**RISK FACTORS FOR CONSTRUCTION PROJECT SUCCESS IN TANZANIA, A CASE OF DAR ES SALAAM CITY**

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**A DESSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS IN PROJECT MANAGEMENT OF THE OPEN UNIVERSITY OF TANZANIA**

**2019**

**CERTIFICATION**

The undersigned certifies that he has read and hereby recommends for acceptance by the Open University of Tanzania a dissertation title; **“Risk Factors for Construction Project Success in Tanzania: A case of Dar Es Salaam”** in partial fulfillment of the requirements for the degree of Masters of Project Management of the Open University of Tanzania.

…………………………………..

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Date

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I, Yasini Iddi Msangi, do hereby declare that this dissertation is my own original work and that it has not been submitted for any degree or similar award in any other University other that the Open University of Tanzania.

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Signature

……………………………

Date

**DEDICATION**

This dissertation is heartily dedicated to my lovely wife Farha Hussein. Her Support can neither be measured nor paid, for good but mainly for happiness and love.

**ACKNOLEDGEMENT**

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**ABSTRACT**

Construction industry in Tanzania includes real estate, transport infrastructure, water supply and other civil works related projects. The industry holds a very special place in country economy as it cuts and stimulates the growth of many other sectors such as agriculture, trade, businesses, employment, transportation. Nevertheless, the projects there in are highly associated with various risks that need to be managed to ensure successful delivery of their required objectives. The study therefore aimed to identify, classify and assess the likelihood of occurrence and the impact of the risk factors for construction project success in Tanzania and perhaps their mitigation strategies. A field survey was then conducted through a well structured questionnaire to get on demand data from stakeholders working in Construction industry in Tanzania. Relative mean item score – impact and probability index, five point likert scale and risk matrix were used to analyze the data obtained for statistical measures and interpretation. Results revealed that, among the 38 identified risk factors, delay in material delivery, poor working environment, Project construction mistakes, theft acts, advert weather condition, lack of team commitment, team resistance, and improper project planning were perceived as most critical risk factors impacting the project key deliverables-time, costs and quality. Furthermore, Risks factors were classified into four groups named high probability- high impact; high probability- low impact; low probability - high impact; and low probability-low impact risk, respectively assigned to their specific minimization strategies. Thus’ the study contributes in the identification, classification and assessment of the risk factors for Construction project Success in Tanzania and their possible mitigation strategies.

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# LIST OF ABBREVIATIONS AND ACRONYMS

AfDB African Development Bank

AQRB Architects and Quantity Surveyors Registration Board

CAG Controller and Auditor General

CRB Contractors Registration Board

CRMS Construction Risk Management System

DC District Commissioner

EPCCM Engineer- Procure-Construct-Contract-Management

ERB Engineering Registration Board

II Impact Index

PMBOK Project Management Body of Knowledge

PMI Project Management Institute

RC Regional Commissioner

RBS Risk Break Down Structure

PI Probability Index

RBS Risk Breakdown Structure

SPSS Statistical Package for Social Science

Tshs Tanzanian Shillings

TBA Tanzania Building Agency

URT United Republic of Tanzania

WB World Bank

# CHAPTER ONE

# INTRODUCTION

* 1. **An Overview**

This Chapter introduces the study by presenting the background information to the study, statement of the problem, general and specific objectives of the study, research questions and the relevance of the study.

**1.2 Background of the Study**

Construction project is usually more risky compared to other business activities because of its complexity in coordinating various activities contained therein. Furthermore each Construction project is unique and often incorporates with new techniques and procedures hence highly exposed to risk. Risk may appear in many ways and at any point in project life circle starting from initiation stage, planning, execution, monitoring and control to project closure which in turn affects project deliverables.

Doloi *et* al. (2012) identified the seven most important risk factors hindering the Construction Project success in India as lack of team commitment, insufficient site management, poor site coordination, improper planning, lack of clarity on project scope, lack of communication and substandard contracts. Furthermore he mentioned unrealistically short project completion time demanded by client, the poor management of subcontractors, poor working environment, in adequately trained and unmotivated team, lack of quality control as well as inadequate planning as additional contribution factors.

A study conducted by Kaming *et* al. (1997) on the risk factors influencing Construction projects time and cost overrun in Indonesia showed that, the predominant risk factors causing time delays in construction projects were design changes, in adequate planning, in accuracy of material estimate and poor labor productivity, while cost overruns were attributes to again the inaccurate material estimation, material cost increases and lack of experience of project type.

The risk factors causing time and cost overruns were further grouped into three categories; (1) those over which neither partly to the contract has control; for example, inclement/adverse weather condition, unforeseen site condition, market fluctuation and regulatory changes, shortage of skills, equipment and material; (2) those over which the project owner has control like design changes and (3) those over which the contractor, subcontractor, suppliers, designer and consultants has control, example; in accurate prediction of labor, material and equipment.

Other studies such as that of Assaf and Al-Hejji, (2006) on the causes of delay in large Construction Projects in Middle East, outlines risk factors that influence construction project success into project related factors, client related, design related, contractors related, consultants related, material related, Labor related, equipment related and external factors. Research also shows that, many Construction Projects in Sri Lanka suffer almost similar causes of managerial and financial difficulties of contractor and project owners, Shortage of resources like labor, material and equipments, inexperience of contractors, ineffective project planning and scheduling and poor site management (Gobi dan *et* al. 2015).

Some of the recent studies in Tanzania also shows how significantly risk factors affect project success, among them was the one conducted by Thereza, (2017), on the factors affecting the performance of Airport Construction Projects in Tanzania whereby delay of project fund, poor involvement of key project stakeholders, design change and unskilled contractors were identified as the key risk factors affecting project success.

Jenifa, (2017) did a study on the factors causing delay in road Construction Projects in Tanzania and found that, lack of skilled personnel, environmental factors, improper project design, poor communication among the team, in adequate and poor quality material and equipments were the main risk factors causing the delay in road construction projects in the country. Critical risk factors that have direct impact on quality performance of Government financed construction projects in Tanzania were furthermore identified as project financing processes, in experience of contractors, project technology, availability of plant and equipment, procurement system and processes as well as the project managers knowledge and skills (Gwahula, 2016).

Like other developing Countries, Tanzania Government directs much of its effort in Construction industry especially in the construction of transport infrastructure, water supply and other civil works since the industry hold a very special place in country economy as it cuts and stimulates the growth of all other sectors such as Agriculture, Trade and Businesses, Employment and Transportation. To provident that, For the fiscal year 2016/2017, the Government of Tanzania has budgeted Tshs 5.47 trillion equivalent to 25.4% of the total national budget for infrastructure development, post dominated by over 1.937 trillion in the fiscal year 2017/2018 budgeted for maintenance of regional and district roads, power Generation Construction project, rural rectification and improvement of transmission lines.

Apart from the Government efforts, there are some of the internal and external donor, agents and Granters who in one way or another contributes in construction industry to effect the world Economic agenda 2030 which outlines among others the built of resilient infrastructure aimed to foster and revamp the global economy. The World Bank (WB) and the African Development Bank (AfDB) on its plan to support Tanzania in achieving its infrastructure development goals, provided grants and credits in different development projects. For re stance, in March 2015, World Bank approved the Dar Es Salaam Metropolitan Development projects to improve urban services in Dar Es Salaam by upgrading and building priority roads and new drainage systems, the project estimated cost was $ 330.3million. Furthermore the AfDB provided Tshs 541billion for funding transport projects in Tanzania in 2015, the program includes rehabilitation and upgrading of roads in Tanzania main land and Zanzibar.

Despite all these efforts made by Government, granters and donors in implementing different construction projects in the country, steal there are many projects which are late completed, with low quality and above the planned budget. Thus, a need therefore arises to identify, classify, and assess the risk factors for construction projects success in Tanzania and their respective mitigation strategies, taking into consideration that, many Construction Projects consume lot of Government and donors fund and yet seems unsuccessful following the requirements.

### 1.3 Statement of the Research Problem

The Construction Project Success depends solely on the effectively and efficiently accomplishment of the project performance key indicators - time, cost, quality, client satisfaction, environmental sustainability and community acceptance (Atkinson, et al., 1997). To accomplish the Country’s 2025 development vision that seeks to attain a sustainable human development and to become a middle-income economy, the Government of Tanzania and other development stakeholders has initiated a lot of construction projects to facilitate the said wide national goal since the year 2000.

