find arithmetic mean and demonstrate the importance of the using regression analysis method to find the relationship between the number of years of experience and the rate of delay rate among respondents. The most critical factors were found to be low price at the time of bidding, contractors' financial incompetence and weakness in time scheduling, frequent change of material price, and sometimes delays due to laboratory tests. The study revealed that the owners related factors are the most critical followed by contractor's related factors.

In 2011 (Ayudhya, 2011) published a paper at the journal of civil engineering and architecture in titled Evaluation of common delays causes of construction projects in Singapore. The primary objective of the study was to identify and evaluate the common delay factors among projects owners, consultants and constructors in building projects in Singapore. Ayudhya used interviews and questionnaires among 74 construction stakeholders: owners, consultants and contractors. He also identified 35 delay factors among which the owner related factors, weather conditions, contractors related factors were the most affecting factors. The obtained data were computed and analyzed to obtain frequency, statistical descriptive variance using SPSS 12.0. It was observed that frequent change of orders in large construction project affect the insufficient working drawing details, inaccurate bill of quantities and unrealistic contract durations which affect project duration during the implementation period. It was also highlighted that poor planning in progress payment by the owner severely delays the execution of the project. Interviewees explained that project owners should have enough fund allocated for payment of different

expenses and when this fund is not available it surely causes delays. The author concluded by classifying the main delay cause into 4 main categories: contract and specifications, financial related factors, environmental related factors and other common factors.

According to (Sofia Margarita Vidalis, 2002) study the cost and time overruns in highway construction in Canada. It was observed that cost and time overruns are among the common problems in every construction project. Various factors such as utility and weather damage delays can have a significant impact on construction cost, this impact results in the exceeding the budget and extend project schedule. Awareness of critical delay factors and its impact to the construction project can help control cost and time extension on projects. This is due to the fact that some parameters are connected to external factors or internal factors. The primary objective of the study was present the status on the causes of overruns in Florida department of Transportation highway projects (Canada). Documentation has been used as a method for data collection where by results from various Florida Department of Transportation highway projects over the past two fiscal years indicated that cost and time overruns, expressed as a percentage of the original contract amount are mostly caused by designs and changed conditions.

In Latino America, a study has been conducted by (França & Haddad, 2018) on causes of construction projects cost overrun in Brazil demonstrated that cost overrun are affected by different factors. 85 causes were identified through questionnaires which involve 11 directors, 17 project managers and 19 area managers of different construction companies. The study used frequency index FI which is used to list the causes identified according to their frequency from the evaluation of each interviewee. On average, respondents pointed out that 71% of contracts have their costs increased by the end of the project by 14%. The results present a very large correlation in the perception of the causes of the cost overrun in the works. Project managers and area managers

presented a coefficient of 94% Spearman correlation. The directors and project managers with 83% and the directors and area managers with 79%.

Studying the case of Norway, (Youcef & Bjorn, 2018) conducted a study on causes of delays and their cures in major Norwegian projects. The author started by showing how project delays affect the construction industry in Norway. The main concern of the research project was to identify the main delay factors and provide possible solutions. They used intensive literature review, open questionnaires and interview. The questionnaire was used to assess the perception of client, consultants and contractors on the relative delay factors in the construction industry. The obtained data were analysed and ranked according to their frequency. As in other countries, the researcher used a questionnaire that contains three main sections: The first section highlights the background data about the respondents and their company, the second section enabled the respondent to list three most critical delay factors and the last section was designed to provide the best solution for these delay factors. A number of 202 respondents were able to give their perception. The study revealed the main factors for time overrun among which poor planning and scheduling followed by slow decision-making process and internal administrative bureaucracy within the project organization have been respectively ranked the top 3 critical factors.

Studying the delay cause in Oman, Nasser Alma and Omar Amoudi (Alamri et al., 2017) through their study in titled analysis of construction delays causes in dam project in Oman. The study aimed at investigating and analyzing the reason behind delays of dam projects in Oman. A questionnaire was developed and contained 60 causes of delays grouped in different categories such as clients, contractors, consultant and external factors. The study used statistical analysis and ranked critical factors according to their significance. It was observed that critical factors

behind dam construction delay are weather conditions, change of orders, and uncertainty in ground conditions and poor site management. It was observed that among the top factors, weather condition, change of orders and ground condition were the first 3 factors. This study provides some possible solution to minimize the time overrun in dam projects. For weather related factors it was recommended that the contract award should be schedule according to external weather severity such as seasonal rain and temperature periods, and the contractor should modify the working time during summer heat. For ground related factors, the author recommended that more data collection from the field of Dam construction projects with intensive laboratory testing for ground conditions. It was also suggested that staffs that deal with Dam construction project should have a high training in geotechnical aspects.

Many related studies found that the bad political situation in Palestine due to the Israel occupation was major influential on the Palestinian construction sector. As an illustration (Al Najjar *et al.*, 2009) studied delay and cost overrun in the construction projects in Palestine-Gaza Strip. Their primary objective was to assess factors leading to time overruns and cost overruns in construction project in Gaza strip. The author used sampling method through 66 contractors and 27 consultants and 31 owners were selected. The survey included 110 which were categorized in 12 main categories.

The study ranked the factors according to the perspective of contractors, consultant and owners. There was a good agreement between contractors, consultant and owners regarding their perspectives on the causes of delay and cost overruns. The top 4 causes were listed as follow (1) strikes and border closures, (2) material-related factors, (3) lack of materials in markets, (4) delays in materials delivery to the site. These were corresponding to the causes of cost overruns

which are: Price fluctuations of construction materials. Contractor delays in material and equipment delivery, inflation.

In the study of (Assaf, 1995) the most important reasons for delay in large construction projects in Saudi Arabia and their relative importance have been evaluated. A survey was undertaken among different stakeholders such as contractors, consultant and projects owners. A sample of 24 contractors, 15 consultant engineering office, and nine owners from the Eastern Province of Saudi Arabia were selected randomly. The survey included 56 causes of delay, asked of the sample questionnaire to determine the degree of importance for these reasons, the delay factors were grouped into nine major groups. The results revealed that there is a consensus in the views of both the contractors, consultants and owners in the order of reasons for the delay and its importance, and financial matters was ranked first among the items. Several reasons found in this study such as: adoption of documentation, the delay in payment to contractors and liquidity problems in the implementation phase, change in engineering designs, conflicts because of schedule for sub-contractors, slow in making decisions, mistakes in design, Shortages and lack of employment experience.

One year later (Assaf & Al-Hejji, 2006) studied a variety of projects in Saudi Arabia to determine the most important reasons for the delay in construction projects, from the point of view of both the owner, contractor and consultant. The study conducted on 23 contractors, 19 consultants and 15 owners were developed 73 reason for the delay in nine groups and the study showed that overtaking time by (10%-30%) and appeared the most common causes of delay is (change order) and found 45 out of 76 projects may delayed from the planned date for the implementation of. The study revealed that most of the reasons for the delay are as follows: Delay in progress payments, Ineffective planning and scheduling by contractor, Poor site management and

supervision by contractor, Shortage of labors and difficulties in financing. All parties agree that the following causes are the least important: changes in government regulations, traffic control, restrictions at site, effect of social and cultural factors and accidents during construction.

In Lebanon, (Mezher & Tawil, 2006) studied of the most important reasons for the major causes of delays in the construction industry and the relative importance of these reasons. Was undertaken a survey of a randomly selected sample of 11 owners, 15 contractors and 10 consultant engineering office from Lebanon. The survey included 64 causes of delay, grouped into 10 major groups, which the participants were asked to indicate the level of importance of each delay. The study showed that most of the reasons for the delay in construction projects in Lebanon are: Factors related to the owner are financial problems. Factors related to the contractor is the contractual relationship. Factors related to the consultant is project management.

According to (Chan & Kumaraswamy, 2002) explored the possible cause and suggestion to compress construction durations of various types of building projects. The compressing construction duration lessons learned from Hong Kong building project was the main objective of the study. The author presented different delay causes as per the reviewed literature, therefore developed a regression-based model on Hong Kong public housing construction project data. The primary thrust of these surveys was to compile and compare the collective experience-based perceptions of different industry practioner, clients, consultants and contractors as to the assist in speeding up the construction process of building projects. On the basis of the factors emerging as significant in studies reported. Aim from this study to find and develop modeling mathematical linking the relationship between the time planned for implementation and the actual time of implementation to be used by project managers and consultants to estimate the time required by the implementation of projects. The study showed that the designer is the main reason on delay,

bad weather, different work condition, late deliveries, economic condition and increase in quantity. Then built a mathematical model (simple linear) of the relationship between time planned and actual for projects, confidence 99% degree.

According to the published paper of (Agu, 2016) in the international journal of innovative science, engineering and technology, assessment of factors causing delay on building construction project in Enugu, Nigeria. The aim of the research was to develop a delay analysis system which were to be used to assess and reduce the impact of delays in Nigeria. In this study, through interviews, focus group discussion and questionnaire followed by relative importance index RII, the author has been able to categorize critical delays factors. The first category is design related factors such as change of design, delay of approval and revising design documents. The second category is Interpersonal related factors such as poor communication and coordination, shortage of labor and absenteeism, third category is owner related factors such as change of order by owners during the construction project, delay in payment. All these delays critically affect the construction time. The author concluded that the top five most important factors causing delays are factors of delay in revising and approving design documents, delays in sub- contractor's work, poor communication and coordination, change orders by owner during construction and inadequate contractors work. To minimize delays in construction project, effective strategic planning, site management and supervision and clear information and communication channels are recommended.

According to (Tumi, 2009) studied delays in construction projects in Benghazi city in Libya. The study showed that delays in construction industry in Libya. He showed that delays have negative effects such as lawsuits between owners and contractors, increased costs, loss of productivity and revenue and contract termination. The objective of the study was to identify the major causes of delays in construction project in the city of Al Zentan, Libya, to identify the effects of delays

in construction project and to recommend strategies for improving project delivery based on the findings of the study. The study used literature review and a questionnaire survey targeted at construction projects in the Libya's country and have been used as the tools to carry out this study. The study revealed that the problem of delay is not solved unless measures have been taken. Administrative strict order to reduce this phenomenon through proper planning and oversight of good design activities and construction works, then study recommended that the application of good practices for the planning and coordination work to reorganize control method.

One of the most important reasons that emerged from the study with regard to the reasons for the delay in construction projects in Libya are: lack of effective communication, design errors, shortage of supply some material, slow decision-making, financial issues, cash-flow problems during construction, increase in quantities. In practice, this phenomenon is expected to continue unless management actions are taken to control these causes within the planned element of the design and construction works. Thus, good practice in planning, coordination, and the change of the control procedures of the public institutions needs to be recognized and the implications understood.

In the study of (Oshungade & Kruger, 2017) known as comparative study of causes and effects of projects delays and disruptions in construction projects in the South African construction industry, indicates that construction delays affect economic development in South Africa. The researcher main objective was to identify different causes and effects of project delays. A questionnaire was used to conduct a survey among clients, consultants and contractors. The developed questionnaire contains 48 delay causes and 13 effects of project delays and disruption identified from desktop study.

The collected data were analysed using statistical package for Social Sciences (SPSS) software with the frequency, severity, and importance indices taking in view of the participants. Furthermore, the Cronbach's Alpha Reliability test in the SPSS software was used to test the reliability of the questionnaire and the data. One hundred and thirty-five (135) questionnaires were sent out to the three main participants of construction project. The questionnaires were distributed to forty-five (45) of each of the main participants clients, consultants, and contractors. A total of seventy-five (75) returned questionnaires were valid. This implies that the valid response rate is 55.6%, which is on the average and acceptable for the analysis. In his findings, the researcher identified 16 most important causes among which strikes, rework due to errors and shortage of material were ranked the first. The causes also were followed by different effects where by the author revealed 5 major effect among which stress, cost overruns and time overrun were ranked to be the first ones.

Another study by (Seboru, 2015) Investigation into factors causing delays in road construction project in Kenya. In this study an investigation on factors causing delays in Kenya has been made. The study employed a questionnaire which were distributed among contractors and consultants. The obtained data were analyzed using the Relative Importance Index and Spearman's rank correlation. The results revealed that 70% of road projects are likely to go beyond the expected time. Five major causes of delays were identified to be payment by client, slow decision making and bureaucracy in client organization, inadequate planning and scheduling, and rain. It was recommended that clients should improve their financial management systems so that they are able to pay contractors in a timely manner. Bureaucracy and red tape should be reduced in client organizations in order to speed up the slow decision-making process. Proper management of the construction process lead to a reduction in incidences

of claims. Contractors should prepare adequate plans and schedules which can also be used to minimize the effects of rain.

In Rwanda, delays in construction projects are among the factors that affect the construction industry. Different researchers purposed to evaluate different reasons behind these delays and provide mitigation strategies. According to (Amandin & Kule, 2016) conducted a study on project delays on cost overrun risks: a study of Gasabo district construction projects Kigali, Rwanda. The aim of the study was primarily to assess the relationship between project expected time and real time, determine project expected cost and real cost, to calculate both project delay and cost overruns and finally to identify the relationship between public construction project delay and their respective cost overruns. The study used questionnaires as a tool for data collections. A number of 42 public construction project managers, consultants/ implementers for projects that had been ongoing for the period 2009 until 2012. The 38 respondents were taken to assure a 95% significant result. To examine the nature of project delays and cost overruns, project delays and cost overruns were calculated, compared and regressed. The study revealed that 65.7% of public construction projects which were implemented between 2009-2012 were delayed, whereas only 5.2% of these projects faced cost overruns.

Another study by (Safari Elly, 2012) on analysing the causes and Impacts of disputes in the Rwanda Road Construction Sector and determining ways of Reducing or addressing such disputes. The study revealed the major causes of disputes in the road construction sector were identified and the key are; i) for contractors, inadequate contract management supervision and coordination, ii) for consultants, inadequate open and factual information and iii) for client's discrepancies and ambiguities in contract documents are most significant causes of construction disputes in the road construction sector.

According to the research by Koushki, (2005) in titled delays and cost increases in the construction of private residential projects in Kuwait published at construction management and economics journal. It was revealed that the delay causes are poor financial management of the owner and lack of materials necessary for working and poor quality. This research was aimed at analyzing factors associated with construction of private residential problem in the state of Kuwait.

The author also analyzed the magnitude of time delays and cost increase associated with these problems. The author used questionnaires as a method for data collection. The developed questionnaires were pretested on a random sample of 30 individuals' owners of residential projects and was then modified to incorporate suggestions made by pretesting sample. A number of 450 respondents were selected in 27 metropolitan districts. In his analysis, the distribution of cost and time expenditures of the design phase of the sample residential projects was nearly 84% of the sample projects and the design phase was successfully completed within the agreed monetary budget. The reasons for the incompletion of the remaining 16% included 'change orders' (25%), design deficiencies (8%), owner's inexperience (4%) and a combination of the above factors in the remaining 63% of the surveyed projects.

The distributional analysis of total delaying time in all phases as well as their causes indicated that while none of the surveyed projects finished on time, approximately 30% experienced a delay of between one to three months during their entire implementation period. A total of 29% had a time-delay of between four and five months each. Nearly 22% were delayed between six and eight months beyond the scheduled time duration, while the remaining 19% each experienced at least nine months of delays. Again, contractor- related problems were the single most frequently observed factor that contributed to time delays during the construction of the

sample residential projects (25%). Owners' financial difficulties were second (22%), and labour-related problems (13%) were the third most-frequent cause of time-delays of the sample projects. The weather factor caused delays to nearly 7%, variation orders to 5%, owners' lack of construction experience 1%, materials 0.7% and, finally, a combination of these factors caused delays for nearly 26% of the sample projects.

Another study by (El-Razek, 1995) studied the main reasons for delay in construction projects in Egypt. From their point of view of both the contractor and consultant and the owner. They have identified the following factors as the main cause affecting delays in Egypt: Financial related factors by contractor during construction, delays in contractor's payment by owner, design changes by owner, partial payments during construction.

According to (Frimpong, 2003) studied the delays in construction projects in Ghana. The study aimed at identifying and examining the causes of delay that pertain to overruns in the construction of groundwater projects in Ghana. The main objective was achieved through evaluation of the factors that contribute to delay and cost overruns in groundwater construction, and by identifying the main factors that influence the causes of delay and cost overruns in construction of groundwater projects and to examine their relative importance.

The author developed a questionnaire of 26 factors from previous preliminary investigations conducted in groundwater drilling projects between 1970 and 1999 in Ghana. The questionnaire was directed towards three groups in both public and private organizations: owners of the groundwater projects, consulting offices, and contractors working in the groundwater works. The questionnaire was distributed to a random sample of 55 owners, 40 contractors and 30 consultants. The study revealed that most of the reasons for the delay are as follows: Monthly

payment difficulties. Poor management of sub-contractors. Supply and collection of materials. Poor technical performance of the Project Management. Change in the prices of materials.

