AN ANALYSIS OF THE USE OF PROJECT FINANCE IN ZAMBIA INFRASTRUCTURE PROJECTS: THE CASE OF MAAMBA COLLIERIES

BY

KENNEDY MUSONDA

A dissertation submitted to the University of Zambia in partial fulfillment of the requirements for the award of the degree of Master of Engineering in Project Management

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DEDICATION

I dedicate my dissertation work to my mother, Ides Kapembwa Musonda, my wife Gwen Chilombo Chinyemba, and my daughters Kapembwa and Chansa Musonda whose inspiration and love enabled me to move on and compiled this work. There is no instrument I can use to measure the magnitude of love you have shown me.

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AUTHOR'S DECLARATION

I, Kennedy Musonda, hereby declare that the work herein is my own, that all the works of other persons used have been duly acknowledged, and that the work has not been presented at the university or indeed another institution for similar purposes.

Signature……

Date……

APPROVAL

The University of Zambia approves the dissertation of Kennedy Musonda as partial fulfillment of the requirements for the award of the degree of Master of Engineering in Project Management by the University of Zambia.

EXAMINERS' SIGNATURE:

Signature:……..

Date:……

Signature:……..

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ABSTRACT

Project Finance has been regarded as a one-stop-shop capable of addressing the gaps in infrastructure financing of most countries. In Zambia, much has been talked about regarding the need for the country to improve its infrastructure. Stakeholders in development have realized that infrastructure is an essential driver of competitiveness which is critical for ensuring the effective functioning of any economy and the country must have basic reliable infrastructure, among others; airports, road networks, railway lines, energy generation, and transmission installations, and telecommunication infrastructure. This research analyzed the use of project finance in Zambia's infrastructure projects using Maamba Collieries as a case study. This research adopted a qualitative approach and interviews were used as the data collection method from a total of twenty (20) key informants. Data was analyzed using thematic analysis. Hence, having explored the relevant body of literature, the targeted institutions included Maamba Collieries Limited as it used project finance in developing the power project, a deal described as the project finance deal of the year 2016, financial institution which was the source of long term debt financing, an investment promotion and facilitation agency, an energy regulatory body, a state energy utility company, and a unit responsible for Public-Private Partnerships (PPPs) as they all represent government a host to project finance deals. The research findings sufficiently supported the use of project finance to close Zambia's infrastructure gap. The experts who were interviewed had no doubt that project finance is an appropriate financing model to develop the country's infrastructure. The growth of project finance in Zambia is constrained by factors such as; the lack of financial resources dedicated to PPP projects, unclear guidelines and regulations to both authorities and the private sector, as well as inadequate expertise in areas such as economics, law and finance in the government departments Nevertheless, the findings of this research also revealed that the cornerstone of the success and continued use of project finance depends on political will and policy consistency.

***KEYWORDS**: Project Finance; Special Purpose Vehicle; infrastructure; Corporate Finance; Energy*

LIST OF ACRONYMS

ADB – Africa Development Bank

AU – African Union

BOO – Build-Own-Operate

BOT – Build Operate Transfer

BTO – Build-Transfer-Operate

ERB – Energy Regulations Board

GHG – Green House Gases

GDP – Gross Development Product

IPFA – International Project Finance Association

LDC – Least Developed Countries

MW – Megawatts

MCL – Mamba Collieries Limited

PIDA – Programme for Infrastructure Development in Africa

PPA – Power Purchase Agreement

PPP – Public-Private Partnership

SPV – Special Purpose Vehicle

WB – World Bank

ZCCM – Zambia Consolidated Copper Mines

ZDA – Zambia Development Agency

ZESCO – Zambia Electricity Supply Corporation

ZIMCO – Zambia Industrial and Mining Co-Operation

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CHAPTER ONE INTRODUCTION

1.1 Background

Investments in modern infrastructure lay the foundations for economic development and growth. Building roads, bridges, power transmission lines and other infrastructure create jobs. When completed, these projects help a society increase its wealth and its citizens' standard of living. Wood (2013) quotes Stephen Hayes, president of the Corporate Council on Africa, a group that promotes U.S.-Africa commercial ties, as saying "Sub-Saharan Africa is one region where infrastructure improvements can spark greater economic development. Many countries there suffer from underdeveloped road and rail systems, rudimentary and unstable electric grids, barebones water supply and sanitation systems, and congested ports and airports. Infrastructure is probably the single most important need for Africa to develop. The development of infrastructure is essential for the creation of a healthy, happy and thriving economic climate in communities. Future endorsements, successes and the enhancement of sustainable development rely on an efficient infrastructure programme within any given country".

Infrastructure is one of the cornerstones of a stable and productive society. Strategic investments in transport, housing, energy and communication infrastructure are essential to create a strong and competitive economy with good jobs and a high standard of living. A study by the Programme for Infrastructure Development in Africa (2012) on key regional projects, endorsed by the 2012 African Union (AU) Summit, estimates a need of US$ 68billion up to 2020 just for that particular list of projects in Africa. The need is particularly stark in light of rising populations and rapid urbanization on the continent. By addressing fully its infrastructure deficit, it is estimated that growth in Africa can be boosted on average by about 2% per annum.