Some of the biggest projects initiated includes the construction of Liquefied Natural Gas plant and the Construction of the standard gauge railway project connecting the Port city of Dar Es Salaam to Morogoro (205 km), and later to Lake Zone regions at total costs of 2.7 trillion. The Kigamboni City project, the upgrade of different regional towns and city roads, the construction of inter-regional roads, the renew of ports such as that of Tanga and Mtwara and the expansion of Airports such as those of JK Nyerere, Songwe and Dodoma.

However, with all these efforts, steal there are numerous poorly conceived Construction projects in term of time, budget and quality, example- the Kigamboni City project was declared failure during the 2016/2017 Tanzania Parliamentary meeting by William Lukuvi (by then, Minister of land, housing and Human Settlement Development), when presenting ministry budget at the Legislative house in Dodoma, Furthermore the report of the Controller and Auditor General of the United Republic of Tanzania March, 2010 discovered that; many of the road projects were finished out of the planned time for restance -Minute – Kagoma road (planned project completion time was 12 months but actual project completion time 23 months), Songwe –Tunduma road (planned project completion time was 24 months but actual project completion time 39 months), Shelui – Nzega road (planned project completion time was 31 months but actual project completion time were 36 months). Other projects such as Nyanguku dispensary construction project in Geita, a 200 million Tshs project cost and Bariadi water supply construction project costing over Tshs 300 million were both counted being of low quality and budged/cost overrun respectively. Other projects such as Ukonga Military Blocks and Magomeni Kota’s Apartments blocks building projects were accused by the President of the United Republic of Tanzania for both delays in completion time and cost overrun.

The study therefore aims to identify, classify and assess the risk factors for construction projects success in Tanzania and their possible mitigation strategies.

**1.4 Research Objectives**

### 1.4.1 General Research Objectives

To identify the key risk factors for construction projects success in Tanzania basing on their impact and likelihood (probability) of occurrence.

## 1.4.2 Specific Research Objectives

1. To assess the likelihood (probability) of occurrence of risk factors for construction projects success in Tanzania.
2. To examine the level of impacts of the risk factors for Construction projects success in Tanzania.
3. To classify risk factors basing on their likelihood (probability) of occurrence and impact on the construction project success.
4. To determine possible mitigation strategies to minimize risks factors for construction project success in Tanzania.

**1.5 Research Questions**

1. To what extent does each of the risk factor for construction project success occur?
2. How deep can risk factors impact construction project success in Tanzania?
3. What are the possible strategies to minimize risk factors for construction project success in Tanzania?

## 1.6 Relevance of the Research

The study is materially helpful to key Practioners in construction industry such as, Government, Contractors, Engineers, Architects, Quantity surveyors, community, project sponsors and other stakeholders to get an insight, crucial knowledge and a vital understanding of the risk factors hindering the construction projects success in Tanzania and perhaps their mitigation strategies which by one way or another may enhance their practice and perhaps aid an enact, reform, restructure of the construction policies and settings.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 An Overview

This chapter sets a base framework for the study by giving a clear insight and understanding of the study subject. The section contains therein a definition of key terms and concepts, Theoretical literature review, Empirical analysis of relevant studies, Identified research gap and Conceptual framework.

## 2.2 Definition of Key Terms and Concepts

**2.2.1 Risk Concept**

Wideman *et* al. (1986) defines risk as a chance of certain occurrence adversely affecting the project objectives; however this definition clarifies only one side of the risks i.e. negative side, it was then modified by Chapman *et* al. (2010) who defined risk as an event which if occur, would have a positive or negative effect on the achievement of a project’s objectives.

Kart *et* al, (2001) refers risk as the probability of occurrence of some uncertain, unpredictable and undesirable event that would change the prospects for the profitability on a given investment. Risk is also defined in the Project Management Book of Knowledge, (2000) as an uncertainty event or condition that if it occurs would have an effect (impact) on any of the project objectives (Time, cost and quality). Barrier and Paulson, (1992) expressed risk ‘’as an exposure to economic loss or gain arising from involvement in the construction process’’. Though many scholars has tried to explain the meaning of the term risk, but in the context of this study‘’ It adds up to understand risk as the likelihood of the occurrence of a definite event or factor or combination of both which if occur would have a detriment effect to project success.

**2.2.2 Risk Factors and their Classification**

Enshassi and Mayer, (2015) conducted a research on risk classification and grouped the risk factors for Construction Project into six (6) categories which are the Act of God, Physical, Economic and Financial, Environmental and Political, Design and Construction site. Risk factors were also classified by Mojtahedi *et* al, (2010) as internal and external. External risk factors were identified as Financial and Economic, Environmental and political and Act of God while design, Site – related job, Managerial and Operational were categorized as internal risk factors.

Ali F Bakr *et* al. (2012) developed a heuristic approach for risk assessment modeling and developed RBS in term of EPCCM (Engineer, Procure, Construct, Contract and Management and layout risk factors as follows, Engineer – economic and contractors risk factors, Procure – Procurement risk factors, Construct – Construction risk factors, Contract – Contractual risk factors, Management – Management risk factors. Sowmya *et* al, (2014) categorized risks factors into nine (9) groups, External environment risk factors, Contractors group risk factors, owner’s group risk factors, resources risk factors, Project management group risk factors, Contractor clause group risk factors and finance group risk factors.

Née raj *et* al*., (*2015) categorized risks factors into 8 groups, Environmental risk factors, Construction risk factors, Financial risk factors, Management risk factors, Political risk factors, Design risk factors, Sub–contractors risk factors, Procurement risk factors and technical risk factors. Furthermore Renuka and Kamal, (2014) layout risk factors into two (2) groups; Engineered and non-Engineered risk factors unlikely Gunduz and Sonmez, (2013) who classified risk factors into five (5) categories - technical, Act of God, Economic, Political, and risk related to Statutory.

**2.2.3 Project and Project Success**

Project is referred as a temporary endeavor undertaken to create a unique product, service or result (PMBOK, 2000). The temporary nature of project indicates that a project has a definite beginning and an end. The end is reached when the project’s objectives have been achieved, and that’s shortly mean project success. Traditionally, a measure of success or failure of any project were considered to be time, cost and quality (Ashley *et* al, 1987) however later on De Bakker *et* al. (2010) advanced it; he defines project success in term of cost, schedule/time, quality, safety and participant’s satisfaction.

More attempts have been made to expand the concept of project success by adding parameters such as environmental sustainability, safely, organizational and stakeholders’ benefits (Atkinson, 1999; Chua *et* al 1999; Liu and Walker, 1998), but in the context of this study, Project success would be essentially referred to an effectively and efficiently fulfillment of the project desired goal and even exceeds the expectation of stakeholders.

## 2.3 Theoretical Literature Review

**2.3.1 Risk Breakdown Structure Theory**

Risk breakdown Structure is a source-oriented grouping of project risks that organizes and defines the total risk exposure of the project (Hillson. 2002). RBS is one of the most important tool used in managing risks. It represent risks in an hierarchical mode starting from higher levels going down to finer level ( level 3 ) risk categories/types ( Level 2 ) , focused on a particular project type or application area/impacted area ( Level 1 ).

**Table 2.1: Typical RBS for Construction Projects**



**Source:** Hillson David. (2002)

**2.3.2 Construction Risk Management System**

This model was presented by Al-Bahar *et* al. (1988) and updated by Craig *et* al. (2018). It provides an effective systematic framework for quantitatively identifying, evaluating, and responding to risks in construction projects. According to CRMS, it is suggested that risk management must be seen as managing responses rather than responding to risk events after they happen. CRMS process includes Risk identification, Risk analysis and evaluation, Response management and System administration.

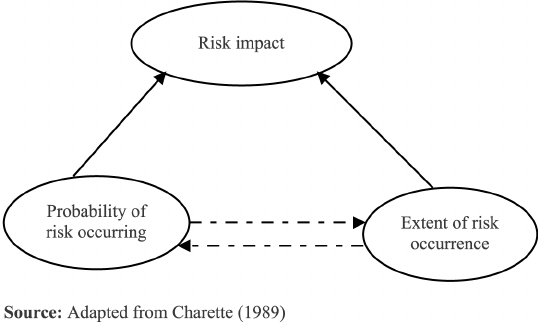


**Figure 2.1: Risk Management Process Model**

**Source:**Craig,(2018)

**2.3.3 Three Dimension Model of Risk**

Charete *et* al, (1989) invented the three dimension model of risk named, the degree of risk/extent of risk, Probability of occurrence of the risk and the consequence/likely impact, where by the degree of risk narrates the extent to which an endeavor is subjected to risk, probability of occurrence portray the chances for the risk to occur and the consequences/impact stipulate the effects of the risk to the project undertaken.