According to (Shiferaw, 2018) study on the cause of project implementation delays in Ethiopia. The primary objective of the study was to evaluate the cause for project implementation delays and determine the most important according to the project participants. The study analyzed the internal related factor, and external related factors. The study used questionnaire and interview to collect data and statistical package for social science (SPSS) version 24 to analyze them.

The results of the study showed that project implementation is negatively affected by owners, banks, and external related causes. It was recommended that delay of procurement of machineries and materials, late deliveries of materials which significantly affect the implementation of projects from scheduled time should be avoided by contracting experienced firms.

As the implementation of the project in physical terms begins with the award of contracts, it should be concluded with maximum expedition. It has also been recommended that to alleviate the problem of stated problems qualified contractors and consultant should be selected project implementation get into start project implementation.

According to (Kikwasi, 2008) study on the cause and effects of delays and disruptions in construction projects in Tanzania she started by showing how delays and disruption project are challenges to the construction industry in Tanzania and therefore wanted to assess the cause and effects and disruption project in Tanzania.

The researcher developed a questionnaire and interviewed clients, consultant firms, regulatory boards and construction firm. In her study, she identified 14 effects of delays and disruptions. These effects comprise of time overrun, cost overrun, negative social impact, idling resources,

disputes, arbitration, delaying by the client to return the loans, poor quality of work due to hurry, delaying in getting profit by clients, bankruptcy, litigation, create stress on contractors, total abandonment, and acceleration losses. He found that the first five effects were identified has the most important effects in Tanzania.

The results revealed that the main cause of delays are due to design changes, delay in payment to contractors, information delays, funding problems, poor project management, compensation issues and disagreement on the work done, she also mentioned that idling resources and dispute to be the major cause of delays in construction budget should be availed and effective communication should be the main focus on the parties in procurement process.

In east Africa, it was recorded that construction delays affect the economy of the country. In Uganda construction industry uses traditional methods of procurement. Clients normally employ consultants to design and supervise construction projects. According to (Alinaitwe, 2013) conducted a study and investigated the cause of delays and cost overruns in Uganda's public sectors construction projects.

The aim of the research was to identify the cause of delays and overruns and to rank them according to their frequency, severity and importance. The study used a questionnaire with which the data from the Uganda Society of Architects (USA), corporate members of the Uganda Institution of Professional Engineers (UIPE) and registered Quantity Surveyors who had participated in the implementation phase of construction projects in Uganda's public sector were collected.

It was also required to test the reliability of the questionnaires Cronbach's alpha was used and SPSS 10.0 was used to compute alpha for all four sets of 22 items in the questionnaire. The entire

set of 88 items in the questionnaire was also analyzed. The author used Civil Aviation Authority (CAA) as a company in which he will validate the response from the questionnaires.

Within several project analyzed at CAA, changes in the work scope were ranked the first having 46%. The second most frequent cause was delayed payments (21%). Fifteen per cent of the delays were due to the remote locations of the projects. Poor communication was the fourth most frequent cause of delays (6%). Bad weather, land disputes, rework and disputes among the project parties were the least common causes, at 3% each. The most frequent causes of delays were found to be similar to those most highly rated in the questionnaire responses. Alinaitwe proposed some possible solution on the time and cost overruns in Uganda. It was recommended that practioners in the construction industry are advised to minimize changes in work scopes, as this has the greatest impact on cost and time overruns.

The author also suggested that project management be improved, with a shift in emphasis towards more collaborative relationships, which reduce payment delays by improving cash flow on the part of the client and thereby reduce overall project costs.

This result in improving the effectiveness and efficiency of the public sector in Uganda. In addition to that many projects are delivered as there are increased throughput. This makes construction more affordable and the public sector are able to deliver more in terms of construction volume.

2.4 Research Gap

According to the studies mentioned in the current study, they have contributed much to the well going of this study, but there was no study among them that has been addressed to critical delays

factors on development of commercial building projects specifically in Rwanda as a geographical gap left by all authors.

Therefore, this study intended to cover the gap by analysing the delaying factors and success of commercial building projects in Rwanda, with case of NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies.

2.5 Conceptual Framework

Literature review showed that delays in construction projects are effected by many factors which are different in severity and consequences (Mezher & Tawil, 2006).

Van (2015) showed that delaying factors affecting success of construction project are internal related factors and external related factors. Internal causes are reasons produced from one of three main parties in the project (contractor, consultant and owner).

External factors related to materials, weather conditions, governmental, political reasons, etc. There are many reasons that lead to delay in construction projects, which come from different sources and cannot be counted; each project has a special environment and circumstances that distinguish it from other projects such as nature of work, total.

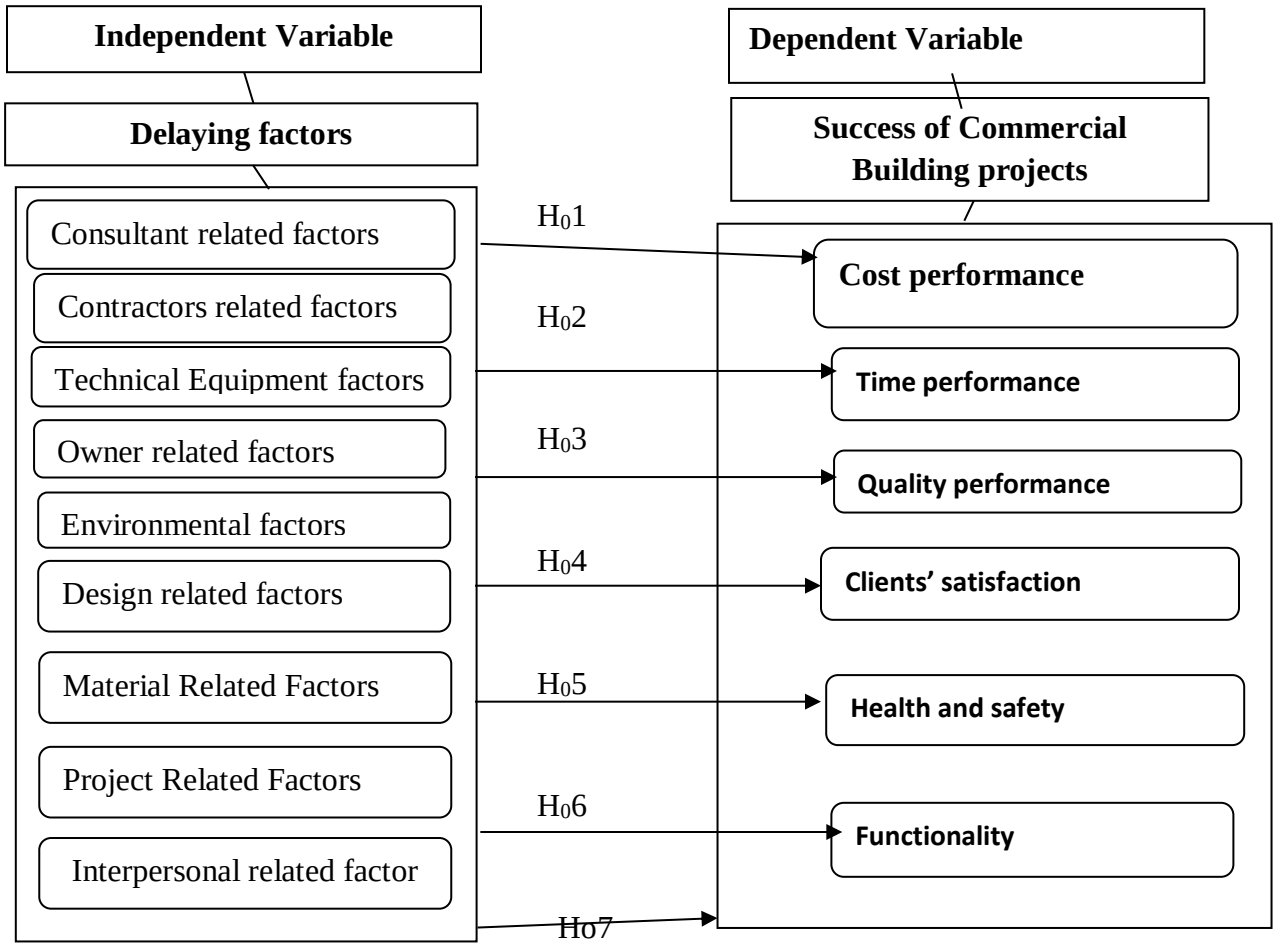

Figure 2.1: Conceptual Framework

Source: *Researcher Conceptualization, (2020)*

CHAPTER THREE: RESEARCH METHODOLOGY

3.0. Introduction

This chapter presents techniques of data collection and methods of data analysis. It shows also the research design, study population, sample size, and sampling techniques. The instruments were used in data collection are questionnaire, and documentary review. Source of data, data processing and analysis methods were well explained in this section. For data analysis, Relative Importance Index (RII) method was employed for ranking different factors that affects delays in commercial buildings projects.

3.1 Profile of Case Study

3.1.1. EPC Africa

EPC Africa is a group of companies based in Rwanda with activities in several African countries, which specializes in procurement, construction, independent power producers in renewable energy, and engineering consulting.

Striving with a vision of building sustainable industries in Africa, the company execute services and projects from the most basic to the highly complex for governments, and international clients in diverse industries in Africa. EPC Africa offers various engineering and project management services from conceptual, inception, preliminary, detail design, implementation and completion stages.

3.1.2 NITSAL International Construction Company

This is a construction company located at Kigali city, Nyarugenge district. It has commitment to delivering quality has seen them walking with their clients at every project phase, from strategy

formulation through design, project management and implementation right through to support and upgrades. Customer satisfaction drives every aspect of their commercial contractor.

3.1.3 Epitome Architects Rwanda Limited

Epitome Architects Rwanda Limited are awakening concepts, powering realities: An esteemed portfolio spanning Tanzania, Rwanda and Nigeria, Epitome Architects continues to spearhead innovative developments across the African continent. Writer: Jonathan Dyble. Project Manager: Eddie Clinton.

A nation on the up, Tanzania is poised for continual prosperity throughout 2019 and beyond. Statistics from the World Bank reveal that the country has sustained an average growth rate of between six and seven percent over the course of the past decade, resulting in dampened poverty and rising socio-economic development.

One sector excelling in this climate is the nation's construction industry. Having accounted for 7.8 percent of GDP in 2010 and more recently 13.6 percent in 2015, businesses in this sphere such as Epitome Architects Limited have continued to make substantial headway. Formerly known as Lanplan-Icon Architects until 2011, Epitome has successfully served across multiple segments of the Tanzanian market as an architectural firm, providing esteemed design and construction monitoring services for education, commercial, residential, industrial, retail, transportation, business and healthcare developments, amongst others.

They become adept in providing a multitude of solutions, from architecture, interior architectural design, master planning, landscape architecture, contract administration and project management," explains Architect David Kibebe, the company's Director who is also a former Secretary General of East Africa Institute of Architects and currently the Honorary Secretary of Architectural Association of Tanzania.

Having joined Epitome straight out of university in August 2005, Kibebe quickly rose through the ranks of the company, now having held partner status for a period of eight years. Having been involved in a range of projects with the firm that is registered with the architects & quantity surveyors registration board and the royal institute of British architects, Kibebe has played a crucial role in aiding the meteoric rise during the past 14 years. An empowered portfolio: this rise is largely owed to the completion of numerous transformative projects across Tanzania, Rwanda and Nigeria.

3.2 Research Design

A research design is the set of methods and procedures used in collecting and analysing measures of the variables specified in the research problem research. The design of a study defines the study type (descriptive, correlation, semi-experimental, experimental, review, meta-analytic) and sub-type (e.g., descriptive-longitudinal case study), research problem, hypotheses, independent and dependent variables, experimental design, and, if applicable, data collection methods and a statistical analysis plan (Creswell, 2012).

In respect this study, research adopted qualitative and quantitative approaches and also correlative approaches. It was descriptive or quantitative in the way, the study describes frequently delay's factors pertaining to commercial building projects in Rwanda, and evaluate rates of commercial building projects delays in Rwanda. It was correlative where it analyses the relationship between delay's factors and development of commercial building projects in Rwanda.

3.3 Study Population

A population is a group of individuals or a body of people or any collection of items under consideration from which samples are taken for measurement (Jill, and Roger, 2003). In respect

of the study, target population was 127 employees from team management of three selected construction companies including NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies. This means 18 engineers, 21 project planners and contractors, 25 technicians and consultants, 12 project managers and assistants, 11 seasoned architects, 9 landscapers, 17 interior designers, 14 people in committees charge to follow up progress of construction projects.

3.4 Sample Size

Sampling refers to the number of items to be selected from the population. A sample is a smaller set of values selected from the population, reflecting its characteristics (Alain Bouchard, 1990). In this study, sample size is selected from the target population. This study uses 5% of margin errors and confidential is 95%. The study applies the formula of Taro Yamane (1982)

$n = \frac{N}{1 + N * (e^2)}$ **n** = sample size **N=** Total population **e=** margin error

$$n = \frac{127}{1 + (127 * (0.05)^2)} = 96.3 \approx 96$$

3.5 Sampling Technique

During this study, sampling procedures were systematic, random and purposive Sampling procedures. Systematic sampling was applied to determine the construction companies where respondents coming from.

Randomly sampling was used to determine departments where respondents are located in a particular company. Purposive sampling technique was applied for selecting 96 respondents in this study.

3.6 Source of Data

In respect of this study, primary and secondary data were collected and used to accomplish the research objectives.

3.6.1 Primary Data

A primary source is an original data that is one in which data are collected first hand by the researcher for a specific purpose. Primary data was collected in a number of ways specifically using questionnaires.

3.6.2 Secondary Data

Secondary data was conducted by collecting information from a diverse source of documents on construction projects delays of NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa companies.

3.7 Data Collection Instruments

Various instruments were used by researcher for gathering information from respondents.

3.7.1 Questionnaire

Questionnaires were distributed to respondents in construction projects of NITSAL International Construction, Epitome Architects Rwanda Limited, and EPC Africa Companies. These were composed by close end and open questions, where we expected participation rate of 100% for responding questions.

Questionnaire consisted of two sections. First section contains three parts which are Part (I) which details the respondent's background. Part (II) contains general information about the company and Part (III) covers general information about the Project. Second section consisted of two parts; Part

(I) is about time overrun in construction projects in Kigali City and Part (II) contains the causes of the delay of constructing projects grouped in nine main factors as can be seen in the table below.

Table 3.1 Factors affecting delays in Commercial building projects

No.	Factors	Causes
1	Consultant related factor	1. Lack of consultant experience 2. Conflicts between consultant and design engineer 3. Major changes approval delays by consultant 4. Changes in government regulations and laws
2	Contractors related factors	1. Inappropriate contractor's policies 2. Unreliable subcontractors 3. Inappropriate construction methods
3	Technical Equipment factors	1. Equipment allocation problem 2. Frequent equipment breakdowns 3. Improper equipment 4. Inadequate modern equipment 5. Shortage of equipment
4	Owner related factors	1. Delay in progress payments 2. Lack of owner experience in construction projects 3. Suspension of work by owner
5	Environmental factors	1. Unfavorable weather conditions 2. Inadequate production of raw material in the country 3. Unexpected surface & subsurface conditions (soil, water table, etc.)
6	Design related factors	1. Rework due to errors 2. Design errors and omissions made by designers 3. Delays in producing design documents 4. Poor use of advanced engineering design software 5. Incomplete project design 6. Defective design made by designers
7	Material Related Factors	1. Delay in manufacturing materials 2. Damage of sorted materials 3. Escalation of material prices 4. Late delivery of materials 5. Poor procurement of construction materials;
8	Project Related Factors	1. Delay in site delivery 2. Improper project feasibility study 3. Inadequate planning 4. Ineffective delay penalties
9	Interpersonal related factor	1. Thefts done on site 2. Absenteeism 3. Low motivation and morale of labor 4. Personal conflicts among labor 5. Shortage of labor 6. Slow mobilization of labor

Source: *Amandin & Kule, (2016) Factors affecting delays in Commercial building projects*

All these factors were accessed in an elaborated questionnaire that indicate the weightage as can be seen in the table below.

Table 3.2 Weighting different factors pertaining to delays in construction

Factor	Weightage
Extremely significant	5
Very significant	4
Moderately significant	3
Slightly significant	2
Not significant	1

In this research, respondent were contractors, engineers, consultants, and owners of the commercial buildings in Kigali City. Sampling questionnaires were used as survey technique to evaluate delaying factors affecting success commercial building construction projects.

3.7.2 Document Review

Documentation review was done by the researcher to obtain the information about a phenomenon. In this study, documents targeted are available reports related to success of commercial buildings project performed by NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies in previous years ago from 2015-2019.