**Figure 2.2: Three-Dimension Model of Risk**

## Source: Charette. (1989)

## 2.4 Empirical Analysis of Relevant Studies

Survey conducted by Abu Mousa *et* al. (2005), revealed that financial failure of the contractor, working in the hot environment, defective design and delayed payment on contracts were the most crucial risk factors causing project failure, followed by difficulty to access the site, lack of consistency and inaccurate quantities of materials which were considered also as the high significant risk factors. Wong and Cheung. (2005) also straps that the most significant risk occurred in design and built lead to time and project cost overrun. The main reason for these risks is termed as an employer or government delay, lack of information from the employer, the difficulty of following instructions, conflict of interest and variation to changes.

Ibrahim, *et* al.(2006) opined that construction projects are attributed to financial, technical, politics, act of God and social risks that may influence the projected profit. Therefore, a thorough review of existing literature was performed to identify common risk factor that altering construction projects success where by forty-four risk factors were identified and categorized into nine groups including:- Physical factors such as occurrence of accidents due to poor safety procedures, supplies of faulty materials, varied labor and equipment productivity; Environmental factors such as difficulty to access the site and adverse weather conditions; Design including defective designs, uncoordinated designs, Inaccurate quantities, Lack of consistency between bill of quantities, drawings and specifications, rushing designs, awarding designs to unqualified designers.

Logistics factors such as unavailability of labor, materials, and equipment, undefined scope of working, high competition in bids, inaccurate project program and poor communications (the home and field offices); Financial factors; including inflation, delayed payments on contract, financial failure of the company, unmanaged cash flow, exchange rate fluctuations and monopolizing of materials; Legal factors including difficulty to get permit, ambiguity of work legislations, legal disputes during the construction phase, delayed disputes resolutions and lack of specialized arbitrators to help settle fast;

Construction factors such as rush bidding, gaps between the implementation & specifications, undocumented change orders poor work quality in presence of time constraints, design changes and actual quantities which differ from contract quantities. Political factors such as new governmental acts or legislations and unstable security circumstances. Managerial factors such as vague planning due to project complexity, poor resource management, changes in management strategies, information availability and poor communication between involved parties.

Nur *et* al. (2012) conducted a study on the significant risk factors in construction projects, contractor’s perceptions; the study focused on the investigation of risk factors in construction projects from contractor’s perspective taken into consideration that the contractors are the key players in the success of the project. The scope of the study was limited to Batu Pahat and Muar districts in Malaysia. Data were gathered using structured questionnaire survey issued to registered contractors. The investigation involves the 25 common risks factors classified in five categories which were identified through literature works. Statistical Methods were used to analyses the data and the results found that, the five most important risk factors in the construction projects were shortage of material, late deliveries of material, insufficient technology, poor quality of workmanship and cash flow difficulties.

Another study documented by Gwahula. (2016) on Assessment of Critical factors affecting quality performance of Government financed Construction projects; evidence from Tanzania; The objective of the study was to assess the critical factors affecting quality performance of Government financed construction projects in Tanzania, closed ended questionnaires consisting of 20 performance factors were issued to 80 respondents dealing with construction related activities. Data analysis was then done using statistical package for social science version 16 (SPSS) and the findings revealed that the critical factors that have direct impact on quality performance of Government financed construction projects are project financing processes, experience of contractors in construction industry, project technology, availability of plant and equipment, procurement system and processes as well as the project managers knowledge and skills.

Another study done by Chileshe *et* al (2012), on evaluation of risk factors impacting construction projects in Ghana; A survey of randomly selected samples approach was used, and the survey data was subjected to descriptive statistics and the results indicate that the risks factors are grouped into the following categories, Weather and environmental, financial, economic and, Government and political, resources, technical, operational and legal risks factors.

Ibrahim *et* al. (2014), did a study to investigate the risk factors and preventive measures in building construction projects in Abuja, Nigeria, use a descriptive survey research design and structured questionnaire to collect data. The findings of the study revealed among other factors that contracting companies should identify and adequately quantify project risk factors, adding a risk premium to quotation and project completion time estimation has to be real and adjustable when necessary following the situation, training courses should also be provided to construction professionals on how to deal with and minimize risks in building projects.

Other researchers, Patel *et* al. (2013), conducted a study on risk assessment and its management in India and the study revealed that it is safe to say that “the majority of construction projects in India have no systematic procedures to deal with risks, also from the obtained results it was also found out that financial, Construction and quality risks were associated with Construction projects in India.

Bhandari. (2014) conducted a study on management of risk in construction industry. Thy classify risk factors into technical, logistical, management, environmental, financial and social – political risk factors. Also Tumala *et* al. (1999) used high level of work breakdown structure to properly identify risk factors. They identified 6 benches of risk factors; Financial, political, environmental design, site construction, physical and act of god).

## 2.4 Research Gap

The research studies, articles, journals and books reviewed was of great significant in widening the broader concept of the topic under the study; it is where the knowledge gape generated making research an endless activity, However it has been noted from the study done by Nur Alkaf *et* al, (2012) that’ the study relies only in Contractors perception when looking on the risk factors for construction project success while the industry comprise of many stakeholders such as Government, Project team members, Community, and project sponsors.

It has also observed from the study done by Gwahula. (2016) that’ the study looks only on the factors affecting the quality performance of the project, other performance factors such as time and cost were not widely sported. Another study done by Jenifa. (2017) looks only on factors for delaying in road Construction, other performance factors such as Project costs, client satisfaction, community acceptance and environmental sustainability were not considered at all; It was further observed from the Gwahula’s study that ‘the study looks only on the Government financed construction projects only while there were also non-governmental financed construction projects. Jenifa. (2017) delighted only on road Construction Projects and left other construction projects segments such as real estates, building and other civil work. Most of the researchers if not all did not classified risk factors basing on their impact and likelihood of occurrence rather they grouped them basing on their sources, nature, causes and controllability aspects, that form a base for this study.

## 2.5 Conceptual Framework

Project success is a function of many different factors, some relate with project itself, some result from different external environment and others due to procedures and managerial act. Being an independent variable, project success is influenced by many internal and external risk factors, the worse the factor, the deeper the project is exposed to risk hence affect project schedule performance, budget, quality and profitability hence distort both project owner and community/public satisfaction.

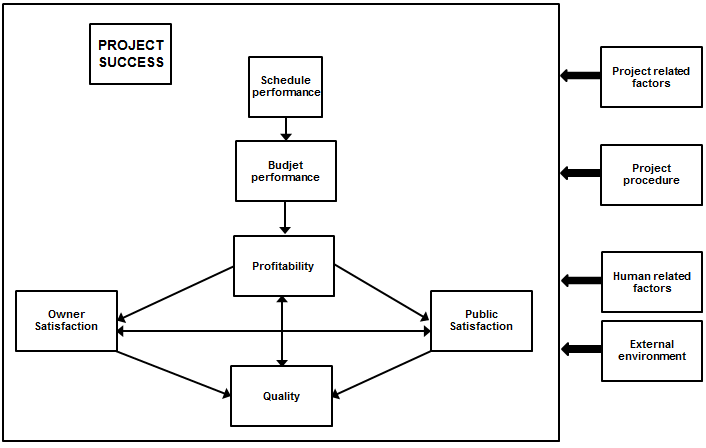


Figure 2.3: Conceptual Framework

**Source:** Ling *et* al, (2009)

# CHAPTER THREE

# RESEARCH METHODOLOY

## 3.1 An Overview

This chapter describes the methods and approaches used in conducting the study. It comprise of research design, description of the study area, population and data collection, sample and sampling techniques, data processing and analysis procedure.

## 3.2 Research Design

Research design is a conceptual structure within which the research is conducted (Kothari, 2006). It constitutes the blue print showing the road map for the overall conduction of the study. To fulfill the goal, the study therefore used Survey research design, simply because it’s effective applicability in data collection and less expensive as compared to other research designs. It also allow for an individual independent opinion regarding the subject matter and useful in describing the characteristics of the large population to get more accurate sample. It is also flexible and easy to administer and apply in many alternatives survey approach such as an online survey, email surveys, social media surveys, paper surveys, mobile surveys, questionnaire or face to face interview surveys unlike other research designs needs researcher physical presence all the time.

## 3.3 Area of the Study or Survey

The study was basically conducted at Dar Es Salaam City. The location was selected simply because of the presence of many big construction projects currently proceeds in Dar es Salaam such as the JK Nyerere international airport expansion project, Ubungo interchange Construction Project, High Speed Buses (Mwendokasi) project phase II and III, Kimara – kibaha eight pass - road project. Therefore make it easy to find respondents especially contractors, sub contractors, project managers and consultants who were often likely to be found at the sites. Also most of the respondent’s offices were nearly located in Dar Es Salaam, example the AQRB, CRB, ERB and TBA. The researcher also lives in Dar Es Salaam, making it easy for him to access respondents in their respective sites/offices

## 3.4 Population and Data Collection

According to Kothari, (2007) the term population means an entire group of individual, event or object that has common observable characteristics. The targeted population for this study was the registered Contractors, Engineers, Architects and Quantity Surveyors, building agency (TBA), Construction companies and solo Construction projects practionner. In order to fulfill the objective of the study, both Secondary and primary data were employed in identifying, classifying and assessing the impact and likelihood of occurrence of the risk factors for Construction project success. Various sources of literature review were also highlighted including but not limited to accredited academic paper, journals, books, internet and past theses and dissertations. The first hand data (primary data) was then obtained through a well structured questionnaire pre tested for its simplicity, suitability, readability and understandability before distributed to the respondents. The drop – off and collect strategy was then adopted to facilitate the data collection activities.

## 3.5 Sample and Sampling Technique

Kothari, (2006) defined sample as a collection of some parts of the population on the basis of which judgment is made. All respondents got equal chance of being selected basing on their willingness to participate in the study, position, education, work experience, adequate knowledge, professional back ground and awareness of the Tanzania construction industry setting.. Random Probability sampling was then used to get a sample from a large population and the technique was more appropriate because not only gave respondents equal chance of being selected but also assure a better representation of the varying population compared to non – probability sampling**,** itis alsoless subjective as the selection does not rely solely on human judgment hence keep the overall process free from biasness.

## 3.6 Data Processing and Analysis Procedure

The classification of risk factors was done using the Risk matrix technique while the five-point Likert Scale was used to examine the level of impact of the identified risk factors. The scale was ‘’1- Very low impact, 2-Low impact 3- medium impact, 4- high impact, 5- very high. Data analysis was effected using the relative mean item score – impact index and the computation was done using the below formula (AL- Ghafly, 1995)

*n*

***I.I*** *=* ***[Σ*** *(VL \*n1)+(L \* n2)+(M \* n3)+(H \* n4)+(VH \* n5)/ (N\*S max)* ***]*** *\*100……..****Eq. 1***

*n=1*

Where; n1 = number of respondents opt for very low impact

n2 = number of respondents opt for low impact

n3 = number of respondents opt for medium impact

n4 = number of respondents opt for high impact

n5 = number of respondents opt for very high impact

VL = Scale for very low impact

L = Scale for low impact

M= Scale for medium impact

H = Scale for high impact

VH = Scale for very high impact

N = total number of respondent

S max = Maximum Scale

The total index of each particular risk factor was obtained by sum up the respondent’s actual scores on 5- point scale given by all respondents as a proportion of the sum of all maximum possible scores on the 5 – point scale that all the respondents could give to that criterion/risk factor. After computation, then the indices obtained were used to rank each risk factor basing on its relative significant impact on the Construction project success. The similar approach has been used by some past researchers to analyze the data gathered from questionnaire survey (Le-Hoai *et* al*.*, 2008).

The same five-point Likert Scale was also used to find the Probability of occurrence of each identified risk item, A risk’s probability scale naturally falls from 0.1 to 0.9 scale level (PMBOK 2000), whereby 0.1 - stand for very low probability, 0.3 - low probability, 0.5 -medium probability, 0.7 - high probability and 0.9 very high probability, Data analysis was then done using the relative mean item score – probability index and the computation was done using the below formula (AL- Ghafly 1995).

*n*

***P.I*** *=* ***[Σ*** *(VL \*n1)+(L \* n2)+(M \* n3)+(H \* n4)+(VH \* n5)/ (N\*Smax)****]*** *\*100…….…****Eq.2***

*n=1*

Whereby;

n1 = number of respondents who selected option for very low probability of occurrence

n2 = number of respondents who selected option for low probability of occurrence

n3= number of respondents who selected option for medium probability of occurrence

n4 = number of respondents who selected option for high probability of occurrence

n5 = number of respondents who selected for option for very high probability of occurrence

VL = Scale for very low probability of occurrence

L = Scale for low probability of occurrence

M= Scale for medium probability of occurrence

H = Scale for high probability of occurrence

VH = Scale for very high probability of occurrence

N = Total number of respondents

S max= Scale for Maximum Probability of Occurrence

The total index of each particular risk factor was obtained by sum up the respondent’s actual scores on 5- point scale given by all respondents as a proportion of the sum of all maximum possible scores on the 5 – point scale that all the respondents could give to that criterion/risk factor. The total probabilities indices obtained after computation were then used to rank each identified risk factors basing on its relative likelihood/probability of occurrence on the Construction project success.

The illustration is given below to make the formula above more understood. Consider the risk factor “adverts weather condition’’ See the respondents weigh below as an example.

**Table 3.1: An Illustration for P.I and I.I Respondent Score**

|  |  |  |  |
| --- | --- | --- | --- |
| **Probability of Occurrence** | | **Degree of Impact** | |
| Options | Respondents | Options | Respondents |
| Very Low | 1 | Very Low | 5 |
| Low | 9 | Low | 10 |
| Medium | 14 | Medium | 7 |
| High | 13 | High | 14 |
| Very High | 24 | Very High | 25 |

**Source:** Research analysis *(2019)*

Total respondents (N) = 61

*P.I = [(24\*0.9+13\*0.7+14\*0.5+9\*0.3+1\*0.1) / (61\*0.9)]\*100 = 73.8%*

*I.I = [(25\*5+14\*4+7\*3+10\*2+5\*1) / (61\*5)]\*100 = 74.4%*

**CHAPTER FOUR**

**FINDINGS AND DISCUSSION**

**4.1 An Overview**

This chapter presents the study findings and discussion. The first section shows respondent’s profile/basic information in terms of position/professional qualification, education and work experience and section two presents research findings on study objectives - identification of risk factors basing on their probability of occurrence, identification of risk factors basing on their level of impacts on the construction project success, classification of risk factors basing on their probability of occurrence and the level of impact and the last section addresses the possible risk factors mitigation strategies.

**4.2 Respondents Profile**

**4.2.1 Respondents Professional Qualifications**

A total of 85 questionnaires were issued, 61 were returned and used weighing to approximately 72% of the total questionnaire provided. Majority of respondents were Architects (16.4%) followed by Sub Contractors (9%), Site inspectors (8%), and others.

**Table 4.1: Respondent’s Professional Qualifications/Position**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Position | | Frequency | Percent | Cumulative percent |
|  | Sub Contractors | 9 | 14.8% | 14.8% |
| Civil Agents | 2 | 3.3% | 18.1% |
| Projects Consultants | 5 | 8.2% | 26.3% |
| Contractors | 7 | 11.5% | 37.8% |
| Enforcement Officer | 7 | 11.5% | 49.3% |
| Engineers | 4 | 6.6% | 55.9% |
| Project managers | 3 | 4.9% | 60.8% |
| Quantity Surveyors | 6 | 9.8% | 70.6% |
| Architects | 10 | 16.3% | 86.9% |
| Site Inspectors | 8 | 13.1% | 100% |
| . Total | 61 | 100% |  |

**Source:** Survey results *(2019)*

**4.2.2 Respondent’s level of Education**

Majority of respondents were bachelor degree holder and most of them were Architects, Engineers, Contractors, and Quantity Surveyors. Most Site inspectors and Enforcement officers were Certificates and Diploma holders while project managers and some of project consultants got Masters Qualification and some few Sub Contractors got only Secondary education.

**Table 4.2: Respondent’s Level of Education**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Award | | Frequency | Percent | Cumulative percent |
|  | Masters | 8 | 13.1% | 13.1% |
| Bachelor Degree  Certificates & Diploma  CSSE/ACSSE | 31  19  3 | 50.8%  31.1%  4.9% | 63.9%  95.1%  100% |
| Total | 61 | 100% |  |

**Source:** Survey results, (2019)

**4.2.3 Construction Experience of Respondents**

Majority of the respondents were fully involved in the construction industry. 48% of them had an experience of 1 to 5 years, 25% had between 6 – 10 years, 14% from 11 – 15 years, 8% from 16 – 20 years and 5% had more than 20 years of working experience. All respondents had enough knowledge and industry experience hence capable of supplying required information needed.

**4.3 Survey Findings**

**4.3.1 Identification of Risk Factors Basing on Their Probability of Occurrence**

Risk factors were identified through Literature review while their probabilities of Occurrence were measured by the scores assigned in each factors by the respondents as shown in the Table 4.3.