3.7.3 Data Quality Control

Validity

Validity can be thought as utility, because validity was the extent to which differences found with a measuring instrument reflect true differences among these being tested. Questionnaires were given to supervisor and other experts to evaluate if it can give the relevant information.

Reliability

There are two general approaches to establish the reliability of a questionnaire where the first is to ask the questions again in a different part of the questionnaire in the same or slightly altered form, but in such a way as to yield the same information. This is a consistency check, but does not take into account variations in day-to-day variations.

A second better approach, called pre-test, is to re-administer a questionnaire to the same group or individuals several days later and to compare the results that obtained. For this study, the questionnaires were given to different groups of respondents two different times to check if they gave the same view in terms of responses. The researcher conducted a pre-test of Cronbach's Alpha of 0.75.

Legend Cronbach's Alpha test of Reliability

Cronbach's alpha	**Internal consistency**
$\alpha \geq 0.9$	Excellent
$0.8 \leq \alpha < 0.9$	Good
$0.7 \leq \alpha < 0.8$	Acceptable (Surveys)
$0.6 \leq \alpha < 0.7$	Questionable
$0.5 \leq \alpha < 0.6$	Poor
$\alpha < 0.5$	Unacceptable

Pre-tested result of Reliability

Cronbach's Alpha	**N of Items**
.778	5

Source: *Pre-test of reliability (2020)*

The pre-test result showed reliability statistic results of 0.778 categorized as good questionnaire and the results helped to continue the study in collecting data from NITSAL International Construction, Epitome Architects Rwanda Limited, and EPC Africa Companies.

3.8 Data Analysis Procedures

This part explains how data obtained from respondents from selected companies were edited, coded and made statistical tables by using various methods of data analysis. After the processing data, Data were analysed by using SPSS (Statistical Package for Social Sciences) computer package and Microsoft excel. This helped to summarize the data into tables and also show the relationship between the variables.

Descriptive statistic methods were the term given to the analysis of data that helps describe, show or summarize data in a meaningful way. The multiple regression models were formulated to analyse the analysis of delay factors on each indicator of success of commercial buildings projects. The models are as follows: **X=** independent variable = Analysis of Delaying Factors **(ADF),** which has nine indicators:

x1= Consultant related factors (CDF1)

x2= Contractors related factors (CDF2)

x3= Technical Equipment factors (CDF3),

x4= Owner related factors (CDF4)

x5= Environmental factors (CDF5)

x6= Design related factors (CDF6),

x7= Material Related Factors (CDF7)

x8= Project Related Factors (CDF8)

x9= Interpersonal related factor (CDF9),

Y= dependent variable= Success of Commercial Buildings Projects (SCBP) which also has six indicators as follows:

y1= Cost performance **(CP)**

y2= Time performance **(TP)**

y3= Quality performance **(QP)**

y4= Clients' satisfaction **(CS)**

y5= Health and safety **(HaS)**

y6= Functionality **(FU)**

Based on these variables, the following functions have been set:

Y= f(X), therefore,

y1= f(x1, x2, x3, x4, x5, x6, x7, x8, x9) function 1

y2= f(x1, x2, x3, x4, x5, x6, x7, x8, x9) function 2

y3= f(x1, x2, x3, x4, x5, x6, x7, x8, x9) function 3

y4= f(x1, x2, x3, x4, x5, x6, x7, x8, x9) function 4

y5 = f(x1, x2, x3, x4, x5, x6, x7, x8, x9) function 5

y6 = f(x1, x2, x3, x4, x5, x6, x7, x8, x9) function 6

Based on these functional relationships the following econometric models have been formulated using multiple regression or polynomial models:

Y= f(X) therefore,

CP=$\beta 0+\beta 1CDF1+\beta 2CDF2+\beta 3CDF3+\beta 4CDF4+\beta 5CDF5+\beta 6CDF6+\beta 7CDF7+\beta 8CDF8+\beta 9CDF9+\varepsilon$ Model1

TP = $\beta 0+\beta 1CDF1+\beta 2CDF2+\beta 3CDF3+\beta 4CDF4+\beta 5CDF5+\beta 6CDF6+\beta 7CDF7+\beta 8CDF8+\beta 9CDF9+\varepsilon$ Model2

QP = $\beta 0+\beta 1CDF1+\beta 2CDF2+\beta 3CDF3+\beta 4CDF4+\beta 5CDF5+\beta 6CDF6+\beta 7CDF7+\beta 8CDF8+\beta 9CDF9+\varepsilon$ Model3

CS = $\beta 0+\beta 1CDF1+\beta 2CDF2+\beta 3CDF3+\beta 4CDF4+\beta 5CDF5+\beta 6CDF6+\beta 7CDF7+\beta 8CDF8+\beta 9CDF9+\varepsilon$ Model4

HaS = $\beta 0+\beta 1CDF1+\beta 2CDF2+\beta 3CDF3+\beta 4CDF4+\beta 5CDF5+\beta 6CDF6+\beta 7CDF7+\beta 8CDF8+\beta 9CDF9+\varepsilon$ Model5

FU = $\beta 0+\beta 1CDF1+\beta 2CDF2+\beta 3CDF3+\beta 4CDF4+\beta 5CDF5+\beta 6CDF6+\beta 7CDF7+\beta 8CDF8+\beta 9CDF9+\varepsilon$ Model 6

CBP = $\beta 0+\beta 1CDF1+\beta 2CDF2+\beta 3CDF3+\beta 4CDF4+\beta 5CDF5+\beta 6CDF6+\beta 7CDF7+\beta 8CDF8+\beta 9CDF9+\varepsilon$ Model7

Where **β0 =** Constant, **β1- β9** are coefficients of determination.

3.9 Ethical Considerations

To ensure confidentiality of the information that was provided by the respondents and to ascertain the practice of ethics in this study, the following activities were implemented by the researcher: the respondents were coded instead of reflecting the names.

The researcher sought permission through a written request to the concerned officials of the study areas. The researcher requested the respondents to sign in the Informed Consent form, acknowledge the authors quoted in this study, and the author of standardized instrument through citations and referencing. The research presented the findings in a generalized manner.

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CHAPTER FOUR:

DATA PRESENTATION, ANALYSIS, AND INTERPRETATION OF FINDINGS

This chapter presents the findings from data analysis of delaying factors and success of commercial building projects in Rwanda. Data were analysed quantitatively using SPSS IBM 21.0 version, where results were presented and interpreted in accordance with the research objectives such as identifying frequently delay factors pertaining for commercial building projects in Rwanda; evaluate rates of success of commercial building projects delays in Rwanda; analyse the relationship between delay factors and success of commercial building projects in Rwanda; and evaluate the consequences of delays of commercial building projects in Rwanda.

Questionnaires were distributed to 96 respondents from selected construction companies including NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa companies where the respondents were given two weeks and three days for responding all questions. Findings indicated the participation rate of 100.0% of answering questions. This helps the researcher to continue with editing, coding, recording, and make statistical tables by using SPSS IBM 20.0 version.

4.1 Socio-Demographic Characteristics of Respondents

This sub-part identifies gender, age, education level, marital status, and experience of respondents in NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies. The information on table 4.1 shows distribution on demographic characteristics of respondents from selected construction companies.

Table 4.1: Socio-Demographic of Respondents

	Data	Frequencies	Percentages
Gender	Male	72	75.0
	Female	24	25.0
	Total	**96**	**100.0**
Marital Status	Single	41	42.7
	Married	55	57.3
	Widow (er)	0	0.0
	Total	**96**	**100.0**
Age	21 and 30 years old	20	20.8
	31 and 40 years old	26	27.1
	41 and 50 years old	30	31.2
	51 years and above	20	20.8
	Total	**96**	**100.0**
Education Level	Masters and above	13	13.5
	Bachelor's degree	71	74.0
	Secondary level	12	12.5
	Professional courses	0	0.0
	Total	**96**	**100.0**
Experiences	Less than 1year	8	8.3
	2-3years	46	47.9
	4-5years	33	34.4
	5years and above	9	9.4
	Total	**96**	**100.0**

Source: *Primary Data, Field results (August, 2020)*

Table 4.1 shows information about socio-demographic characteristics of respondents from NITSAL International Construction, Epitome Architects Rwanda Limited, and EPC Africa Companies in Rwanda. Concerning to gender, 72 (i.e. 75.0%) of respondents were males, while 24 (i.e. 25.0%) of respondents were females that working within NITSAL International Construction, Epitome Architects Rwanda Limited, and EPC Africa Companies.

In terms of marital status, 41 (i.e. 42.7%) of respondents were singles while 55 (i.e. 57.3%) of respondents were married. In regards of ages of respondents are varied where 20 (i.e. 20.8%) of respondents have between 21 and 30 years old. 31 and 40 years old were 26 (i.e 27.1%) of

respondents.30 (i.e. 31.2%) of respondents have age between 41 and 50 years old. 20 (i.e 20.8%) of respondents were in ages of 51 years and above at NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies operating in Rwanda.

In relation with the education level of respondents; 13 (i.e.13.5%) of respondents have Master's Degree and above. 71 (i.e 74.0%) of respondents have bachelor's degree. 12 (i.e. 12.5%) of respondents have Secondary level.

Concerning to experience in construction projects; 8 (i.e. 8.3%) of respondents have less than 1year of experience in construction projects. 46 (i.e. 47.9%) of respondents have experiences between 2-3years in construction projects. 33 (i.e. 34.4%) of respondents have between 4-5years of experiences in construction projects in Rwanda. 9 (i.e. 9.4%) of respondents have experience of 5years and above in construction projects in NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies operating in Rwanda.

4.2 Perceptions of Respondents

This section presents results based on the perceptions and opinions of respondents from NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies about frequently delay's factors pertaining for commercial building projects in Rwanda; indicators of commercial building projects delays in Rwanda; consequences of delays of commercial building projects in Rwanda, and relationship between delay's factors and development of commercial building projects in Rwanda; as detailed below.

4.2.1 Frequently delay factors of commercial building projects of construction companies in Rwanda

Table 4.2 illustrates perceptions of respondents on consultant related delay factors of commercial building projects of construction companies in Rwanda.

Table 4.2: Consultant related delay's factors affecting commercial building projects in Rwanda

Perceptions of respondents on Consultant related delay's factors	ES		VS		MS		SS		NS	
	fi	%	fi	%	fi	%	fi	%	fi	%
Lack of consultant experience	11	11.5	38	39.6	31	32.3	13	13.5	3	3.1
Conflicts between consultant and design engineer	4	4.2	27	28.1	36	37.5	17	17.7	12	12.5
Major changes approval delays by consultant	24	25.0	19	19.8	35	36.5	12	12.5	6	6.2
Changes in government regulations and laws	8	8.3	23	24.0	37	38.5	17	17.7	11	11.5

Source: *Primary Data, Field results (August, 2020).*

Full meaning of the used Abbreviations on table above: ES: *Extremely significant*; **VS:** *Very significant*; **MS:** *Moderately significant*; **SS:** *Slightly significant*; **NS:** *Not significant*; **Fi:** *Frequency*, and **%:** *Percentage.*

Table 4.2 shows perceptions of respondents on consultant related factors as among of delay's factors that affecting commercial building projects in construction companies of Rwanda. Among of these related delay's factors, there is the lack of consultant experience confirmed by 11 (i.e. 11.5%) respondents as "extremely significant"; 38 (i.e. 39.6%) of respondents confirmed it is "Very significant"; 31 (i.e. 32.3%) respondents confirmed that this delay factor is "Moderately significant"; 13 (i.e. 13.5%) respondents said that it is "Slightly significant"; while only 3 (i.e 3.1%) respondents said that this delay's factor is "Not significant" in affecting success of commercial building projects in Rwanda.

Conflicts between consultant and design engineer is among of consultant related delay's factors that affecting commercial building projects in Rwanda confirmed by 4 (i.e. 4.2%) respondents who

said that it is “Extremely significant”; 27 (i.e. 28.1%) said that it is “very significant”; 36 (i.e, 37.5%) confirmed that this factor is “Moderately significant”; 17 (i.e. 17.7%) said that this delay factor is “Slightly significant”; while 12 (i.e. 12.5%) respondents said that conflicts between consultant and design engineer is consultant related delay’s factors which is not significant in affecting success of commercial building projects in Rwanda.

Major changes approval delays by consultant are consultant related factor delays commercial building projects in Rwanda; 24 (i.e. 25.0%) respondents said this factor is “Extremely significant”. 19 (i.e 19.8%) respondents said the factor is “very significant”. 35 (i.e. 36.5%) of respondents are saying it is “Moderately significant”. 12 (i.e. 12.5%) of respondents said that it is “Slightly significant” while 6 (i.e. 6.2%) of respondents confirmed that this factor is “Not significant”.

Changes in government regulations and laws is among of the consultant related factor delays commercial building projects in Rwanda. 8 (i.e. 8.3%) respondents said this factor is “*Extremely significant”*; 23 (i.e. 24.0%) of respondents confirmed the factor is “*very significant*”; 37 (i.e. 38.5%) of respondents said that this factor is “*Moderately significant”;* 17 (i.e. 17.7%) of respondents said this factor is “*Slightly significant*” while 11 (i.e. 11.5%) respondents confirmed that this factor is “*not significant”* as delay’s factors affecting success of commercial building projects in NITSAL International Construction, Epitome Architects Rwanda Limited, and EPC Africa Companies.

According to above findings, it was clear that developing commercial real estate projects require many different vendors, architects, construction companies, interior designers, facility managers and more. It was recorded that there are many delay factors that affect delays in construction projects. These are the delay in payments, poor cash flow, poor contractor supervision, insufficient

communication between parties, delay in instruction, underestimation of contract time, poor professional management, variations, inadequate skill and experience of contractor staff and poor site management. However, the following results based on frequently delay's factors of commercial building projects of construction companies in Rwanda.

Table 4.3: Contractors related delay's factors that affecting commercial building projects in Rwanda

Perceptions of respondents on Contractors related factors	ES		VS		MS		SS		NS	
	fi	%	fi	%	fi	%	fi	%	fi	%
Inappropriate contractor's policies	37	38.5	28	29.2	22	22.9	7	7.3	2	2.1
Unreliable subcontractors	40	41.7	16	16.7	19	19.8	12	12.5	9	9.4
Inappropriate construction methods	41	42.7	39	40.6	11	11.5	2	2.1	3	3.1

Source: *Primary Data, Field results (August, 2020).*

Full meaning of the used Abbreviations on table above: ES: *Extremely significant*; **VS:** *Very significant*; **MS:** *Moderately significant*; **SS:** *Slightly significant*; **NS:** *Not significant*; **Fi:** *Frequency*, and **%:** *Percentage.*

Perceptions of respondents on contractors related factors including an inappropriate contractor's policies as it is confirmed by 37 (i.e. 38.5%) who said inappropriate contractor's policies is "Extremely significant"; 28 (i.e. 29.2%) said that it is "Very significant"; 22 (i.e. 22.9%) confirmed that this is "Moderately significant"; 7 (i.e 7.3%) said that this factor is "Slightly significant" while 2 (i.e 2.1%) of respondents said that inappropriate contractor's policies as contractors related factor is "Not significant" in affecting delays of commercial building projects in Rwanda.

Perceptions of respondents on unreliable subcontractors as among of contractors related factors, confirmed this delay factor to be "Extremely significant" in affecting commercial building projects in Rwanda as confirmed by 40 (i.e. 41.7%) respondents selected in NITSAL International Construction, Epitome Architects Rwanda Limited, and EPC Africa Companies operating in Rwanda. 16 (i.e. 16.7%) said it is "Very significant"; 19 (i.e 19.8%) said that this delay factor is "Moderately significant" affecting commercial building projects in Rwanda. 12 (i.e. 12.5%) said

it is “Slightly significant”; and 9 (i.e. 9.4%) respondents confirmed this is “Not significant” in affecting commercial building projects in NITSAL International Construction, Epitome Architects Rwanda Limited, and EPC Africa Companies.

Inappropriate construction methods is among of the contractors related factors that confirmed by 41 (i.e. 42.7%) to be “Extremely significant”; 39 (i.e. 40.6%) respondents said this delay’s factor is “Very significant”; 11 (i.e. 11.5%) said that this factor is “Moderately significant”; 2 (i.e. 2.1%) respondents said the factor is “Slightly significant”; and 3 (i.e. 3.1%) of respondents said that inappropriate construction methods which are among of the contractors related factors are “Not significant” in affecting commercial building projects in NITSAL International Construction, Epitome Architects Rwanda Limited, and EPC Africa Companies in Rwanda.