**Table 4.3: Probability Index Score**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Risk Factors** | Very low | **Probability Scale** | | | | P. I | Ranking |
| Low | medium | High | V. high |
| Unrealistic Project Completion time estimates  Poor working environment  Delay in material delivery  Unforeseen site condition  Construction mistakes  Theft Acts  Advert weather condition  Lack of team commitment  Team resistance  Improper project planning | 3  5  1  4  2  6  1  7  3  10 | 2  4  1  3  8  3  9  2  4  1 | 6  1  10  7  15  10  14  5  12  8 | 17  17  28  22  8  17  13  31  28  23 | 33  34  21  25  28  25  24  16  14  19 | 82.9%  81.4%  79.9%  77.7%  74.5%  74.5%  73.8%  72.6%  72.3%  70% | 1  2  3  4  5  6  7  8  9  10 |
| Natural calamities  Financial Constraints | 5  4 | 13  6 | 8  23 | 21  20 | 14  8 | 65%  63.6% | 11  12 |
| Increase in material price | 13 | 4 | 8 | 21 | 15 | 63.2% | 13 |
| Externalities during implementation  Defective and rush design  Inadequate quality control strategy  Ineffective resources management  Inaccurate project program  Lack of clarity on project scope  Ineffective risk management tactics | 13  7  5  16  13  10  7 | 5  6  15  1  7  12  15 | 10  26  21  18  17  14  21 | 19  9  7  15  11  14  9 | 14  13  13  11  13  11  9 | 61.4%  61%  58.5%  57%  57%  57%  54.8% | 14  15  16  17  18  19  20 |
| Supply of fault material | 7 | 20 | 15 | 7 | 12 | 54.5% | 21 |
| Difficult to access the site | 12 | 10 | 23 | 9 | 7 | 51.5% | 22 |
| Corruption | 16 | 9 | 19 | 7 | 10 | 50.5% | 23 |
| Political instability  Community resistance  Unrealistic project cost estimates | 16  4  15 | 10  32  12 | 18  6  19 | 7  14  10 | 10  5  5 | 50.1%  49.7%  47.5% | 24  25  26 |
| Delay in Contract payments  Poor equipments  Shortage of equipments | 17  22  18 | 9  12  14 | 23  7  10 | 5  11  16 | 7  9  3 | 46.8%  45.7%  45.4% | 27  28  29 |
| Stakeholders conflict of interest  Contractor – client poor relationship  Delay in tender evaluation | 8  22  17 | 26  9  19 | 20  14  13 | 3  12  6 | 4  4  6 | 4%  43.5%  42.8% | 30    31  32 |
| Poor team communication | 20 | 17 | 9 | 11 | 4 | 41.7% | 33 |
| Technology change | 24 | 15 | 3 | 13 | 6 | 41.7% | 34 |
| Shortage of personnel skills | 19 | 19 | 11 | 7 | 5 | 41% | 35 |
| Changes in Government legislation | 25 | 14 | 6 | 10 | 6 | 40% | 36 |
| Inexperience of project type | 23 | 16 | 8 | 13 | 1 | 38.4% | 37 |
| Delay in disputes resolutions | 30 | 10 | 8 | 6 | 7 | 37.3% | 38 |

**Source:** *Research findings*, *(2019)*

The computation was done using the formula illustrated above; - i.e.

*n*

***P.I*** *=* ***[Σ*** *(VL \*n1)+(L \* n2)+(M \* n3)+(H \* n4)+(VH \* n5)/ (N\*Smax)****]*** *\*100.*

*n=1*

And factors ranked in ascending order from the highest score ( high probability risk factor) to lowest score ( low probability risk factors).

**4.3.2 Identification of Risk Factors Basing on Their Level of Impacts on the Construction Project Success**

Risk factors were identified through Literature review while their impact was measured by the scores assigned in each factors by the respondents as shown in the Table 4.4.

**Table 4.4: Impact Index Score**

|  | **Very Low** | **Low** | **Medium** | **High** | **Very high** | **I. I** | **Ranking** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Lack of team Commitment  Inexperience of project type  Ineffective resources management  Advert weather condition  Defective and rush design | 4  4  8  5  5 | 5  2  4  10  6 | 5  14  8  7  22 | 14  10  16  14  14 | 33  31  25  25  14 | 82%  80.3%  75.1%  74.4%  68.5% | 1  2  3  4  5 |
| Natural calamities  Ineffective risk management tactics  Increase in material price  Financial Constraints | 3  5  6  1 | 13  12  11  16 | 16  20  22  27 | 22  9  7  4 | 7  15  15  13 | 65.6%  65.6%  64.6%  63.9% | 6  7  8  9 |
| Delay in material delivery | 8 | 9 | 20 | 12 | 12 | 63.6% | 10 |
| Stakeholders Conflict of interest  Team resistance | 1  14 | 9  10 | 36  9 | 9  12 | 6  16 | 63.3%  62% | 11  12 |
| Lack of clarity on project scope  Improper Project Planning | 15  8 | 12  7 | 7  27 | 7  10 | 20  9 | 61.6%  61.6% | 13  14 |
| Delay in tender evaluation  Construction mistakes  Inadequate quality control strategy | 9  11  6 | 4  14  15 | 29  12  15 | 13  11  22 | 6  13  3 | 60.9%  60.3%  60.3% | 15  16  17 |
| Externalities during implementation  Unrealistic project cost estimates  Corruption | 13  11  10 | 14  9  13 | 5  18  17 | 19  17  11 | 10  6  10 | 59.7%  59.3%  59.3% | 18  19  20 |
| Changes in Government legislation | 14 | 18 | 3 | 10 | 16 | 58.7% | 21 |
| Shortage of equipments | 16 | 12 | 17 | 8 | 8 | 53.4% | 22 |
| Political Instability | 17 | 15 | 9 | 13 | 7 | 52.8% | 23 |
| Theft act  Poor working environment | 19  23 | 10  12 | 12  10 | 16  5 | 4  11 | 52.1%  49.8% | 24  25 |
| Delay in Contract payments  Contractor – client poor relationship | 20  23 | 17  20 | 9  6 | 6  4 | 9  8 | 49%  44.9% | 26  27 |
| Difficult to access the site  Technology change  Poor equipments | 27  33  25 | 7  4  25 | 16  18  6 | 10  5  2 | 1  1  3 | 44%  39%  38% | 28  29  30 |
| Unrealistic project completion time estimates  Shortage of personnel skills  Community resistance  Inaccurate project program  Delay in disputes resolutions | 29  34  31  26  29 | 21  19  22  30  28 | 7  1  4  3  1 | 1  5  2  1  2 | 3  2  2  1  1 | 36.4%  34.4%  34.4%  34.1%  33.1% | 31  32  33  34  35 |
| Supply of fault material | 37 | 16 | 2 | 4 | 2 | 33.1% | 36 |
| Unforeseen site condition | 42 | 14 | 3 | 1 | 1 | 28.9% | 37 |
| Poor team communication | 47 | 10 | 1 | 2 | 1 | 27.2% | 38 |

**Source:** Research findings, *(2019)*

The computation was done using the formula illustrated above; - i.e.

*n*

***I.I*** *=* ***[Σ*** *(VL \*n1)+(L \* n2)+(M \* n3)+(H \* n4)+(VH \* n5)/ (N\*S max)* ***]*** *\*100.*

*n=1*

And factors ranked in ascending order from the highest score ( high impact risk factor) to lowest score ( low impact risk factors).

**4.3.3 Classification of Risk Factors Basing on their Likelihood of Occurrence and Impacts on the Construction Project Success**

Risk Matrix technique was used to classify the risk factors basing on the aggregate scores assigned to each. The categories are as ‘high impact – high probability, high impact – low probability, low impact – low probability, low impact – high probability (El- Fattah et *al,* 2010). The scale for likelihood (probability) of occurrence was bordered in percentage as follows*-* 1% - 69% lowand 70% - 100% high,for Impact - 1% - 39% low and40% - 100% high.



**Figure 4.1: Risk Factors Matrix**

**Source:** El- Fattah, (2010)

**Table 4.5: Classification of Risk Factors Following the Risk Factor Matrix**

|  |  |
| --- | --- |
| 1. Natural calamities,2. Financial Constraints, 3.Increase in material Price, 4.Externalities during implementation, 5.Defective and rush design, 6.Inadequate quality control strategies, 7. Lack of clarity on project scope, 8.Ineffective risk management tactics, 9.Difficult to access the site, 10.Corruption, 11.Political instability, 12.Unrealistic project costs estimates, 13.Delay in Contract payments, 14.Shortage of equipments  15. Contractor - client poor relationship,16. Delay in tender evaluation, 17.Ineffective resources management, 18.Stakeholders conflict of interest, 19. In experience of project type, 20. Changes in Government legislation. | 1.Delay in material delivery 2.Poor working environment 3.Construction mistakes  4.Theft acts  5.Advert weather condition  6.Lack of team commitment  7.Team resistance  8. Improper project planning |
| 1. Poor team communication,2. Inaccurate project program, 3.Supply of fault material, 4.Community resistance, 5.Poor Equipments, 6.Technology change, 7.Shortage of personnel skills, 8.Delay in disputes resolutions | 1.Unforeseen site condition, 2.Unrealistic project completion time estimates |

**Source:** research findings, *(2019)*

**4.3.4 Risk Factors Mitigation Strategies**

The actual reduction of risks is through the improvements of the physical devices, procedural, educational and training (Flanagan and Norman 1993). Physical devices can be improved by upgrading and continuing maintaining to enhance their productivity to prevent loss, procedures can be changed to decompensate the possible risk outbreak losses while Education and training program are effectively to project team members and other project stakeholders. Retention is sometimes referred as Absorption and they are of two types Active and Passive (Carter and Doherty 1974), where by active depend merely on deliberately management strategy after a conscious evaluation of the possible losses and costs of alternative ways of handling risk while passive is simply risk neglect ion.

Risk transfer mitigation strategy can take three basic forms (Thompson and Perry 1992), firstly, the property or an activity responsible for the risk may be transferred, and secondly, the activity or property can be retained but the financial risk transferred and lastly risk sharing (Co-insurance) whereby the financial risk is shared in between the parties in contract. Risk Avoidance involves changing the project plan to prevent a potentially detrimental risk condition and contingency is simply a provision of some of money to cover the future unplanned/unexpectedly costs increment.

Risk factor mitigation strategies depends solely on the nature, causes and their impacts on the project deliverables, strategic plan, technical–know how and financial capacity of an organization (Barrie *et* al, 1992).

## Table 4.6: Risk factors Minimization Strategies

|  |  |
| --- | --- |
| Risk Factors | Mitigation strategies |
| Lack of team commitment | Reduction - Education and training, Motivation, Improving labor relation. |
| Inexperience of the project type | Reduction - Education and training, Outsourcing, Selection of the qualified contractors |
| Ineffective resources management | Reduction - Education and training |
| Advert weather condition | Retention/Absorption |
| Defective and rush design | Avoidance, recruit a qualified designer |
| Natural Calamities | Risk transfer |
| Ineffective risk management tactics | Reduction - Education and training |
| Increase in material price | Contingency |
| Financial Constraints | Contingency |
| Delay in material delivery | Reduction - Procedural change |
| Stakeholders conflict of interest | Retention/Absorption |
| Team resistance | Reduction - Education and training |
| Lack of clarity on project scope | Reduction - Training and education |
| Improper project planning | Avoidance - Intensive feasibility study |
| Delay in tender evaluation | Reduction - Procedural change |
| Construction mistakes | Reduction - Education and training |
| Inadequate quality control strategy | Reduction– Quality Assurance team |
| Externalities during implementation | Both Avoidance and Reduction strategies |
| Unrealistic project costs estimates | Contingency |
| Corruption | Reduction - Education and training |
| Changes in Government legislation | Absorption/Retention |
| Shortage of equipments | Reduction - Leasing/Hiring |
| Political instability | Risk transfer |
| Theft acts | Risk transfer/Strong security |
| Poor working environment | Reduction - Physical improvement |
| Delay in contract payments | Reduction – Procedural change |
| Contractor – client poor relationship | Reduction -Immediate Resolution |
| Difficult to access the site | Both Avoidance and Reduction |
| Technology change | Reduction - Leasing/hiring |
| Poor equipments | Reduction - Upgrading/Lease/Hiring |
| Unrealistic project completion time estimates | Both Avoidance and Reduction |
| Shortage of personnel skills | Reduction - Education and training |
| Community resistance | Reduction - Education, community participation |
| Inaccurate project program | Both Avoidance and Reduction |
| Delay in disputes resolution | Reduction - Procedural change |
| Supply of faults material | Reduction - Procedural change |
| Unforeseen site condition | Risk Transfer and Avoidance |
| Poor team communication | Reduction - Education and training |

## Source*:* Research findings, *(2019)*

**CHAPTER FIVE**

**CONCLUSIONS AND RECOMMENDATIONS**

**5.1 Conclusion**

Thirty eighty risk factors were revealed through a detailed literature review and then ranked and classified into four groups namely low impact – low probability, low impact – high probability, high impact – low probability and high impact – high probability category each assigned to its respective mitigation strategy basing on the study findings.

Risks factors that are classified as both low impact and likelihood of occurrence are normally less concerned by many organization and the response required is not necessarily as proactive management action, however they should be included in the risk register for future monitoring and control. The combat of risk factors with high impact but low likelihood of occurrence depends on the organization defined threshold. Some of these events occurred rarely making it difficult to determine its probability of occurrence basing on the historical records, example natural calamities, therefore most of the time their probabilities are subjectively estimated, due to this, it is advised to use reduction strategy mainly insurance at least to reduce or cover the lose caused incase it occur.

The mitigation of risk factors with low impact but high likelihood of occurrence depends on the organization defined threshold and the resources available, these risks are mostly due to uncertainties of numerous elements that might individually look miner but when combined could amount to higher risk, example unrealistic estimation of project completion time and unforeseen site condition. The most common mitigation strategy is to change the project plan in order to prevent a potentially detrimental risk condition and that’s called risk avoidance.

Risk factors that are characterized as high impact and high likelihood of occurrence need to be prioritized and aggressively responded. The responses could be mitigation of the risk, or even terminating the project if the risk is too significant, example Advert weather condition (P.I 73.8%, I.I 74.4%), their response depends mostly on deliberately management strategy and the available financial capacity after a conscious evaluation of the possible losses. risk retention is more appropriate in this category though some may also be minimized through risk reduction measures example; delay in material delivery (P.I 79.9%, I.I 63.6%), poor working environment (P.I 81.4%, I.I 49.8%), construction mistakes (P.I 74.5%, I.I 60.3%) and Lack of team commitment (P.I 72.6%, I.I 82%).

**5.2 Recommendations**

1. Boards and institutions responsible for Construction industry in Tanzania should make prior assessment of the capacity of the contractors including but not limited to their financial, Skills, Technology and Commitment before the commence of the project to avoid the contractors risk factors such as improper project design, planning and program.
2. There should be an open tender bidding to avoid corruption and selection of unqualified contractors.
3. There should be an international contract bound agreement to safeguard projects and the proceeds from changes in Government legislation/Act.
4. The act of God cause - risk factors causes should be enlighten by the parties in contract in order to avoid the client – contractor’s conflict following the project success distortion, but it should not be always the case, therefore the contractors should not take advantage of it.
5. The Project Owner should make Contingency provision to cover for uncertainties both controllable and uncontrollable.
6. Intensive feasibility study should be done before the start of the project, this will helps in project design, programs and planning.
7. It is also essential to establish a designated group within the Project team or specialized professionals outside the team for risk management.
8. In Project tendering, contractor should consider the risk premium in cost & time estimation
9. Proper trainings should be given to employees/project team from competent person within the team or specialized persons.
10. Proactive approach should be taken in risk combat rather than reactive.
11. There should be an open communication system within the team for better idea ideas generation, promoting a sense of participation and team involvements to avoid team resistance.

**REFERENCES**

Abu, M.. (2005). Risk management in construction projects: from contractors and owners perspectives. Master of Science in Construction Management Dissertation, The Islamic University of Gaza, Palestine.

Al-Bahar, J. F. (1988). “Risk management in construction Projects: A systematic analytical approach for contractors”, Ph.D. Dissertation, Department of Civil Engineering, University of California, Berkeley.

Al-Khalil M, Al-Ghafly M. Important causes of delay in public utility projects in Saudi Arabia. *Constr Manage Econ* 17(5), 647–55.

Ashley, D. B., Laurie, C. S. & Jaselskis, E. J. (1987). "Determinants of Construction Project Success", *Proj. Manage. J.,* 18(2), 69–79.

Assaf, S. A. & Al-Hejji, S. (2006). Causes of delay in large construction projects,” *Int. J. Proj. Manag.* 24, 349–357.

Assaf, S. A., Al-Khalil, M. & Al-Hazmi, M. (1995). Causes of delay in large building construction projects. *Journal of Management in Engineering*, *ASCE*, 11(2), 45-50.