Table 4.4: Technical Equipment delays factors affecting commercial building projects in Rwanda

Technical Equipment factors as delay’s factor	ES		VS		MS		SS		NS	
	fi	%	fi	%	fi	%	fi	%	fi	%
Equipment allocation problem	17	17.7	31	32.3	28	29.2	17	17.7	3	3.1
Frequent equipment breakdowns	26	27.1	36	37.5	14	14.6	13	13.5	7	7.3
Improper equipment	26	27.1	33	34.4	20	20.8	15	15.6	2	2.1
Inadequate modern equipment	40	41.7	35	36.5	14	14.6	7	7.3	0	0.0
Shortage of equipment	34	35.4	34	35.4	10	10.4	16	16.7	2	2.1

Source: *Primary Data, Field results (August, 2020).*

Full meaning of the used Abbreviations on table above: ES: *Extremely significant*; **VS:** *Very significant*; **MS:** *Moderately significant*; **SS:** *Slightly significant*; **NS:** *Not significant*; **Fi:** *Frequency*, and **%:** *Percentage.*

Table 4.4 shows the perceptions of respondents about technical Equipment factors as delay’s factor that affecting commercial building projects in Rwanda. Out of 96 respondents; 17 (i.e. 17.7%) respondents said that equipment allocation problem is as technical equipment factors which is “Extremely significant” in affecting commercial building projects in Rwanda. 31 (i.e. 32.3%) said it is “Very significant”; 28 (i.e. 29.2%) confirmed the factor is “Moderately significant”; 17 (i.e.

17.7%) said this is “Slightly significant”; while only 3 (i.e. 3.1%) respondents said that equipment allocation problem is “Not significant” affecting commercial building projects in Rwanda.

Frequent equipment breakdowns is technical equipment factors as delay’s factor that affecting commercial building projects in Rwanda that is “Extremely significant” as confirmed by 26 (i.e. 27.1%). 36 (i.e. 37.5%) is “Very significant”; 14 (i.e. 14.6%) said this factor is “Moderately significant”; 13 (i.e. 13.5%) confirmed this delay factor to be “Slightly significant”; while 7 (i.e. 7.3%) respondents said that frequent equipment breakdowns is “Not significant” to affect commercial building projects in Rwanda.

Improper equipment as among of technical Equipment factors delay commercial building projects in Rwanda. This is confirmed by 26 (i.e. 27.1%) respondents said this factor is “Extremely significant” to affect commercial building projects in Rwanda. 33 (i.e. 34.4%) said it is Very significant; 20 (i.e. 20.8%) said that this delay factor is moderately significant; 15 (i.e. 15.6%) respondents said that it is slightly significant while only 2 (i.e. 2.1%) respondents are saying that Improper equipment which is among of technical equipment factors has not significant in delaying of commercial building projects in Rwanda.

Inadequate modern equipment as technical equipment delay’s factor accused to be Extremely significant in affecting commercial building projects in Rwanda as confirmed by 40 (i.e. 41.7%) respondents. 35 (i.e. 36.5%) respondents said the inadequate modern equipment is Very significant; 14 (i.e. 14.6%) respondents confirmed that this factor is moderately significant; while 7 (i.e. 7.3%) said that inadequate modern equipment as technical equipment delay’s factor is slightly significant in affecting delays of commercial building projects in Rwanda.

Shortage of equipment is as technical equipment delay’s factor affecting commercial building projects in Rwanda. 34 (i.e. 35.4%) respondents said that it is extremely significant, and Very

significant in delays of commercial building projects in Rwanda. 10 (i.e. 10.4%) respondents said it is moderately significant; 16 (i.e. 16.7%) respondents confirmed this delay factor is slightly significant; while 2 (i.e. 2.1%) respondents said that the factor is not significant affecting delays of commercial building projects in Rwanda.

Table 4.5: Owner related delay's factors affecting commercial building projects in Rwanda

	ES		VS		MS		SS		NS	
Owner related delays' factors	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
Delay in progress payments	55	57.3	25	26.0	11	11.5	5	5.2	0	0.0
Lack of owner experience in construction projects	38	39.6	34	35.4	16	16.7	5	5.2	3	3.1
Suspension of work by owners	41	42.7	35	36.5	14	14.6	4	4.2	2	2.1

Source: *Primary Data, Field results (August, 2020).*

Full meaning of the used Abbreviations on table above: ES: *Extremely significant*; **VS:** *Very significant*; **MS:** *Moderately significant*; **SS:** *Slightly significant*; **NS:** *Not significant*; **Fi:** *Frequency*, and **%:** *Percentage*

Table 4.5 presents perceptions from respondents on owner related factors delays affecting commercial building projects in Rwanda. Delay in progress payments is owner related factors that affect extremely significant commercial building project in Rwanda as confirmed by 55 (i.e. 57.3%) of respondents. 25 (i.e. 26.0%) respondents said that this factor affecting Very significant; 11 (i.e. 11.5%) respondents confirm this factor is Moderately significant; while 5 (i.e. 5.2%) respondents said that delay in progress payments is owner related factors which is not significant on delays of commercial building project in Rwanda.

Lack of owner experience in construction projects is one among the owner related delays factors affecting commercial building projects in Rwanda; this confirmed by 38 (i.e. 39.6%) respondents who said this factor is extremely significant; 34 (i.e. 35.4%) said that it is Very significant; 16 (i.e. 16.7%) respondents said lack of owner experience in construction projects is Moderately significant; 5 (i.e. 5.2%) respondents confirmed this factor is Slightly significant affecting

commercial building projects in Rwanda while 3 (i.e. 3.1%) respondents said that lack of owner experience in construction projects is Not significant on delays of commercial building projects in Rwanda.

Suspension of work by owners is owner related delays' factors on commercial building projects in Rwanda. 41 (i.e. 42.7%) respondents said suspension of work by owners are extremely significant; 35 (i.e. 36.5%) respondents are very significant; 14 (i.e. 14.6%) respondents said that this factor is moderately significant; 4 (i.e. 4.2%) respondents said that this factor is slightly significant affecting commercial building projects in Rwanda; while 2 (i.e. 2.1%) respondents said that suspension of work by owners is Not significant affecting commercial building projects in Rwanda.

Table 4.6: Environmental delay's factors affecting commercial building projects in Rwanda

Environmental delay's factors	ES		VS		MS		SS		NS	
	fi	%	fi	%	fi	%	fi	%	fi	%
Unfavourable weather conditions	38	39.6	33	34.4	10	10.4	12	12.5	3	3.1
Inadequate production of raw material in the country	20	20.8	47	49.0	23	24.0	5	5.2	1	1.0
Unexpected surface & subsurface conditions (soil, water table, etc.)	28	29.2	36	37.5	14	14.6	10	10.4	8	8.3

Source: *Primary Data, Field results (August, 2020).*

Full meaning of the used Abbreviations on table above: ES: *Extremely significant*; **VS:** *Very significant*; **MS:** *Moderately significant*; **SS:** *Slightly significant*; **NS:** *Not significant*; **Fi:** *Frequency*, and **%:** *Percentage*

Table 4.6 presents perceptions of respondents about environmental factors delays affecting commercial building projects in Rwanda. Unfavorable weather conditions are environmental delay factors that affecting extremely significant commercial building projects in Rwanda as confirmed by 38 (i.e. 39.6%) respondents. 33 (i.e. 34.4%) respondents confirmed this factor is Very significant. 10 (i.e. 10.4%) respondents confirmed moderately significant; 12 (i.e. 12.5%)

respondents is saying that the factor is Slightly significant while 3 (i.e. 3.1%) respondents said that unfavorable weather conditions is environmental delay factors which is not significant affecting commercial building projects in Rwanda.

Inadequate production of raw material in the country, is confirmed by 20 (i.e. 20.8%) respondents saying that it is extremely significant; 47 (i.e. 49.0%) respondents said this factor is Very significant; 23(i.e. 24.0%) respondents is moderately significant; 5 (i.e. 5.2%) respondents said that it is slightly significant; while 1(i.e. 1.0%) respondent is not significant affecting commercial building projects in Rwanda.

Unexpected surface & subsurface conditions (soil, water table, etc.); is confirmed by 28 (i.e. 29.2%) respondents who said that it is extremely significant; 36 (i.e. 37.5%) respondents say that unexpected surface & subsurface conditions is very significant; 14 (i.e. 14.6%) respondents have said it is moderately significant; 10 (i.e. 10.4%) respondents said that it is slightly significant; while 8 (i.e. 8.3%) respondents said that unexpected surface & subsurface conditions (soil, water table, etc.) is not significant affecting commercial building projects in Rwanda.

Table 4.7: Design related delay's factors affecting commercial building projects in Rwanda

	ES		VS		MS		SS		NS	
Design related delay's factors	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
Rework due to errors	43	44.8	28	29.2	13	13.5	10	10.4	2	2.1
Design errors and omissions made by designers	28	29.2	46	47.9	8	8.3	7	7.3	7	7.3
Delays in producing design documents	46	47.9	32	33.3	14	14.6	2	2.1	2	2.1
Poor use of advanced engineering design software	37	38.5	33	34.4	17	17.7	5	5.2	4	4.2
Incomplete project design	35	36.5	40	41.7	11	11.5	10	10.4	0	0.0
Defective design made by designers	28	29.2	44	45.8	19	19.8	4	4.2	1	1.0

Source: *Primary Data, Field results (August, 2020).*

Full meaning of the used Abbreviations on table above: ES: *Extremely significant*; **VS:** *Very significant*; **MS:** *Moderately significant*; **SS:** *Slightly significant*; **NS:** *Not significant*; **Fi:** *Frequency*, and **%:** *Percentage.*

Table 4.7 presents perceptions from respondents on design related factors affecting commercial building projects in Rwanda; where rework due to errors as design related factors confirmed by 43 (i.e. 44.8%) respondents said this factor is extremely significant; 28(i.e. 29.2%) respondents said that this is very significant; 13(i.e. 13.5%) respondents said it is moderately significant; 10 (i.e. 10.4%) respondents said this is slightly significant while only 2 (i.e. 2.1%) respondents said that rework due to errors as design related factors is not significant in affecting commercial buildings projects in Rwanda.

Design errors and omissions made by designers, is extremely significant as confirmed by 28 (i.e. 29.2%) respondents; 46 (i.e. 47.9%) respondents said it is very significant; 8 (i.e. 8.3%) respondents is moderately significant; 7 (i.e. 7.3%) respondents confirmed to be slightly significant; while 7 (i.e. 7.3%) respondents said that Design errors and omissions made by designers as design related factors is not significant in affecting commercial building projects in Rwanda.

Delays in producing design documents is confirmed to be extremely significant by 46 (i.e. 47.9%) respondents; 32(i.e. 33.3%) respondents said it is very significant; 14 (i.e. 14.6%) respondents is moderately significant; 2 (i.e. 2.1%) respondents said that this is slightly significant; while 2 (i.e. 2.1%) respondents said that Delays in producing design documents as design related factors is not significant in affecting commercial building projects in Rwanda.

Poor use of advanced engineering design software is extremely significant as said by 37 (i.e. 38.5%) respondents; 33 (i.e. 34.4%) said it is very significant; 17 (i.e. 17.7%) respondents said to be moderately significant; 5 (i.e. 5.2%) respondents said it is slightly significant; while only 4 (i.e.

4.2%) respondents said that poor use of advanced engineering design software is not significant affecting commercial building projects in Rwanda.

Incomplete project design is extremely significant as confirmed by 35 (i.e. 36.5%) respondents; it is very significant as said by 40 (i.e. 41.7%) respondents; it is moderately significant as said by 11 (i.e. 11.5%) respondents; and incomplete project design is slightly significant as shown by 10 (i.e. 10.4%) respondents**.**

Defective design made by designers is extremely significant as confirmed by 28 (i.e. 29.2%) respondents; it is very significant as said by 44 (i.e. 45.8%) respondents; 19 (i.e. 19.8%) respondents said that it is moderately significant; 4 (i.e. 4.2%) respondents said that it is slightly significant; while only 1 (i.e. 1.0%) respondent said that Defective design made by designers as design related factors is not significant in affecting commercial building projects in Rwanda.

Table 4.8: Material Related delay's Factors affecting commercial building projects in Rwanda

	ES		VS		MS		SS		NS	
Material Related Factors	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
Delay in manufacturing materials	40	41.7	28	29.2	13	13.5	9	9.4	6	6.2
Damage of sorted materials	39	40.6	34	35.4	16	16.7	2	2.1	5	5.2
Escalation of material prices	35	36.5	38	39.6	10	10.4	10	10.4	3	3.1
Late delivery of materials	32	33.3	39	40.6	19	19.8	2	2.1	4	4.2
Poor procurement of construction materials	36	37.5	34	35.4	16	16.7	10	10.4	0	0.0

Source: *Primary Data, Field results (August, 2020).*

Full meaning of the used Abbreviations on table above: ES: *Extremely significant*; **VS:** *Very significant*; **MS:** *Moderately significant*; **SS:** *Slightly significant*; **NS:** *Not significant*; **Fi:** *Frequency,* and **%:** *Percentage.*

Table 4.8 illustrates perceptions of respondents about material Related Factors affecting commercial building projects in Rwanda. Delay in manufacturing materials is extremely significant as confirmed by 40 (i.e. 41.7%) respondents; it is very significant as said by 28 (i.e.

29.2%) respondents; it is moderately significant as said by 13 (i.e. 13.5%) respondents; this is slightly significant as confirmed by 9 (i.e. 9.4%) respondents; while 6 (i.e. 6.2%) respondents said that delay in manufacturing materials as material related factors is not significant affecting commercial building projects in Rwanda.

Damage of sorted materials is extremely significant as said by 39 (i.e. 40.6%) respondents; it is very significant as said by 34 (i.e. 35.4%) respondents; it is moderately significant as said by 16 (i.e. 16.7%) respondents; it is slightly significant as confirmed by 2 (i.e. 2.1%) respondents while 5 (i.e. 5.2%) respondents said that damage of sorted materials as material related factors is not significant affecting commercial building projects in Rwanda.

Escalation of material prices is extremely significant as confirmed by 35 (i.e. 36.5%) respondents; it is very significant as said by 38 (i.e. 39.6%) respondents; it is moderately significant as 10 (i.e. 10.4%) respondents; this is slightly significant as confirmed by 10 (i.e. 10.4%) respondents while 3 (i.e. 3.1%) respondents said that escalation of material prices as material related factors is not significant affecting commercial building projects in Rwanda.

Late delivery of materials is extremely significant as confirmed by 32 (i.e. 33.3%) respondents; it is very significant as said by 39 (i.e. 40.6%) respondents; this is moderately significant as said by 19 (i.e. 19.8%) respondents; it is slightly significant as said by 2(i.e.2.1%) respondents; while 4 (i.e. 4.2%) respondents said that Late delivery of materials as material related factors is not significant affecting commercial building projects in Rwanda.

Poor procurement of construction materials is extremely significant as confirmed by 36 (i.e. 37.5%) respondents; this is very significant as confirmed by 34 (i.e. 35.4%) respondents; it is moderately significant as confirmed by 16 (i.e. 16.7%) respondents; and poor procurement of construction materials is slightly significant as said by 10 (i.e. 10.4%) respondents.

Table 4.9: Project Related Factors affecting commercial building projects in Rwanda

Project Related Factors	ES		VS		MS		SS		NS	
	fi	%	fi	%	fi	%	fi	%	fi	%
Delay in site delivery	32	33.3	37	38.5	18	18.8	5	5.2	4	4.2
Improper project feasibility study	33	34.4	39	40.6	12	12.5	10	10.4	2	2.1
Inadequate planning	46	47.9	29	30.2	14	14.6	5	5.2	2	2.1
Ineffective delay penalties	32	33.3	36	37.5	14	14.6	10	10.4	4	4.2

Source: *Primary Data, Field results (August, 2020).*

Full meaning of the used Abbreviations on table above: ES: *Extremely significant*; **VS:** *Very significant*; **MS:** *Moderately significant*; **SS:** *Slightly significant*; **NS:** *Not significant*; **Fi:** *Frequency*, and **%:** *Percentage.*

Table 4.9 shows the perceptions of respondents on the project related factors affecting commercial building projects in Rwanda. Delay in site delivery is extremely significant as confirmed by 32 (i.e. 33.3%) respondents; it is very significant as confirmed by 37 (i.e. 38.5%) respondents; this is moderately significant as said by 18 (i.e. 18.8%) respondents; it is slightly significant as confirmed by 5 (i.e. 5.2%) respondents, while 4 (i.e. 4.2%) respondents said that delay in site delivery as project related factors is not significant affecting commercial building projects in Rwanda.

Improper project feasibility study is extremely significant as confirmed by 33 (i.e. 34.4%) respondents; it is very significant as said by 39 (i.e. 40.6%) respondents; this factor is moderately significant as confirmed by 12 (i.e. 12.5%) respondents; 10 (i.e. 10.4%) respondents said that Improper project feasibility study is slightly significant, while 2 (i.e.2.1%) respondents said that Improper project feasibility study as project related factors is not significant affecting commercial building projects in Rwanda.