Atkinson, R. (1999). Project Management: Cost, Time and Quality, Two Best Guesses and a Phenomenon, It’s Time to accept other Success Criteria. *International Journal of Project Management,* 17(6), 337-342.

Bakr A. F. (2012). Heuristic Approach for Risk Assessment Modeling: EPCCM Application. [*AEJ - Alexandria Engineering Journal*](https://www.researchgate.net/journal/1110-0168_AEJ-Alexandria_Engineering_Journal), 51(4), 305–323.

Barrie, D. & Paulson, B. C. (1992). *Professional Construction Management*. 3rd Ed., New York: McGraw-Hill.

Bhandari, M. G. (2014). “Management of Risk in Construction Projects in Maharashtra” *International Journal of Engineering Science Invention*, 3(1), 14-17.

Chan, A. P. C. (2001). Framework for measuring success in construction projects. Queensland University of Technology: Australia.

Chan, A. P. C. (2004). Key performance indicators for measuring Construction Success Benchmarking. *International Journal,* 11(2), 203-221.

Chapman, R. J. (2001). “The Controlling Influences on Effective Risk Identification and Assessment for Construction Design Management”, *Internat. J. of Project Management.* 19, 147-160.

Charette, R. N. (1996). Large scale project management is risk management*. IEEE Software*, 110–117.

Chua, D., Kim, H., Yue-Choong, K. & Ping, K. L. "Critical success factors for different project objectives." *Journal of construction engineering and management*, 125(3), 142-150.

Construction Industry Policy, (2003). United Republic of Tanzania, Ministry of Works, Dar es Salaam, Tanzania.

Construction Registration Board, (2008). Monthly Review Report, August,Construction Registration Board, (2011), Monthly Review Report, September, 2008.

Craig, R. (2018). The five steps Risk Management Process; Updated version of 2010 for Comprehensive and Accuracy.

Doloi, H., Sawhney, A., Iyer, K. C. & Rentala, S. (2011). ‘Analyzing factors affecting delays in Indian Construction projects”, *Austr. J. Bus. Manag. Res.* 1, 41– 50.

Enshassi, J. M. (2015). Risk management in building projects: owners’ perspective. *IUG Journal of Natural Studies,* 95-123.

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

Flanagan, R. & Norman, G. (1993). *Risk management and construction*, Oxford: Blackwell Scientific Publications.

Gobi, D., Gonzalez, P., Orozco, F. (2015). Analysis of causes of delay and time performance in construction projects Srilanka, [*Journal of Construction Engineering and Management*](https://www.researchgate.net/journal/0733-9364_Journal_of_Construction_Engineering_and_Management), 140(1), 04013027.

Gunduz, M. D., Ph, A., Asce, M., Nielsen, Y., & Ozdemir, M. (2013). “Fuzzy Assessment Model to Estimate the Probability of Delay in Turkish Construction Projects,” *J. Management, Eng.,* 29(2),1–14.

Gwahula, R. (2016). An Assessment of Critical factors affecting Quality performance of Government financed Construction Projects; Evidence from Tanzania. Department of Accounting and Finance at the Open University of Tanzania, Dar es Salaam.

Hillson, D. (2002). 'Extending the risk process to manage opportunities', *International Journal of Project Management,* 20(3), 235-240.

Ibrahim, A. D., Dainty, A. R. J. (2006). The analysis and allocation of risks in public private partnerships in infrastructure projects in Nigeria, *Journal of Financial Management of Property and Construction*, 11(3), 149–163.

Kaming P. F, Olomolaiye O. P., Holt, D. G. & Harris, C. F. (1997) Factors influencing construction time and cost overruns on high-rise projects in Indonesia. *Construction Management and Economics,* 15, 83-94.

Karel-de, B., Boonstra, A., Wortmann, H. (2011). Risk Management Affecting IS/IT Project Success through Communicative Action, *Article in Project Management Journal,* 42(3), 75-90.

# Kartam, N. A. & Kartam, S. A. (2001). Risk and its Management in the Kuwaiti Construction Industry, a Contractors Perspective, *International Journal of Project Management,* 19, 325-335.

Kinnaresh, P. (2013). “A study on risk assessment and its management in India” American Journal of Civil Engineering, 1(2), 64-67.

Kothari, C. R. (2006). *Research Methodology: Methods and Techniques*, 2nd Edition, New Delhi: New Age International Publishers.

Le-Hoai, L., Lee, Y. D., & Lee, J. Y. (2008). Delay and cost overruns in Vietnam large construction projects: A comparison with other selected countries, *KSCE Journal of Civil Engineering,* 12(6), 367– 377.

Ling F. Y. Y. & Hoi, L. (2006). ‘Risks faced by Singapore firms when undertaking construction project in India’ *International Journal of Project Management,* 24( 3), 261-70.

Mallewo, A. (2014). An assessment of project management concepts in building projects in Tanzania, a case study of building projects in Dar Es Salaam. Unpublished (Master of Science degree on construction economy and management), Ardhi University, Tanzania.

Matiko, S. (2007). Critical Performance Improvement Factors for Contractors in Tanzania; CIB 2007 – 375.

Mohamed, N. A. E. (2010). “Risk Assessment and Analysis for Construction of Off Shoe Petroleum and Gas Projects in Egypt, Masters thesis, Ain Shams University, Egypt.

Mohammad, H. & Mojtahedi, S. M. (2010). Project risk identification and assessment simultaneously using multiattribute group decision making technique. *Safety Science Elsever Science Direct,* 48*,* 499-507.

Nicholas, C. & Adwoa, B. Y. (2012) ‘An Evaluation of risk factors impacting Construction projects in Ghana’’, *Journal of Engineering, Design and Technology,* 10(3), 303-329.

Nur-Alkaf, A. K. (2012). Risk allocation in Public - Private Partnership Project; A review on Risk Factors; Faculty of Civil and Environmental Engineering Department, UTHM, Batu Pahat, Johor, Malaysia.

Project Management Institute, (2013). A Guide to the Project Management Body of Knowledge, 5th Edition, PMI.

Renuka, C. U. (2014). A Review on Critical Risk Factors in the Life Cycle of Construction Projects. *Journal of Civil Engineering Research,* 4(2),31-36

Shankar, N. B. (2015). Assessment of risk in construction industry. *International Research Journal of Engineering and Technology (IRJET),* 8(4), 68-72.

Simon, J. (2017). Factors causing delay in Road Construction Projects in Tanzania, A case of Tan Road in Dar Es Salaam City. Masters Dissertation, Open University of Tanzania, Dar es Salaam, Tanzania.

Srinivasa Raghavan, M. S. (2014). Construction Risk Identification and Assessment. *Indian Journal of Applied Research,* 2(3), 388-391.

Tanzania Development Vision, (2025). Together with Five Year Development Plan II; The Estimates of Public Revenue and Expenditure Books for year 2016/17 (Volumes I – IV).

Tanzania Ministry of Finance report, June 9 2016, Estimates of Public Expenditure Report, Geita Region, details on Urban and District Grants and Subentions 2014/2015 report.

Tanzania National Bureau of statistics, 2012, Report.

Thereza, K. L (2017). Factors affecting Performance of Airport Construction Projects in Tanzania. Masters dissertation, Open University of Tanzania, Dar es Salaam, Tanzania.

Thompson, P. & Perry, J. (1992). *Engineering construction risks: A guide to project risk analysis and risk management*, London: Thomas Telford.

Tummala, V. M. R, & Burchett, J. F. (1999). Applying a Risk Management Process (RMP) to manage cost risk for an EHV transmission line project*, International Journal of Project Management*, 17(4), 223 – 235.

United Republic of Tanzania, (2010). The Performance Audit Report on Road works, Ministry of Finance: Tanzania.

Walker, A. (2007). "Project management in construction" 5th edition, Oxford: Blackwell Publishing.

Wideman, R. M. (1986). Project and Program Risk Management – A Guide to Managing Risks and Opportunities, Project Management Institute, Pennsylvania, PA.

Wong, P. S. P. & Cheung, S. O. (2005). No Structural Equation Model of Trust and Partnering Success, *Journal of Management in Engineering*, 21(2), 70-80.

Word Bank KPMG, (2013). Country survey Report.

**APPENDICES**

**Appendix 1: Research Questionnaire**

**THE OPEN UNIVERSITY OF TANZANIA**

**MASTERS THESIS QUESTIONNARE**

Dear Respondents/Participants

I ……………………………………………………………..a student at the Open University of Tanzania undertaking Masters in Project Management (MPM). Research activity being part of my studies, I am currently writing my Master’s thesis specifically on the **“Risk factors for Construction project Success in Tanzania”** with such connotation, I’m humbly please you to objectively participate in filling the attached questionnaire essentially for data gathering.