Inadequate planning is extremely significant as said by 46 (i.e. 47.9%) respondents; it is very significant as confirmed by 29 (i.e. 30.2%) respondents; this is moderately significant as said by 14 (i.e. 14.6%) respondents; it is slightly significant as confirmed by 5 (i.e. 5.2%) respondents;

and 2 (i.e. 2.1%) respondents said that inadequate planning as project related factors is not significant affecting commercial building projects in Rwanda

Table 4.10: Interpersonal related delay's factors affecting commercial building projects in Rwanda

	ES		VS		MS		SS		NS	
Interpersonal related factor	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
Thefts done on site	42	43.8	37	38.5	11	11.5	4	4.2	2	2.1
Absenteeism	31	32.3	36	37.5	17	17.7	9	9.4	3	3.1
Low motivation and morale of labor	27	28.1	44	45.8	18	18.8	5	5.2	2	2.1
Personal conflicts among labor	33	34.4	38	39.6	15	15.6	8	8.3	2	2.1
Shortage of labor	40	41.7	34	35.4	17	17.7	4	4.2	1	1.0
Slow mobilization of labor	38	39.6	34	35.4	9	9.4	14	14.6	1	1.0

Source: *Primary Data, Field results (August, 2020).*

Table 4.10 presents opinions from respondents on interpersonal related factor as delays that affecting commercial building projects in Rwanda. Thefts done on site is extremely significant as said by 42 (i.e. 43.8%) respondents; it is very significant as confirmed by 37 (i.e. 38.5%) respondents; it is moderately as confirmed by 11 (i.e. 11.5%) respondents; this is slightly significant as confirmed by 4 (i.e. 4.2%) respondents; while 2 (i.e. 2.1%) respondents said that thefts done on site is interpersonal related factor which is not significant affecting commercial building projects in Rwanda.

Absenteeism is extremely significant as confirmed by 31 (i.e. 32.3) respondents; it is very significant as said by 36 (i.e. 37.5%) respondents; it is moderately significant as confirmed by 17 (i.e. 17.7) respondents; this factor is slightly significant as confirmed by 9 (i.e. 9.4%) respondents and 3 (i.e. 3.1%) respondents said that Absenteeism as interpersonal related factor that is not significant affecting commercial building projects in Rwanda.

Low motivation and morale of labor is extremely significant as confirmed by 27 (i.e. 28.1%) respondents; it is very significant as said by 44 (i.e. 45.8%) respondents; this factor is moderately significant as shown by 18 (i.e. 18.8%) respondents; it is slightly significant as it was said by 5 (i.e. 5.2%) respondents while 2 (i.e. 2.1%) respondents said that Low motivation and morale of labor interpersonal related factor that is not significant affecting commercial building projects in Rwanda.

Personal conflicts among labor is extremely significant as confirmed by 33 (i.e. 34.4%) respondents; 38 (i.e. 39.6%) respondents said that it is very significant; 15 (i.e. 15.6%) respondents said this factor is moderately significant; it is slightly significant as confirmed by 8 (i.e. 8.3) and 2 (i.e. 2.1%) respondents said that Personal conflicts among labor is not significant in affecting commercial building projects.

Shortage of labor is extremely significant as confirmed by 40 (i.e. 41.7%) respondents; it is very significant as said by 34 (i.e. 35.4%) respondents; this is moderately significant as shown by 17 (i.e. 17.7%) respondents; this factor is slightly significant as confirmed by 4 (i.e. 4.2%) respondents and also 1 (i.e. 1.0%) respondent said that Shortage of labor is not significant affecting commercial building project.

Slow mobilization of labor is extremely significant as confirmed by 38 (i.e. 39.6%) respondents; it is very significant as shown by 34 (i.e. 35.4%) respondents; this factor is moderately significant as said by 9 (i.e. 9.4%) respondents; it is slightly significant as said by 14 (i.e. 14.6%) respondents; while 1 (i.e. 1.0%) respondent confirmed that Slow mobilization of labor is not significant affecting commercial building projects in Rwanda.

4.2.2 Indicators of success of Commercial building Projects of construction companies in Rwanda

Commercial real estate development is the next one. Rarely do commercial real estate spaces come exactly how owners and tenants' desire. Each organization has its own goals and an ideal layout for productivity. There are many moving parts involved in successfully renovating and building commercial real estate to a tenant's specifications. The top commercial real estate developers handle every aspect of that development process and work closely with tenants to build the space they desire. Handling commercial real estate development on own can quickly become time-consuming and expensive without professional experience.

Commercial building projects organize and provide the pre-construction services that prepare preliminary feasibility estimates for the development for presentation and acceptance by the client, prepare and present development to potential private syndicate or institutional investors and financiers, assess and place purchase options on development land. Based on market needs research, carry out full risk assessment study in conjunction with the client, prepare final estimates for presentation to and acceptance of investors and financiers, work with client, designers and local authorities to obtain the prior to settling on the land, settle on the development land, prepare development contract documentation, and prepare "lease-back" documentation including preliminary and final agreement to lease (CBP, 2018).

Table 4.11: Cost performance as indicator of success of Commercial Building Projects delays for construction companies

Cost performance	ES		VS		MS		SS		NS	
	fi	%	fi	%	fi	%	fi	%	fi	%
Costs of projects arise from variations in inception to completion	21	21.9	47	49.0	25	26.0	3	3.1	0	0.0
Modification during construction period	30	31.2	36	37.5	11	11.5	12	12.5	7	7.3
Cost arising from the legal claims	42	43.8	33	34.4	10	10.4	7	7.3	4	4.2
Project is over budget	28	29.2	47	49.0	7	7.3	8	8.3	6	6.2

Source: *Primary Data, Field results (August, 2020)*

Table 4.11 show the perceptions of respondents about existing cost performance as an indicator of commercial building projects delays for construction companies. 21 (i.e. 21.9%) respondents said that costs of projects arise from variations in inception to completion is extremely significant in cost performance of commercial building projects delays in construction companies of Rwanda. 47 (i.e. 49.0%) respondents said that it is very significant in cost performance of commercial buildings projects. 25 (i.e. 26.0%) respondents said it is moderately significant; 3 (i.e. 3.1%) respondents said the costs of projects arise from variations in inception to completion slightly significant to the cost performance of commercial building projects delayed in construction companies in Rwanda.

Modification during construction period is extremely significant as confirmed by 30 (i.e. 31.2%) respondents; it is very significant as said by 36 (i.e. 37.5%) respondents; this factor is moderately significant as confirmed by 11 (i.e. 11.5%) respondents; 12 (i.e. 12.5%) respondents said that Modification during construction period is slightly significant in commercial building projects; and some of 7 (i.e. 7.3%) respondents affirmed that Modification during construction period is not significant in commercial building projects in Rwanda.

Cost arising from the legal claims is extremely significant as said by 42 (i.e. 43.8%) respondents; it is very significant as confirmed by 33 (i.e. 34.4%) respondents; it is moderately as confirmed by 10 (i.e. 10.4%) respondents; 7 (i.e. 7.3%) respondents said this indicator is slightly significant, while only 4 (i.e. 4.2%) respondents said that Cost arising from the legal claims is not significant in commercial building projects in Rwanda.

Project is over budget is extremely significant as confirmed by 28 (i.e. 29.2%) respondents; 47 (i.e. 49.0%) respondents said that it is very significant; this factor is moderately significant as confirmed by 7 (i.e. 7.3%) respondents; it is it is found that this indicator is slightly significant 8 (i.e. 8.3%) respondents confirmed that Project is over budget is slightly significant, while 6 (i.e. 6.2%) respondents said that it is not significant in commercial building projects in Rwanda.

Table 4.12: Time performance as indicator of success of Commercial Building Projects delays for construction companies

	ES		VS		MS		SS		NS	
Time performance	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
Long timely delivery of projects	45	46.9	37	38.5	11	11.5	1	1.0	2	2.1
Delays of commencement of site works to the completion	37	38.5	34	35.4	16	16.7	5	5.2	4	4.2
Delays of handover of a building to the clients	37	38.5	40	41.7	11	11.5	7	7.3	1	1.0
Delays of construction time of a building as planned	30	31.2	42	43.8	18	18.8	5	5.2	1	1.0

Source: *Primary Data, Field results (August, 2020)*

Table 4.12 illustrates the perceptions of respondents about time performance as indicator of commercial building projects delayed for construction companies. Long timely delivery of projects is extremely significant as confirmed by 45 (i.e. 46.9%) respondents; it is very significant as said by 37 (i.e. 38.5%) respondents; 11 (i.e. 11.5%) respondents said that this indicator is moderately significant; 1 (i.e. 1.0%) respondents said that it is slightly significant; while only 2(i.e. 2.1%)

respondents confirmed that Long timely delivery of projects in time performance is not significant in success of commercial building projects delayed for construction companies in Rwanda.

Delays of commencement of site works to the completion is extremely significant as said by 37 (i.e. 38.5%) respondents; it is very significant as confirmed by 34 (i.e. 35.4%) respondents; this is moderately significant as confirmed by 16 (i.e. 16.7%) respondents; 5 (i.e. 5.2%) respondents said that delays of commencement of site works to the completion is slightly significant; 4 (i.e. 4.2%) respondents confirmed that delays of commencement of site works to the completion in time performance is not significant for commercial building projects delayed for construction companies in Rwanda.

Delays of handover of a building to the clients is extremely significant as confirmed by 37 (i.e. 38.5%) respondents; it is very significant as said by 40 (i.e. 41.7%) respondents; 11 (i.e. 11.5%) respondents said that delays of handover of a building to the clients is moderately significant; 7 (i.e. 7.3%) respondents said that it is slightly significant while 1 (i.e. 1.0%) respondent said that Delays of handover of a building to the clients is in time performance and it is not significant for commercial building projects delayed for construction companies in Rwanda. Delays of construction time of a building as planned is extremely significant as confirmed by 30 (i.e. 31.2%) respondents; it is very significant as said by 42 (i.e. 43.8%) respondents; 18 (i.e. 18.8%) respondents said that it is moderately significant; 5 (i.e. 5.2%) respondents said that Delays of construction time of a building as planned is slightly significant while only 1 (i.e. 1.0%) respondents confirmed that delays of construction time of a building as planned in time performance is not significant for success of commercial building projects delayed for construction companies in Rwanda.

Table 4.13: Quality performance as indicator of success of Commercial Building Projects delays for construction companies

	ES		VS		MS		SS		NS	
Quality performance	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
No meet with totality of features required by a product or services to satisfy a given need	43	44.8	28	29.2	13	13.5	8	8.3	4	4.2
Low quality that fitness for purpose of projects	42	43.8	33	34.4	12	12.5	7	7.3	2	2.1
Low meeting with owner's quality expectations	37	38.5	38	39.6	11	11.5	7	7.3	3	3.1
Misunderstanding in all parties of project to acquire expectations	34	35.4	39	40.6	17	17.7	4	4.2	2	2.1

Source: *Primary Data, Field results (August, 2020)*

Table 4.13 presents opinions from respondents on the quality performance as indicator of success of commercial building projects delays for construction companies in Rwanda. No meet with totality of features required by a product or services to satisfy a given need is extremely significant as confirmed by 43 (i.e. 44.8%) respondents; it is very significant as said by 28 (i.e. 29.2%) respondents; this indicator is moderately significant as confirmed by 13 (i.e. 13.5%) respondents; 8 (i.e. 8.3%) respondents said that it is slightly significant, while 4 (i.e.4.2%) respondents said that no meet with totality of features required by a product or services to satisfy a given need is not significant in success of commercial building projects delays for construction companies in Rwanda.

Low quality that fitness for purpose of projects is extremely significant as confirmed by 42 (i.e. 43.8%) respondents; it is very significant as confirmed by 33 (i.e. 34.4%) respondents; this is moderately significant as said by 12 (i.e. 12.5%) respondents; 7 (i.e. 7.3%) respondents said that it is slightly significant; while only 2 (i.e. 2.1%) respondents said that low quality that fitness for purpose of projects is not significant in success of commercial building projects delays for construction companies in Rwanda.

Low meeting with owner's quality expectations is extremely significant as said by 37 (i.e. 38.5%) respondents; it is very significant as confirmed by 38 (i.e. 39.6%) respondents; 11 (i.e. 11.5%) respondents said that it is moderately significant; 7 (i.e. 7.3%) respondents said that low meeting with owner's quality expectations is slightly significant; while 3 (i.e. 3.1%) respondents said that low meeting with owner's quality expectations is not significant in success of commercial building projects delays for construction companies in Rwanda.

Misunderstanding in all parties of project to acquire expectations is being extremely significant as confirmed by 34 (i.e. 35.4%) respondents; it is very significant as confirmed by 39 (i.e. 40.6%) respondents; 17 (i.e. 17.7%) respondents said that this indicator is moderately significant; it is slightly significant as confirmed by 4 (i.e. 4.2%) respondents; while 2 (i.e. 2.1%) respondents confirmed that misunderstanding in all parties of project to acquire expectations is not significant in success of commercial building projects delays for construction companies in Rwanda.

Table 4.14: Clients' satisfaction as indicator of success of commercial building projects delays construction companies

	ES		VS		MS		SS		NS	
Clients' satisfaction	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
Dissatisfaction is widely experienced by clients of construction projects	37	38.5	35	36.5	14	14.6	9	9.4	1	1.0
Attributable to overrunning project costs	34	35.4	37	38.5	17	17.7	6	6.2	2	2.1
Delayed of project completion	34	35.4	41	42.7	11	11.5	9	9.4	1	1.0
Inferior quality and incompetent service providers	47	49.0	30	31.2	12	12.5	7	7.3	0	0.0

Source: *Primary Data, Field results (August, 2020)*

Table 4.14 show perceptions of respondents about clients' satisfaction as indicator of success of commercial building projects delays construction companies in Rwanda. Dissatisfaction is widely experienced by clients of construction projects is extremely significant as confirmed by 37 (i.e. 38.5%) respondents; it is very significant as said by 35 (i.e. 36.5%) respondents; it is moderately

significant as confirmed by 14 (i.e. 14.6%) respondents; 9 (i.e. 9.4%) respondents said that dissatisfaction is widely experienced by clients of construction projects is slightly significant while 1(i.e. 1.0%) respondents said that dissatisfaction is widely experienced by clients of construction projects is not significant for success of commercial building projects delays construction companies in Rwanda.

Attributable to overrunning project costs is extremely significant as confirmed by 34 (i.e. 35.4%) respondents; it is very significant as said by 37 (i.e. 38.5%) respondents; 17 (i.e. 17.7%) respondents said that this indicator is moderately significant; it is slightly significant as confirmed by 6 (i.e. 6.2%) respondents while only 2 (i.e. 2.1%) respondents said that Attributable to overrunning project costs is not significant in success of commercial building projects delays construction companies in Rwanda.

Delayed of project completion is extremely significant as confirmed by 34 (i.e. 35.4%) respondents; it is very significant as said by 41 (i.e. 42.7%) respondents; this indicator is moderately significant as confirmed by 11 (i.e. 11.5%) respondents; 9 (i.e. 9.4%) respondents confirmed that it is slightly significant while only 1 (i.e.1.0%) respondent says that Delayed of project completion is not significant in success of commercial building projects delays construction companies in Rwanda.

Inferior quality and incompetent service providers is extremely significant as confirmed by 47 (i.e. 49.0%) respondents; it is very significant as confirmed by 30 (i.e. 31.2%) respondents; 12 (i.e. 12.5%) respondents said that this indicator is moderately significant, and inferior quality and incompetent service providers is slightly significant as confirmed by 7 (i.e. 7.3%).

Table 4.15: Health and safety as indicator of success of commercial Building Projects delays for construction companies

	ES		VS		MS		SS		NS	
Health and safety	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
Accidents occur during project implementation stage.	31	32.3	39	40.6	14	14.6	9	9.4	3	3.1
Presence of hazardous activities.	41	42.7	38	39.6	11	11.5	3	3.1	3	3.1
People are killed and disabling injury annually in construction industrial accident.	33	34.4	37	38.5	12	12.5	9	9.4	5	5.2
No single reliable measure of health and safety performance.	27	28.1	47	49.0	17	17.7	2	2.1	3	3.1
Absence of control health and safety risks.	41	42.7	37	38.5	12	12.5	5	5.2	1	1.0

Source: *Primary Data, Field results (August, 2020)*

Table 4.15 show the perceptions of respondents about health and safety as indicator of commercial building projects delays for construction companies in Rwanda. Accidents occur during project implementation stage is extremely significant as confirmed by 31(i.e. 32.3%) respondents; it is very significant as said by 39 (i.e. 40.6%) respondents; 14 (i.e. 14.6%) respondents said that it is moderately significant; 9 (i.e. 9.4%) respondents said that this indicator is slightly significant while 3 (i.e. 3.1%) respondents said that accidents occur during project implementation stage is not significant for commercial building projects delays for construction companies in Rwanda.

Presence of hazardous activities is extremely significant as confirmed by 41 (i.e. 42.7%) respondents; it is very significant as said by 38 (i.e. 39.6%) respondents; this is moderately significant as confirmed by 11 (i.e. 11.5%) respondents; 3 (i.e. 3.1%) respondents said that it is slightly significant while only 3 (i.e. 3.1%) respondents said that presence of hazardous activities is not significant for success of commercial building projects delays for construction companies in Rwanda.

People are killed and disabling injury annually in construction industrial accident is extremely significant as confirmed by 33 (i.e. 34.4%) respondents; this is very significant as more than 37

(i.e. 38.5%) respondents confirmed it. It is moderately significant as said by 12 (i.e. 12.5%) respondents; 9 (i.e. 9.4%) said that People are killed and disabling injury annually in construction industrial accident is slightly significant while only 5 (i.e. 5.2%) respondents said that People are killed and disabling injury annually in construction industrial accident is not significant in success of commercial building projects delays for construction companies in Rwanda.

No single reliable measure of health and safety performance is extremely significant as confirmed by 27 (i.e. 28.1%) respondents; it is very significant as said by 47 (i.e. 49.0%) respondents; this is moderately significant as said by 17 (i.e. 17.7%) respondents; 2 (i.e. 2.1%) respondents said that it is slightly significant while only 3 (i.e. 3.1%) respondents said that no single reliable measure of health and safety performance is not significant in success of commercial building projects delays for construction companies in Rwanda.Absence of control health and safety risks is extremely significant as confirmed by 41 (i.e. 42.7%) respondents; it is very significant as said by 37 (i.e. 38.5%) respondents; this is moderately as confirmed by 12 (i.e. 12.5%) respondents; it is slightly significant as confirmed by 5 (i.e. 5.2%) respondents while only 1 (i.e. 1.0%) respondents said that absence of control health and safety risks is not significant in success of commercial building projects delays for construction companies in Rwanda.

Table 4.16: Functionality as indicator of success of Commercial Building Projects delays for construction companies

	ES		VS		MS		SS		NS	
Functionality	**Fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
Project is finished and delivered to service far along	39	40.6	35	36.5	8	8.3	14	14.6	0	0.0
Unappropriated financial and technical aspects implemented	21	21.9	47	49.0	26	27.1	1	1.0	1	1.0
Technical specifications are not totally considered	30	31.2	37	38.5	12	12.5	10	10.4	7	7.3
Less achievement of fitness for purpose objective	42	43.8	32	33.3	11	11.5	8	8.3	3	3.1

Source: *Primary Data, Field results (August, 2020)*

Table 4.16 shows the perceptions of respondents about functionality as indicator of success of commercial building projects delays for construction companies in Rwanda. Project is finished and delivered to service far along is extremely significant as confirmed by 39 (i.e. 40.6%) respondents; it is very significant as said by 35 (i.e. 36.5%) respondents; this is moderately significant as confirmed by 8 (i.e. 8.3%) respondents; and it is also confirmed to be slightly significant as said by 14 (i.e. 14.6%) respondents.

Unappropriated financial and technical aspects implemented is extremely significant as confirmed by 21 (i.e. 21.9%) respondents; it is very significant as said by 47 (i.e. 49.0%) respondents; this is moderately significant as confirmed by 26 (i.e. 27.1%) respondents; and unappropriated financial and technical aspects implemented is slightly significant as confirmed by 1 (i.e. 1.0%) respondents while 1(i.e. 1.0%) respondent said that unappropriated financial and technical aspects implemented is not significant in success of commercial building Projects delays for construction companies in Rwanda.

Technical specifications are not totally considered is extremely significant as confirmed by 30 (i.e. 31.2%) respondents; it is very significant as confirmed by 37 (i.e. 38.5%) respondents; this is also moderately as said by 12 (i.e. 12.5%) respondents; it is slightly significant as confirmed by 10 (i.e. 10.4%) respondents while only 7 (i.e. 7.3%) respondents said that technical specifications are not totally considered is not significant in success of commercial building Projects delays for construction companies in Rwanda.

Less achievement of fitness for purpose objective is extremely significant as said by 42 (i.e. 43.8%) respondents; it is very significant as confirmed by 32 (i.e. 33.3%) respondents; this is moderately significant as shown by 11 (i.e. 11.5%) respondents; 8 (i.e. 8.3%) respondents said that less achievement of fitness for purpose objective is slightly significant while only 3 (i.e. 3.1%)

respondents said that Less achievement of fitness for purpose objective is not significant in success of commercial building projects delays for construction companies in Rwanda.

4.2.3 Relationship between analysis of delay factors and success of commercial building projects of construction companies in Rwanda

4.2.3.1 Opinions from respondents from selected construction companies in Rwanda

Through findings from respondents of NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies in Rwanda confirmed that there are poor scope definition at the start can be a result of cost overrun and time delay of any construction project. The project complexity can also be a major factor for time delay and cost overrun. Generally, the delay in the construction sector is defined as a "time overrun after the completion. Of a contract or beyond the date agreed upon by the parties for delivery of the project.

The success of a project depends on the most efficient. Programming, scheduling and control of available resources and project activities by keeping. Its time, cost and utility values at the top. However, along with cost and quality. Change in project scope, project complexity, inadequate planning, impropriate project schedule design variation, inaccurate engineering estimate, inefficient material and equipment and improper post execution phase management. Groups of factors that cause of delays of commercial building projects are mainly:

i. External- related Delay in obtaining permits from city
ii. External- related Change in government regulations and laws
iii. Contractor- related Difficulties in financing project
iv. Client- related Delay in approving design documents
v. Labor- related Shortage of labors
vi. Client- related slow decision making

vii. Contractor- related inadequate experience of contractor

viii. Labor- related Unskilled and/or unqualified labors

ix. Design- related inadequate experience of design office

x. Design- related Unclear and inadequate details in drawings

Each individual causes perceived by all participants were used to assess the general and overall rankings in order to give an overall information of the causes of construction delays in company

There is an Agreement on the causes for the three most important delays between the clients and the Contractors, while close ranking is seen for other causes. Consultants, on the other hand government that the most important delays are due to financial reasons. Material and equipment-related.

In conclusion, delays in construction of commercial building projects are experienced today with various known and/or unknown factors and will continue to be experienced in future periods. Therefore, it is necessary: to predict and to analyses the causes of the delays carefully in order to take precaution and to control delays. An investigation on the causes and effects of delays for local and small-scale.

Projects is crucial as it provides a positive contribution to the national development of the Construction industry. The fact that the time management is not done properly in the provinces, where the construction activities are progressing rapidly, affect the investments of the sector negatively. This can help to minimize the time and cost overruns, especially by taking the necessary precautions at the first stage of the commercial building project and by preparing the project Schedule plans.

4.2.3.2 Statistical Test of Rank between Independent Variables over dependent Variables

This section shows the test of nine representatives of independent variables and indicators representing dependent variables by ranking each delay's factors over dependent variable representative to show the causality of each factor as detailed below.

Table 4.17: Correlation Matrix

		Cost performance	Time performance	Quality performance	Clients' satisfaction	Health and safety	Functionality
Consultant related factors	Pearson Correlation	-.007	-.113	-.060	.076	-.004	-.046
	Sig. (2-tailed)	.947	.275	.559	.464	.968	.657
	N	96	96	96	96	96	96
Contractors related factors	Pearson Correlation	**.322****	**.232***	.115	.151	**.250***	**.320****
	Sig. (2-tailed)	.001	.023	.266	.141	.014	.001
	N	96	96	96	96	96	96
Technical Equipment factors	Pearson Correlation	**.566****	**.267****	.053	.193	**.306****	**.593****
	Sig. (2-tailed)	.000	.008	.606	.059	.002	.000
	N	96	96	96	96	96	96
Owner related factors	Pearson Correlation	**.376****	**.250***	.012	.136	**.337****	**.524****
	Sig. (2-tailed)	.000	.014	.909	.186	.001	.000
	N	96	96	96	96	96	96
Environmental factors	Pearson Correlation	**.517****	.106	-.088	.108	**.241***	**.664****
	Sig. (2-tailed)	.000	.303	.392	.297	.018	.000
	N	96	96	96	96	96	96
Design related factors	Pearson Correlation	**.416****	**.560****	**.257***	**.256***	**.371****	**.483****
	Sig. (2-tailed)	.000	.000	.011	.012	.000	.000
	N	96	96	96	96	96	96
Material Related Factors	Pearson Correlation	.102	**.472****	**.607****	**.343****	**.325****	.102
	Sig. (2-tailed)	.322	.000	.000	.001	.001	.321
	N	96	96	96	96	96	96
Project Related Factors	Pearson Correlation	.172	**.296****	**.245***	**.604****	**.497****	**.203***
	Sig. (2-tailed)	.094	.003	.016	.000	.000	.048
	N	96	96	96	96	96	96
Interpersonal related factor	Pearson Correlation	**.358****	**.337****	.134	**.387****	**.561****	**.425****
	Sig. (2-tailed)	.000	.001	.194	.000	.000	.000
	N	96	96	96	96	96	96

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

**. *Correlation is significant at the 0.05 level (2-tailed).*

Table 4.17 shows that there is a negative and insignificant correlation between consultant related factors and cost performance with (r= -.007, p > 0.01); Time performance with (r= -.113, p > 0.01); Quality performance with (r= -.060, p > 0.01). There is also a positive significant correlation between consultant related factors and clients' satisfaction with (r= 0.076, p > 0.01). There is a negative and insignificant correlation between consultant related factors and health and safety with (r= -.004, p>0.01); and functionality with (r= -.046, p>0.01) for commercial building projects.

The findings revealed that there is a positive and low correlation between contractors related factors and Cost performance with (r= 0.322, p<0.01); Time performance with (r= 0.232, p<0.05); Health and safety with (r= 0.250, p<0.05); Functionality with (r= 0.320, p<0.01) for commercial building projects.

The results revealed that there is also a positive and strong correlation between technical equipment factors and Cost performance with (r= 0.566, p<0.01); positive and low correlation between technical equipment and time performance with (r= 0.267, p<0.01); and health and safety with (r= 0.306, p<0.01); positive and strong correlation between technical equipment and functionality (r= 0.593, p<0.01) for commercial building projects.

The findings confirmed that there is a positive and low correlation between Owner related factors and Cost performance with (r= 0.376, p<0.01); time performance with (r= 0.250, p<0.05); health and safety with (r= 0.337, p<0.01); and there is positive and strong correlation between technical equipment and functionality (r= 0.524, p<0.01) for commercial building projects.

The study revealed that there is a positive and strong correlation between environmental factors and Cost performance (r= 0.517, p<0.01); a positive and low correlation between environmental

factors and health and safety with (r= 0.241, p<0.05). There is also a positive and very strong correlation between environmental factors and functionality with (r= 0.664, p<0.01).

The results revealed that there is also a positive and low correlation between design related factors and cost performance with (r= 0.416, p<0.01); there is a positive and strong correlation between design related factors and time performance with (r= 0.560, p<0.01). There is also a positive and low correlation between design related factors and quality performance with (r= 0.257, p<0.05); clients' satisfaction with (r= 0.256, p<0.05); and health and safety with (r= 0.371, p<0.01); and functionality with (r= 0.483, p<0.01) for commercial building projects.

The study results argued that there is also a positive and low correlation between Material Related factors and time performance with (r= 0.472, p<0.01); there is a positive and very strong correlation between material related factors and quality performance with (r= 0.607, p<0.01). There is also a positive and low correlation between material related factors and clients' satisfaction with (r= 0.343, p<0.01); health and safety with (r= 0.325, p<0.01) for commercial building projects.

The results argued that there is also a positive and low correlation between Project Related Factors and Time performance with (r= 0.296, p<0.01); Quality performance with (r= 0.245, p<0.05). There is also a positive and very strong correlation between project related factors and clients' satisfaction with (r= 0.604, p<0.01); there is positive and low correlation between project related factors and health and safety with (r= 0.497, p<0.01); and functionality with (r= 0.203, p<0.05) for commercial building projects.

Finally, the study revealed that there is a positive and low correlation between Interpersonal related factor and Cost performance with (r= 0.358, p<0.01); time performance with (r= 0.337, p<0.01);

Clients' satisfaction with (r= .387, p<0.01). There is also a positive and strong correlation between Interpersonal related factor and health and safety with (r=0.561, p<0.01); and there is a positive and low correlation between Interpersonal related factor and Functionality with (r= 0.425, p<0.01) for commercial building projects in construction companies in Rwanda.

4.2.3.3 Testing Hypotheses

This section shows the test of six null hypotheses that have been formulated in introductory chapter of this research.

Testing Ho1 that says:

There is no significant influence of delay factors on cost performance for commercial building projects in construction companies in Rwanda.

Table 4.18: Model Summary for *Ho1*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.691[a]	.478	.423	2.27397

a. **Predictors: (Constant),** *CDF1, CDF2, CDF3, CDF4, CDF5, CDF6, CDF7, CDF8, CDF9*

The results in table 4.18 indicate that Adj. $\mathbf{R^2= 0.423}$ representing 42.3% change from cost performance of commercial building projects come from critical delay's factors. This means that critical delay's factors affect at least 42.3% cost performance in commercial building projects while other 57.7% remaining come from other variables which are not included in Model of this research.

Table 4.19: ANOVA[b] for *Ho1*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	407.038	9	45.226	**8.746**	**.000[a]**
	Residual	444.701	86	5.171		
	Total	851.740	95			

a. **Predictors: (Constant),** *CDF1, CDF2, CDF3, CDF4, CDF5, CDF6, CDF7, CDF8, CDF9*

b. **Dependent Variable:** *Cost performance (CP)*

The results from table 4.19 indicated that the F-test = 8.746 which is positive and significant at 0% shows that we failed to accept **$H_0$1** which states that "There is no significant influence of delay factors on cost performance in commercial building projects delayed at construction companies in Rwanda". This is based on the fact that the findings indicated positive and significant effect on critical delay's factors on cost performance for commercial building projects in Rwanda.

Table 4.20: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	**Std. Error**	**Beta**		
1	**(Constant)**	1.829	1.585		1.154	.252
	Consultant related factors (CDF1)	-.095	.114	**-.066**	**-.832**	**.408**
	Contractors related factors(CDF2)	.266	.121	**.204**	**2.196**	**.031**
	Technical Equipment factors (CDF3)	.346	.122	**.389**	**2.835**	**.006**
	Owner related factors (CDF4)	-.523	.191	**-.450**	**-2.735**	**.008**
	Environmental factors (CDF5)	.242	.127	**.271**	**1.902**	**.060**
	Design related factors (CDF6)	.256	.099	**.343**	**2.585**	**.011**
	Material Related Factors (CDF7)	-.182	.089	**-.229**	**-2.049**	**.043**
	Project Related Factors (CDF8)	-.213	.121	**-.221**	**-1.752**	**.083**
	Interpersonal related factor (CDF9)	.283	.105	**.388**	**2.680**	**.009**

a. Dependent Variable: ***Cost performance***

The results from Table 4.20 indicated that **CDF1** has negative and insignificant influence on cost performance for commercial building projects (β1= -.066, t= -.832); p-value = .408 greater than

5%. **CDF2** has positive and significant influence on cost performance for commercial building projects (β2= .204, t= 2.196) and p-value = .031 less than 5%.

CDF3 has positive and significant influence on cost performance for commercial building projects (β3= .389, t= 2.835) and p-value = .006 less than 5%.

CDF4 has negative and insignificant influence on cost performance for commercial building projects (β4= -.450, t= -2.735); p-value= .008 less than 5%.

CDF5 has positive and significant influence on cost performance for commercial building projects (β5= .271, t= 1.902) and p-value= .060 greater than 5%.

CDF6 has positive and significant influence on cost performance for commercial building projects (β6= .343, t= 2.585) and p-value= .011 less than 5%.

CDF7 has negative and insignificant influence on cost performance for commercial building projects (β7= -.229, t= -2.049) and p-value = .043 less than 5%.

CDF8 has negative and insignificant influence on cost performance for commercial building projects (β8= -.221, t= -1.752) and p-value = .083 greater than 5%.

CDF9 has positive and significant influence on cost performance for commercial building projects (β9= .388, t= 2.680), and p-value = .009 less than 5%.

Testing Ho2 that says:

"There is no significant influence of delay factors on time performance of commercial building projects delayed in construction companies in Rwanda"

Table 4.21: Model Summary for *Ho2*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.704[a]	.495	**.442**	1.93753

a. Predictors: (Constant), *CDF1, CDF2, CDF3, CDF4, CDF5, CDF6, CDF7, CDF8, CDF9*

The results in table 4.21 indicate that Adj. R^2= **0.442** representing 44.2% change from time performance of commercial building projects come from critical delay's factors. This means that critical delay's factors affect at least 44.2%-time performance in commercial building projects while other remaining 55.8% come from other variables that are not included in Model of this research.