Note:

The questionnaire consists of three parts, part A covers respondents (you) basic information, part B highlight the risks factors for construction projects success, you are then kindly requested to choose the probability of occurrence of each risk factor, Part C also covers the identifies risk factors and you are again required to choose the likely impact of each factor on the construction project success following the below scale respectively;

|  |  |  |
| --- | --- | --- |
| Option | Probability of Occurrence Scale | Impact Scale |
| Very low | 0.1 | 1 |
| Low | o.3 | 2 |
| Medium | 0.5 | 3 |
| High | 0.7 | 4 |
| Very High | 0.9 | 5 |

**PART A: RESPONDENTS BASIC INFORMATION**

**Fill ups the dotted line**

i Your name (not necessary) ………………………………………………

ii Gender ………………………………………………………………

iii Marital Status (optional)……………………………………………

iv Name of your Organization…………………………………………

v When did you join this Organization?....................................................

vi What position have you held in this organization……………………

vii Your Nationality……………………………………………………

**Tick Appropriately**

Viii Your age 18 – 30 years old ( )

31 – 40 years old ( )

41 - 50 years old ( )

Above 50 years ( )

ix What qualification do you have?( level of education )

1. Certificate ( )
2. Advanced Diploma/Degree ( )
3. Masters holder ( )
4. PhD/Professor ( )

**PART B: The Probability of Occurrence of Risk factors for Construction Project Success**

*Please use a tick to select the scale option in each of the tabulated risk factor below**and place it in an appropriate box/cell*.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Very low | Low | Medium | High | Very high | Remark |
| Political instability |  |  |  |  |  |  |
| Advert weather condition |  |  |  |  |  |  |
| Shortage of personnel skills |  |  |  |  |  |  |
| Stakeholders conflict of interest |  |  |  |  |  |  |
| Delay in contract payments |  |  |  |  |  |  |
| Changes of Government legislation |  |  |  |  |  |  |
| Corruption |  |  |  |  |  |  |
| Unforeseen site condition |  |  |  |  |  |  |
| Technology change |  |  |  |  |  |  |
| Externalities during implementation |  |  |  |  |  |  |
| Community resistance |  |  |  |  |  |  |
| Difficulties to access the site |  |  |  |  |  |  |
| Supply of fault material |  |  |  |  |  |  |
| Increase in material price |  |  |  |  |  |  |
| Shortage of equipments |  |  |  |  |  |  |
| Construction Mistakes |  |  |  |  |  |  |
| Delay in disputes resolutions\* |  |  |  |  |  |  |
| Inadequate quality control strategy |  |  |  |  |  |  |
| Ineffective risk management tactics |  |  |  |  |  |  |
| Poor team communication |  |  |  |  |  |  |
| Team resistance |  |  |  |  |  |  |
| Ineffective resources management |  |  |  |  |  |  |
| Delay in material delivery |  |  |  |  |  |  |
| Theft acts |  |  |  |  |  |  |
| Inexperience of project type |  |  |  |  |  |  |
| Improper project planning |  |  |  |  |  |  |
| Lack of team commitment |  |  |  |  |  |  |
| Lack of clarity on project scope |  |  |  |  |  |  |
| Poor equipment |  |  |  |  |  |  |
| Defective and rush design |  |  |  |  |  |  |
| Inaccurate project program |  |  |  |  |  |  |
| Poor working environment |  |  |  |  |  |  |
| Natural calamities |  |  |  |  |  |  |
| Financial constraints |  |  |  |  |  |  |
| Unrealistic project costs estimates |  |  |  |  |  |  |
| Contractor – client poor relationship |  |  |  |  |  |  |
| Delay in tender evaluation |  |  |  |  |  |  |
| Unrealistic project completion time estimates |  |  |  |  |  |  |

**PART C: The degree of impact of Risk Factors for Construction Project Success**

*Please use a tick to select the scale option in each of the tabulated risk factor below**and place it in an appropriate box/cell*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Very low | Low | Medium | High | Very high | | Remark |
| Advert weather condition |  |  |  |  |  |  | |
| Political instability |  |  |  |  |  |  | |
| Shortage of personnel skills |  |  |  |  |  |  | |
| Stakeholders conflict of interest |  |  |  |  |  |  | |
| Delay in contract payments |  |  |  |  |  |  | |
| Changes in Government legislation |  |  |  |  |  |  | |
| Corruption |  |  |  |  |  |  | |
| Unforeseen site condition |  |  |  |  |  |  | |
| Technology change |  |  |  |  |  |  | |
| Externalities during implementation |  |  |  |  |  |  | |
| Community resistance |  |  |  |  |  |  | |
| Difficulties to access the site |  |  |  |  |  |  | |
| Supply of fault material |  |  |  |  |  |  | |
| Increase in material price |  |  |  |  |  |  | |
| Shortage of equipments |  |  |  |  |  |  | |
| Construction Mistakes |  |  |  |  |  |  | |
| Delay in disputes resolutions |  |  |  |  |  |  | |
| Inadequate quality control strategy |  |  |  |  |  |  | |
| Inadequate risk management tactics |  |  |  |  |  |  | |
| Contractors – client poor relationship |  |  |  |  |  |  | |
| Team resistance |  |  |  |  |  |  | |
| Ineffective resources management |  |  |  |  |  |  | |
| Delay in material delivery |  |  |  |  |  |  | |
| Theft acts |  |  |  |  |  |  | |
| Inexperience of project type |  |  |  |  |  |  | |
| Improper project planning |  |  |  |  |  |  | |
| Lack of team commitment |  |  |  |  |  |  | |
| Lack of clarity on project scope |  |  |  |  |  |  | |
| Poor equipment |  |  |  |  |  |  | |
| Defective and rush design |  |  |  |  |  |  | |
| Natural calamities |  |  |  |  |  |  | |
| Financial Constraint |  |  |  |  |  |  | |
| Poor working environment |  |  |  |  |  |  | |
| Unrealistic project completion time estimates |  |  |  |  |  |  | |
| Poor communication between the parties |  |  |  |  |  |  | |
| Inadequate project program |  |  |  |  |  |  | |
| Unrealistic project costs estimates |  |  |  |  |  |  | |
| Delay in tender evaluation |  |  |  |  |  |  | |

THANKS FOR YOUR VALUABLE INPUTS.

**Appendix 2: Research Schedule**

The main research activities to be undertaken includes literature review, the designing of questionnaires, contacting the targeted respondents whether be it physically or by call for appointment purpose and my intention to them, Data collection through questionnaire, Data Processing and analysis, Dissertation writing (data presentation, conclusion and recommendation for further studies), Dissertation Printing, binding and submission.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/NO** | **Activity** | **Activity duration (Months)** | | | | | | | | | | | | | | | | | | |
| **Oct 2018** | | | | **Nov 2018** | | | | **Dec 2018** | | | | | **Jan 2019** | | | | | |
| 1 | Literature Review |  |  |  |  |  |  |  |  | |  |  |  |  | |  |  |  |  |  |
| 3 | Designing Questionnaires |  |  |  |  |  |  |  |  | |  |  |  |  | |  |  |  |  | |
| 4 | Data collection through questionnaires |  |  |  |  |  |  |  |  | |  |  |  |  | |  |  |  |  | |
| 5 | Data Processing and Analysis |  |  |  |  |  |  |  |  | |  |  |  |  | |  |  |  |  | |
| 6 | Dissertation writing (data presentation, conclusion and recommendation for future studies |  |  |  |  |  |  |  |  | |  |  |  |  | |  |  |  |  | |
| 7 | Dissertation printing, binding and submission |  |  |  |  |  |  |  |  | |  |  |  |  | |  |  |  |  | |

## Appendix 3: Estimated Research Budget

The anticipated research budget is Tshs 600,000 (Six Hundred Thousands only). As indicated in the table below,

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ALL ACTIVITIES** | | | | | |
| **S/N** | Description | Units of measure | Quantity  (Units) | Rate  (Tshs) | Amount  (Tshs) |
| 1 | Communication | Tshs | anticipated |  | 50,000.00 |
| 2 | Stationeries (Questionnaire printing ) | Tshs | 50 | 1,000.00 | 50,000.00 |
| 3 | Secondary data (purchases of books, online desperation and thesis) | ls | anticipated |  | 100,000.00 |
| 4 | 1st Draft dissertation report production | ls | 1 | 150,000.00 | 150,000.00 |
| 5 | Final dissertation report printing & binding | ls | 1 | 250,000.00 | 250,000.00 |
|  | **Total** | | | | **600,000.00** |