Table 4.22: ANOVA[b] for *Ho2*

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	316.811	9	35.201	**9.377**	**.000[a]**
	Residual	322.845	86	3.754		
	Total	639.656	95			

a. Predictors: (Constant), *CDF1, CDF2, CDF3, CDF4, CDF5, CDF6, CDF7, CDF8, CDF9*

b. Dependent Variable: *Time performance*

The results from table 4.22 indicated that the F-test = 9.377 which is positive and significant at 5% shows that we cannot accept **$H_0$2** which states that "There is no significant influence of delay factors on time performance of commercial building projects in construction companies in Rwanda". This is based on the fact that the findings indicated positive and significant influence from critical delay's factors to cost performance in commercial building projects in Rwanda.

Table 4.23: Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	3.595	1.351		2.662	.009
Consultant related factors (CDF1)	-.164	.097	**-.132**	**-1.689**	**.095**
Contractors related factors (CDF2)	.083	.103	**.073**	**.804**	**.424**
Technical Equipment factors (CDF3)	.215	.104	**.279**	**2.066**	**.042**
Owner related factors (CDF4)	-.508	.163	**-.505**	**-3.120**	**.002**
Environmental factors (CDF5)	-.229	.109	**-.296**	**-2.111**	**.038**
Design related factors (CDF6)	.468	.084	**.724**	**5.554**	**.000**
Material Related Factors (CDF7)	.174	.076	**.253**	**2.305**	**.024**
Project Related Factors (CDF8)	-.204	.104	**-.245**	**-1.972**	**.052**
Interpersonal related factor (CDF9)	.175	.090	**.278**	**1.954**	**.054**

a. Dependent Variable: ***Time performance***

The results from Table 4.23 indicated that **CDF1** has a negative and insignificant influence on Time performance in commercial building projects (β1= -.132, t= -1.689); p-value =.095 greater than 5%.

CDF2 has positive and significant influence on time performance in commercial building projects (β2= .073, t= .804) and p-value= .424 greater than 5%.

CDF3 has positive and significant influence on time performance in commercial building projects (β3= .279, t= 2.066) and p-value= .042 less than 5%.

CDF4 has negative and insignificant influence on time performance for commercial building projects (β4= -.505, t= -3.120); p-value= .002 less than 5%.

CDF5 has a negative and insignificant influence on time performance for commercial building projects (β5= -.296, t= -2.111) and p-value= .038 less than 5%.

CDF6 has positive and significant influence on time performance for commercial building projects (β6= .724, t= 5.554) and p-value= .000 less than 5%.

CDF7 has a positive and significant influence on time performance for commercial building projects (β7= .253, t= 2.305) and p-value = .024 less than 5%.

CDF8 has negative and insignificant influence on time performance for commercial building projects (β8= -.245, t= -1.972) and p-value = .052 greater than 5%.

CDF9 has positive and significant influence on time performance for commercial building projects (β9= .278, t= 1.954), and p-value = .054 greater than 5%.

Testing Ho3 that says:

"There is no significant influence of delay factors on quality performance in commercial building projects of construction companies in Rwanda"

Table 4.24: Model Summary for *Ho3*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.730[a]	.533	**.484**	2.13873

a. Predictors: (Constant), *CDF1, CDF2, CDF3, CDF4, CDF5, CDF6, CDF7, CDF8, CDF9*

The results in table 4.24 indicates that Adj. R^2= **.484** representing 48.4% change from quality performance of commercial building projects come from critical delay's factors. This means that critical delay's factors affect at least 48.4% quality performance of commercial building projects while other remaining 51.6% come from other variables that are not included in Model of this research.

Table 4.25: ANOVA[b] for *Ho3*

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	449.247	9	49.916	**10.913**	**.000[a]**
	Residual	393.378	86	4.574		
	Total	842.625	95			

a. Predictors: (Constant), *CDF1, CDF2, CDF3, CDF4, CDF5, CDF6, CDF7, CDF8, CDF9*

b. Dependent Variable: ***Quality performance***

The results from table 4.25 indicated that the F-test = **10.913** which is positive and significant at 5% shows that we cannot accept **$H_0$3** which states that "There is no significant influence of delay factors on quality performance in commercial building projects of construction companies in Rwanda". This is based on the fact that the findings indicated positive and significant influence from critical delay's factors to quality performance of commercial building projects in Rwanda.

Table 4.26: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	**(Constant)**	4.516	1.491		3.029	.003
	Consultant related factors (CDF1)	-.120	.107	**-.084**	**-1.114**	**.268**
	Contractors related factors (CDF2)	.142	.114	**.109**	**1.241**	**.218**
	Technical Equipment factors (CDF3)	.074	.115	**.084**	**.644**	**.521**
	Owner related factors (CDF4)	-.524	.180	**-.453**	**-2.912**	**.005**
	Environmental factors (CDF5)	-.154	.120	**-.174**	**-1.289**	**.201**
	Design related factors (CDF6)	.110	.093	**.149**	**1.186**	**.239**
	Material Related Factors (CDF7)	.644	.084	**.815**	**7.713**	**.000**
	Project Related Factors (CDF8)	-.165	.114	**-.172**	**-1.441**	**.153**
	Interpersonal related factor (CDF9)	.055	.099	**.076**	**.559**	**.578**

a. Dependent Variable: ***Quality performance***

The results from Table 4.26 indicated that **CDF1** has a negative and insignificant influence on quality performance of commercial building projects (β1= -.084, t= -1.114); p-value =.268 greater than 5%. **CDF2** has a positive and significant influence quality performance of commercial building projects (β2= .109, t= 1.241) and p-value= .218 greater than 5%.

CDF3 has a positive and significant influence quality performance of commercial building projects (β3= .084, t= .644) and p-value= .521 greater than 5%.

CDF4 has a negative and insignificant influence on quality performance of commercial building projects (β4= -.453, t= -2.912); p-value= .005 less than 5%. **CDF5** has a negative and insignificant influence on Quality performance of commercial building projects (β5= -.174, t= -1.289) and p-value= .201 greater than 5%. **CDF6** has a positive and significant influence on quality performance of commercial building projects (β6= .149, t= 1.186) and p-value= .239 greater than 5%. **CDF7** has a positive and significant influence on quality performance of commercial building projects (β7= .815, t= 7.713) and p-value = .000 less than 5%.

CDF8 has a negative and insignificant influence on quality performance of commercial building projects (β8= -.172, t= -1.441) and p-value = .153 greater than 5%. **CDF9** has a positive and significant influence on quality performance of commercial building projects (β9= .076, t= .559), and p-value = .578 greater than 5%.

Testing Ho4 that says:

"There is no significant influence of delay factors on client's satisfaction of commercial building projects in construction companies in Rwanda"

Table 4.27: Model Summary for *Ho4*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.667[a]	.445	.**386**	2.22134

a. Predictors: (Constant), *CDF1, CDF2, CDF3, CDF4, CDF5, CDF6, CDF7, CDF8, CDF9*

The results in table 4.27 indicates that Adj. R^2**= .386** representing 38.6% change from client's satisfaction of commercial building projects come from critical delay's factors. This means that critical delay factors affect at least 48.4% client's satisfaction of commercial building projects while other remaining 51.6% come from other variables that are not included in Model of this research.

Table 4.28: ANOVA[b] for *Ho4*

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	339.644	9	37.738	**7.648**	**.000[a]**
	Residual	424.356	86	4.934		
	Total	764.000	95			

a. Predictors: (Constant), *CDF1, CDF2, CDF3, CDF4, CDF5, CDF6, CDF7, CDF8, CDF9*

b. Dependent Variable: *Clients' satisfaction*

The results from table 4.28 indicated that the F-test = **7.648** which is positive and significant at 5% shows that we cannot accept **$H_0$4** which states that **"**There is no significant influence of delay factors on client's satisfaction of commercial building projects in construction companies in

Rwanda". This is based on the fact that the findings indicated positive and significant influence from delaying factors to client's satisfaction of commercial building projects in Rwanda.

Table 4.29: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	**(Constant)**	2.427	1.549		1.567	.121
	Consultant related factors (CDF1)	-.002	.111	**-.001**	**-.018**	**.986**
	Contractors related factors (CDF2)	.152	.119	**.122**	**1.278**	**.205**
	Technical Equipment factors (CDF3)	-.013	.119	**-.016**	**-.112**	**.911**
	Owner related factors (CDF4)	-.564	.187	**-.513**	**-3.022**	**.003**
	Environmental factors (CDF5)	.088	.124	**.104**	**.708**	**.481**
	Design related factors (CDF6)	.016	.097	**.022**	**.162**	**.871**
	Material Related Factors (CDF7)	-.007	.087	**-.010**	**-.083**	**.934**
	Project Related Factors (CDF8)	.599	.119	**.656**	**5.047**	**.000**
	Interpersonal related factor (CDF9)	.159	.103	**.230**	**1.540**	**.127**

a. Dependent Variable: ***Clients' satisfaction***

The results from Table 4.29 indicated that **CDF1** has a negative and insignificant influence on clients' satisfaction of commercial building projects with (β1= -.001, t= -.018); p-value =.986 greater than 5%. **CDF2** has a positive and significant influence on clients' satisfaction of commercial building projects (β2= .122, t= 1.278) and p-value= .205 greater than 5%. **CDF3** has a negative and insignificant influence on clients' satisfaction of commercial building projects (β3= -.016, t= -.112) and p-value= .911 greater than 5%.

CDF4 has a negative and insignificant influence on clients' satisfaction of commercial building projects (β4= -.513, t= -3.022); p-value= .003 less than 5%. **CDF5** has a positive and significant influence on clients' satisfaction of commercial building projects (β5= .104, t= .708) and p-value= .481 greater than 5%. **CDF6** has a positive and significant influence on clients' satisfaction of commercial building projects (β6= .022, t= .162) and p-value= .871 greater than 5%.

CDF7 has a negative and insignificant influence on clients' satisfaction of commercial building projects (β7= -.010, t= -.083) and p-value = .934 greater than 5%. **CDF8** has a positive and significant influence on clients' satisfaction of commercial building projects (β8= .656, t= 5.047) and p-value = .000 less than 5%. **CDF9** has a positive and significant influence on clients' satisfaction of commercial building projects (β9= .230, t= 1.540), and p-value = .127 greater than 5%.

Testing Ho5 that says:

"There is no significant influence of delay factors on health and safety in commercial building projects of construction companies in Rwanda"

Table 4.30: Model Summary for *Ho5*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.625[a]	.391	**.327**	2.90012

a. Predictors: (Constant), *CDF1, CDF2, CDF3, CDF4, CDF5, CDF6, CDF7, CDF8, CDF9*

The results in table 4.30 indicates that Adj. R^2= **.327** representing 32.7% change from health and safety in commercial building projects come from critical delay's factors. This means that critical delay's factors affect at least 32.7% health and safety in commercial building projects while other remaining 67.3% come from other variables that are not included in Model of this research.

Table 4.31: ANOVA[b] for *Ho5*

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	464.304	9	51.589	**6.134**	**.000[a]**
	Residual	723.321	86	8.411		
	Total	1187.625	95			

a. Predictors: (Constant), *CDF1, CDF2, CDF3, CDF4, CDF5, CDF6, CDF7, CDF8, CDF9*

b. Dependent Variable: ***Health and safety***

The results from table 4.31 indicated that the F-test = **6.134** which is positive and significant at 5% shows that we cannot accept **$H_0$5** which states that **"**There is no significant influence of delay

factors on health and safety in commercial building projects of construction companies in Rwanda". This is based on the fact that the findings indicated positive and significant influence from critical delay's factors to health and safety in commercial building projects in Rwanda.

Table 4.32: Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.802	2.022		1.386	.169
Consultant related factors (CDF1)	-.099	.146	**-.059**	**-.684**	**.496**
Contractors related factors (CDF2)	.278	.155	**.180**	**1.798**	**.076**
Technical Equipment factors (CDF3)	.055	.156	**.052**	**.351**	**.727**
Owner related factors (CDF4)	-.560	.244	**-.408**	**-2.296**	**.024**
Environmental factors (CDF5)	.063	.162	**.060**	**.388**	**.699**
Design related factors (CDF6)	.057	.126	**.065**	**.453**	**.652**
Material Related Factors (CDF7)	-.039	.113	**-.042**	**-.346**	**.730**
Project Related Factors (CDF8)	.204	.155	**.180**	**1.319**	**.191**
Interpersonal related factor (CDF9)	.542	.134	**.629**	**4.028**	**.000**

a. Dependent Variable: ***Health and safety***

The results from Table 4.32 indicated that **CDF1** has a negative and insignificant influence on health and safety in commercial building projects with (β1= -.059, t= -.684); p-value =.496 greater than 5%. **CDF2** has a positive and significant influence on health and safety in commercial building projects (β2= .180, t= 1.798) and p-value= .076 greater than 5%.

CDF3 has a positive and significant influence on health and safety in commercial building projects (β3= .052, t= .351) and p-value= .727 greater than 5%. **CDF4** has a negative and insignificant influence on health and safety in commercial building projects (β4= -.408, t= -2.296); p-value= .024 less than 5%. **CDF5** has a positive and significant influence on health and safety in commercial building projects (β5= .060, t= .388) and p-value= .699 greater than 5%.

CDF6 has a positive and significant influence on health and safety in commercial building projects (β6= .065, t= .453) and p-value= .652 greater than 5%. **CDF7** has a negative and insignificant

influence on health and safety in commercial building projects (β7= **-.042**, t= **-.346**) and p-value = .730 greater than 5%.

CDF8 has a positive and significant influence on health and safety in commercial building projects (β8= .180, t= 1.319) and p-value = .191 greater than 5%. **CDF9** has a positive and significant influence on health and safety in commercial building projects (β9= .629, t= 4.028), and p-value = .000 less than 5%.

Testing Ho6 that says:

"There is no significant influence of delay factors on functionality of commercial building projects in construction companies in Rwanda"

Table 4.33: Model Summary for Ho6

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.769[a]	.592	**.549**	1.88610

a. Predictors: (Constant), *CDF1, CDF2, CDF3, CDF4, CDF5, CDF6, CDF7, CDF8, CDF9*

The results in table 4.33 indicates that **Adj. R^2= .549** representing 54.9% change from functionality of commercial building projects come from critical delay's factors. This means that delay factors affect at least 54.9% functionality of commercial building projects while other remaining 45.1% come from other variables that are not included in Model of this research.

Table 4.34: ANOVA[b] for Ho6

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	444.067	9	49.341	**13.870**	**.000[a]**
	Residual	305.933	86	3.557		
	Total	750.000	95			

a. Predictors: (Constant), *CDF1, CDF2, CDF3, CDF4, CDF5, CDF6, CDF7, CDF8, CDF9*

b. Dependent Variable: ***Functionality***

The results from table 4.34 indicated that the F-test = **13.870** which is positive and significant at 0% shows that we cannot accept **$H_0$6** which states that **"**There is no significant influence of delay

factors on functionality of commercial building projects in construction companies in Rwanda". This is based on the fact that the findings indicated positive and significant influence from delay factors to functionality of commercial building projects in Rwanda.

Table 4.35: Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.712	1.315		2.062	.042
Consultant related factors (CDF1)	-.125	.095	**-.093**	**-1.323**	**.189**
Contractors related factors (CDF2)	.250	.101	**.204**	**2.487**	**.015**
Technical Equipment factors (CDF3)	.124	.101	**.149**	**1.227**	**.223**
Owner related factors (CDF4)	-.210	.159	**-.193**	**-1.327**	**.188**
Environmental factors (CDF5)	.424	.106	**.506**	**4.012**	**.000**
Design related factors (CDF6)	.205	.082	**.292**	**2.492**	**.015**
Material Related Factors (CDF7)	-.217	.074	**-.291**	**-2.941**	**.004**
Project Related Factors (CDF8)	-.141	.101	**-.156**	**-1.403**	**.164**
Interpersonal related factor (CDF9)	.192	.087	**.282**	**2.201**	**.030**

a. Dependent Variable: ***Functionality***

The results from Table 4.35 indicated that **CDF1** has a negative and insignificant influence on functionality of commercial building projects with (β1= -.093, t= -1.323); p-value =.189 greater than 5%. **CDF2** has a positive and significant influence on functionality of commercial building projects (β2= .204, t= 2.487) and p-value= .015 greater than 5%.

CDF3 has a positive and significant influence on functionality of commercial building projects (β3= .149, t= 1.227) and p-value= .223 greater than 5%. **CDF4** has a negative and insignificant influence on functionality of commercial building projects (β4= -.193, t= -1.327); p-value= .188 greater than 5%. **CDF5** has a positive and significant influence on functionality of commercial building projects (β5= .506, t= 4.012) and p-value= .000 less than 5%.

CDF6 has a positive and significant influence on functionality of commercial building projects (β6= .292, t= 2.492) and p-value= .015 less than 5%. **CDF7** has a negative and insignificant

influence on functionality of commercial building projects (β7= -.291, t= -2.941) and p-value = .004 less than 5%.

CDF8 has a negative and insignificant influence on functionality of commercial building projects (β8= -.156, t= -1.403) and p-value = .164 greater than 5%. **CDF9** has a positive and significant influence on functionality of commercial building projects (β9= .282, t= 2.201), and p-value = .030 less than 5%.

Testing Ho7 that states:

There is no significant and positive relationship between delay factors and development of commercial building project in Rwanda.

Table 36: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.487[a]	.237	**.229**	10.83391

a. Predictors: (Constant), CDF

The results in table 4.36 indicated that **Adj. R^2= .229** representing **22.9**% change from success of commercial building projects come from delay factors. This means that delay factors affect at least **22.9**% success of commercial building projects while other remaining 77.1% come from other variables that are not included in Model of this research.

Table 4.37: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3425.512	1	3425.512	**29.185**	**.000[b]**
	Residual	11033.113	94	117.374		
	Total	14458.625	95			

a. Dependent Variable: DCBP

b. Predictors: (Constant), CDF

The results from table 4.37 indicated that the F-test = **29.185** which is positive and significant at 0% shows that we cannot accept **$H_0$7** which states that **"**There is no significant and positive relationship between delay factors and success of commercial building project in Rwanda". This is based on the fact that the findings indicated positive and significant influence from delay factors to success of commercial building projects in Rwanda.

Table 4.38: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	18.118	4.733		3.828	.000
	CDF	.345	.064	**.487**	**5.402**	**.000**

a. Dependent Variable: DCBP

The results from Table 4.38 indicated that **CDF** has a positive and significant influence on success of commercial building projects with (β1= **.487**, t= **5.402**); p-value =**.000** less than 5%.

4.2.4 Consequences of delay factors to success of commercial building projects of construction companies of Rwanda

The findings show that one of consequences is by issuing a time extension without additional compensation by the owners. Generally, consequences of these delays to success of commercial building projects in the construction sector is defined as a "time overrun after the completion. Of a contract or beyond the date agreed upon by the parties for delivery of the project. The six major consequences of these delays to development of commercial building project include time overrun, cost overrun, dispute, arbitration, litigation and total abandonment.

i. Time overrun: time overrun it mean contractor could not carry out their work within contract period.

ii. Cost overrun: during construction stage, the client and contractor always facing of cost overrun. cost overrun is an unexpected cost incurred in excess of a budget amount due to cost underestimation.

iii. Dispute: project delay because of dispute between contractual parties such as client, consultants, contractor and some relevant parties. Those disputes because of client failure make payment to the contractor failure.

iv. Arbitration: contractual parties do not accept the mediator decision and they appeal in arbitration.

v. Litigation: the relevant parties because of still do not accept with the arbitration decision.

vi. Total abandonment: means the whole project stop immediately because of client facing financial difficulties.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

The core drive of the research is about analysis of delay factors and success of commercial buildings projects in Rwanda; case study of NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies. In Kigali city, some buildings like Champion Investment Corporation (CHIC building), Down town commercial buildings, Muhima Investment company (MIC), M&M Plaza, Makuza Plaza are commercial buildings projects have been completed; but there are also high number of cancelled and delayed commercial buildings projects which are very significant around the city.

According to that attracting a researcher to analyse delay factors and success of commercial building projects in Rwanda by answering the following questions: what are frequently delay's factors pertaining to commercial building projects in Rwanda, what are the indicators of success of commercial building projects in Rwanda; what are the consequences of each delays for commercial building projects in Rwanda; and which is relationship between delaying factors and success of commercial building projects in Rwanda.

Data collection techniques used were questionnaires, and documentary review; while methods of data analysis were descriptive statistics methods and linear regression analysis. Target population was 127 people and sample size were 96 respondents selected from NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies by using Systematic, Random and Purposive Sampling procedures.

5.1 Summary of Major Findings

During the research; findings show that 72 (i.e., 75.0%) of respondents were males, while 24 (i.e. 25.0%) of respondents were females that work with NITSAL International Construction, Epitome Architects Rwanda Limited, and EPC Africa Companies. Findings were presented and analysed in accordance to research objectives.

Findings on ***"Frequently delay factors of commercial building projects of construction companies in Rwanda";*** the results were presented on table from 4.2 to 4.10 which confirmed that delay factors of commercial building projects of construction companies as confirmed by different respondents; these delay factors are consultant related factors; contractors related factors; technical equipment factors; owner related factors; environmental factors; design related factors; material related factors; project related factors; and interpersonal related delaying factors that affecting commercial building projects of construction companies in Rwanda.

The results on the *"**Indicators of success of commercial building projects of construction companies in Rwanda";*** were shown on table from 4.11 to 4.16 which said that the indicators of success of commercial building projects are cost performance; time performance; quality performance; clients' satisfaction; health and safety; and functionality.

Findings on the "***Relationship between delay factors and success of commercial building projects of construction companies in Rwanda";*** the results were presented on table 4.17 to 4.35 that show different tests of relationship. Apart from opinions from respondents from selected construction companies in Rwanda; table 4.17 shows that there is a negative and insignificant correlation between consultant related factors and cost performance with ($r = -.007$, $p > 0.01$); Time performance with ($r = -.113$, $p > 0.01$); quality performance with ($r = -.060$, $p > 0.01$). There is also a positive significant correlation between consultant related factors and clients' satisfaction with

(r= 0.076, p > 0.01). There is a negative and insignificant correlation between consultant related factors and health and safety with (r= -.004, p>0.01); and functionality with (r= -.046, p>0.01) for commercial building projects.

The findings revealed that there is a positive and low correlation between contractors related factors and Cost performance with (r= 0.322, p<0.01); Time performance with (r= 0.232, p<0.05); Health and safety with (r= 0.250, p<0.05); Functionality with (r= 0.320, p<0.01) for commercial building projects. The results revealed that there is also a positive and strong correlation between technical equipment factors and Cost performance with (r= 0.566, p<0.01); positive and low correlation between technical equipment and time performance with (r= 0.267, p<0.01); and health and safety with (r= 0.306, p<0.01); positive and strong correlation between technical equipment and functionality (r= 0.593, p<0.01) for commercial building projects.

The findings confirmed that there is a positive and low correlation between Owner related factors and Cost performance with (r= 0.376, p<0.01); time performance with (r= 0.250, p<0.05); health and safety with (r= 0.337, p<0.01); and there is positive and strong correlation between technical equipment and functionality (r= 0.524, p<0.01) for commercial building projects.

The study revealed that there is a positive and strong correlation between environmental factors and Cost performance (r= 0.517, p<0.01); a positive and low correlation between environmental factors and health and safety with (r= 0.241, p<0.05). There is also a positive and very strong correlation between environmental factors and functionality with (r= 0.664, p<0.01).

The results revealed that there is also a positive and low correlation between design related factors and cost performance with (r= 0.416, p<0.01); there is a positive and strong correlation between design related factors and time performance with (r= 0.560, p<0.01). There is also a positive and low correlation between design related factors and quality performance with (r= 0.257, p<0.05);

clients' satisfaction with (r= 0.256, p<0.05); and health and safety with (r= 0.371, p<0.01); and functionality with (r= 0.483, p<0.01) for commercial building projects.

The study results argued that there is also a positive and low correlation between Material Related factors and time performance with (r= 0.472, p<0.01); there is a positive and very strong correlation between material related factors and quality performance with (r= 0.607, p<0.01). There is also a positive and low correlation between material related factors and clients' satisfaction with (r= 0.343, p<0.01); health and safety with (r= 0.325, p<0.01) for commercial building projects.

The results argued that there is also a positive and low correlation between Project Related Factors and Time performance with (r= 0.296, p<0.01); quality performance with (r= 0.245, p<0.05). There is also a positive and very strong correlation between project related factors and clients' satisfaction with (r= 0.604, p<0.01); there is positive and low correlation between project related factors and health and safety with (r= 0.497, p<0.01); and functionality with (r= 0.203, p<0.05) for commercial building projects.

Finally, the study revealed that there is a positive and low correlation between interpersonal related factor and cost performance with (r= 0.358, p<0.01); time performance with (r= 0.337, p<0.01); clients' satisfaction with (r= .387, p<0.01). There is also a positive and strong correlation between Interpersonal related factor and health and safety with (r=0.561, p<0.01); and there is a positive and low correlation between interpersonal related factor and functionality with (r= 0.425, p<0.01) for commercial building projects in NITSAL International Construction, Epitome Architects Rwanda Limited, and EPC Africa Companies in Rwanda.

Results on the ***"Consequences of delay factors to success of commercial building projects of construction companies of Rwanda";*** the findings show that the consequences of the delays to success of commercial building projects in the construction sector is defined as a time overrun after the completion. The contract or beyond the date agreed upon by the parties for delivery of the project. There are many consequences; but major consequences of these delays to success of commercial building project include time overrun, cost overrun, dispute, arbitration, litigation and total abandonment.

5.2 Conclusion

Construction is believed to be one of the key elements to economic development of any nation. Without infrastructure, industry cannot function; without road, goods and be people can be transported and without affordable priced houses, a country can't be on a sustainable path to development. Rwanda and the rest of the world have been challenged with a lot of difficulties that projects face along the way which causes them not to meet project deadlines which leads to low quality and overruns hence causing commercial building project failure and abandonment (Amade, 2015). Project is a unique Venture to produce a set of deliverables within a clearly stated time, cost and quality limitations (PMI, 2019). A project is a sequence of duties that has a start, middle and an end. For project to succeed, there are five phases it has to go through which initiating, planning, executing, monitoring/controlling and closing. Wherever the project doesn't follow these phases, it normally fails.

Based on outcomes from the study, the objectives of the study were realized, and the research questions responded; problem of the study was solved; research hypotheses were verified where all six null hypotheses were rejected, by saying that analysis of delaying factors in success of

commercial buildings projects in Rwanda based on data collected from respondents of NITSAL International Construction, Epitome Architects Rwanda Limited and EPC Africa Companies.

5.3 Recommendations

The important recommendation of this study, is involving the institutional management framework surrounding to construction projects. During the pre-constructive stage, the community should choose a committee that is accountable for the organization of the site and for the long-term use of the water project.

During construction and post-constructive phase numerous trainings should be given. These trainings should cover subjects such as project management, natural resources management and catchment development. Given the changing nature of project management, a series of longitudinal studies, based on project value metrics, and methodology models, would document trends and thereby increase the potential that decisions regarding the project deliverables and methodology would be relatively current and less exposed to personal bias.

Given that this study provides a basis for concluding research on project failure defining the attributes that constitute project success/failure would prove to be of valuable to the project management discipline. Such an effort would enable practitioners to derive project related course content from a research base.

5.4 Suggestions for Further Studies

The researcher carried out the study on analysis of delay factors and success of commercial buildings projects in Rwanda which is useful topic. Then, the researcher opens the door to further researchers to consider others factors to complete the researcher did not cover like exploring the possible cause and suggestion to compress construction durations of various types of building

projects; comparative study of causes and effects of projects delays and disruptions in construction projects in the Rwanda construction industry.

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APPENDICES

RESEARCH QUESTIONNAIRE

Re: Introductory Letter to Respondents

Dear Respondent,

My name is Yvette INGABIRE, a student at UR/Masters level. I am doing my research project by fulfilling academic requirement on the topic of ***"Analysis of Delay Factors and success of Commercial Real Estate Development in Rwanda, Case study of NITSAL International Construction,*** **Epitome Architects Rwanda Limited** ***and EPC Africa Companies".*** Therefore, I will be grateful if you answer these questions, the information will be obtained would only be used for academic purposes and shall be treated with confidence.

Thank you,

Yvette INGABIRE

SECTION I: What is your Social Demographic Characteristics?

1. **Gender**

   Male [ ] Female [ ]

2. **Age**

Between 21 and 30 years old [ ] 31 and 40 years old [ ]

Between 41 and 50 years old [ ] 51 years and above [ ]

3. **Marital Status**

   Single [ ] Married [ ] Divorced [ ] Widow [ ]

4. **Education level**

   Masters and above [ ] Bachelor's degree [ ]

   Secondary level [ ] Primary level [ ]

5. **How long have you been working with this construction company?**

   Less than 1year [ ] 2-3years [ ] 4-5years [ ]

SECTION II: Analysis of delay factors in Commercial Real Estate Development projects

Please tick (*V*) in the front of statements provided in below tables to show your level of perceptions.

6. **What are the frequently delay's factors of commercial building projects of your construction company?**

A. Consultant related factors	**Extremely significant**	**Very significant**	**Moderately significant**	**Slightly significant**	**Not significant**
Lack of consultant experience					
Conflicts between consultant and design engineer					
Major changes approval delays by consultant					
Changes in government regulations and laws					
B. Contractors related factors	**Extremely significant**	**Very significant**	**Moderately significant**	**Slightly significant**	**Not significant**
Inappropriate contractor's policies					
Unreliable subcontractors					
Inappropriate construction methods					
C. Technical Equipment factors	**Extremely significant**	**Very significant**	**Moderately significant**	**Slightly significant**	**Not significant**
Equipment allocation problem					
Improper equipment					
Inadequate modern equipment					
Shortage of equipment					
D. Owner related factors	**Extremely significant**	**Very significant**	**Moderately significant**	**Slightly significant**	**Not significant**
Delay in progress payments					
Lack of owner experience in construction projects					
Suspension of work by owner					
E. Environmental factors	**Extremely significant**	**Very significant**	**Moderately significant**	**Slightly significant**	**Not significant**
Unfavourable weather conditions					
Inadequate production of raw material in the country					

Unexpected surface & subsurface conditions (soil, water table, etc.)					
F. Design related factors	**Extremely significant**	**Very significant**	**Moderately significant**	**Slightly significant**	**Not significant**
Rework due to errors					
Design errors and omissions made by designers					
Delays in producing design documents					
Poor use of advanced engineering design software					
Incomplete project design					
Defective design made by designers					
G. Material Related Factors	**Extremely significant**	**Very significant**	**Moderately significant**	**Slightly significant**	**Not significant**
Delay in manufacturing materials					
Damage of sorted materials					
Escalation of material prices					
Late delivery of materials					
Poor procurement of construction materials;					
H. Project Related Factors	**Extremely significant**	**Very significant**	**Moderately significant**	**Slightly significant**	**Not significant**
Delay in site delivery					
Improper project feasibility study					
Inadequate planning					
Ineffective delay penalties					
I. Interpersonal related factor	**Extremely significant**	**Very significant**	**Moderately significant**	**Slightly significant**	**Not significant**
Thefts done on site					
Absenteeism					
Low motivation and morale of labor					
Personal conflicts among labor					
Shortage of labor					
Slow mobilization of labor					

SECTION III: Success of Commercial buildings projects

7. **What are concerning indicators of success of commercial building projects delays at your construction company?**

A. Cost performance	**Extremely significant**	**Very significant**	**Moderately significant**	**Slightly significant**	**Not significant**
Costs of projects arise from variations in inception to completion					
Modification during construction period					
Cost arising from the legal claims					
Project is over budget					
B. Time performance	**Extremely significant**	**Very significant**	**Moderately significant**	**Slightly significant**	**Not significant**
Long timely delivery of projects					
Delays of commencement of site works to the completion					
Delays of handover of a building to the clients					
Delays of construction time of a building as planned					
C. Quality performance	**Extremely significant**	**Very significant**	**Moderately significant**	**Slightly significant**	**Not significant**
No meet with totality of features required by a product or services to satisfy a given need					
Low quality that fitness for purpose of projects					
Low meeting with owner's quality expectations					
Misunderstanding in all parties of project to acquire expectations					
D. Clients' satisfaction	**Extremely significant**	**Very significant**	**Moderately significant**	**Slightly significant**	**Not significant**
Dissatisfaction is widely experienced by clients of construction projects					
Attributable to overrunning project costs					
Delayed of project completion					

Inferior quality and incompetent service providers					
E. Health and safety	**Extremely significant**	**Very significant**	**Moderately significant**	**Slightly significant**	**Not significant**
Accidents occur during project implementation stage					
Presence of hazardous activities					
People are killed and disabling injury annually in construction industrial accident					
No single reliable measure of health and safety performance					
Absence of control health and safety risks					
F. Functionality	**Extremely significant**	**Very significant**	**Moderately significant**	**Slightly significant**	**Not significant**
Project is finished and delivered to service far along					
unappropriated financial and technical aspects implemented					
Technical specifications are not totally considered					
Less achievement of fitness for purpose objective					

8. What do you take as the influences of delay's factors to success of commercial building projects in your company?

……

……

9. What do you see as consequences of these delays to success of commercial building projects in your company?

……

……

THANK YOU

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