Infrastructure is an input to a wide range of industries and as such, an important driver of long-term growth and employment creation as many laborers and skilled manpower will be required during and after construction. At the same time, delays in the realization of infrastructure projects pose potentially large economic and social costs. Projects which are realized are sometimes badly designed and cannot deliver the expected performance. In some emerging markets, the lack of well-performing

infrastructure holds back economic development. In addition, a lack of investment in well-designed transport, renewable energy, and commercial infrastructure is becoming more evident.

In Zambia, much is being talked about the need for the country to improve its infrastructure. This is because stakeholders in development have realized that Infrastructure is an essential driver of competitiveness which is critical for ensuring the effective functioning of any economy and the country must have a basic reliable infrastructure in terms of airports, road networks, railway lines, energy generation and transmission installations, and telecommunication infrastructure. The Zambia Development Agency (ZDA) (2014) further explains that Infrastructure serves as a central delivery mechanism in achieving sustainable economic development and in the generation of quality social-economic development in the country.

Infrastructure still remains a major challenge to growth, economic diversification and human development in Zambia. As such, Infrastructure development, is one of the Government's priority areas, and is upheld in both the Eighth National Development Plan (8^{th}NDP) and the Vision 2030. The aim is to achieve the availability of reliable and affordable public infrastructure services for sustained economic development. According to the World Bank (2010), Zambia needed to spend US$1.6 billion a year over the decade 2006-2015 to develop its infrastructure to the level found in the rest of the developing world. This would be equivalent to 20% of Zambia's GDP and it is about double the country's rate of investment in recent years. Further, Zambia's infrastructure funding gap was estimated at US$500 million per year (6.5% of GDP) for the ten years from 2006 to 2015. Closing the gap required raising more funds and looking for more effective ways to meet infrastructure targets, stated the report

To close the huge infrastructure gap, the previous government embarked on ambitious infrastructure spending that focused on almost all sectors – from transportation to telecommunication, from agriculture to education and indeed from administrative infrastructure to health. However, this ambitious infrastructure spending left the country in serious debt without achieving the targets. PricewaterhouseCoopers Zambia (2021) explains that Zambia's external debt ballooned under the former Patriotic Front (PF) Government, grew from around US$2 billion in 2011 to US$14.7 billion at the end of September,2021 a situation that had contributed significantly to

high poverty levels across the country. The debt included a US$750 million Eurobond that was due for repayment the following year. Government also owed K46.9 billion in domestic arrears as at the end of June,2021. The current government however, announced plans to cancel more than US$2 billion worth of projects financed by commercial loans to reduce the risk of accumulating more non-concessional debt.

One of the most popular forms of financing to infrastructure projects called **Project Finance** can be used by any country to avoid debt in its books. Project finance may take the form of financing the construction of a new capital installation, or refinancing of an existing installation, with or without improvements. In such transactions, the lender is usually paid solely or almost exclusively out of the money generated by the contracts for the facility's output, such as the electricity sold by a power plant. The borrower is usually a special purpose entity that is not permitted to perform any function other than developing, owning and operating the installation. The result is that repayment depends mainly on the project's cash flow and on the collateral value of the project's assets. Project financing is used to strike a balance between the need for sharing the risk of sizeable investments among multiple investors and the importance of effectively monitoring managerial actions and ensuring a coordinated effort by all project-related parties.

The significance of the study emanates from its objectives and the findings will provide timely insights to the policymakers on how project finance can be used in huge infrastructure projects in these times of reduced government revenue. The study further provides an opportunity for the current and future governments to replicate the use of project finance in procuring Mamba thermal plant in others sectors. Furthermore, the study will increase the awareness that project finance contributes towards economic growth and promote project finance as an alternative funding mechanism for infrastructure development in Zambia. In addition, the study acts as a basis for further study as it is an assessment, and facilitate the development of infrastructure in Zambia upon the acceptance of project finance as a preferred financing mechanism for infrastructure Zambia, Africa and beyond.

1.2 Problem Statement

Like many developing countries in the world, African countries face real economic growth, poverty and inequality challenges. To exacerbate these challenges, Zambia

also faces severe infrastructure backlogs. These infrastructure backlogs are not limited to the creation of new assets, but includes the upgrading, refurbishment and rehabilitation of existing infrastructure. World Bank (1994) reviewed the importance of infrastructure on productivity growth and pointed out that infrastructure might influence economic development through its impacts on economic growth, poverty alleviation, and the environment. Economies with adequate and efficient infrastructure services had higher productivity growth than those with lower and inefficient infrastructure services. In addition, Canning (1998) provided a dataset on physical infrastructure stocks such as roads, paved roads, rail lines, electricity-generating capacity, telephones, and telephone lines for 152 economies for 1950–1995, which contained descriptions from the annual database of physical infrastructure constructed. Telephones and paved roads had a significant impact on growth, while the others did not.

The Road Development Agency (2022) reports that infrastructure development remains a major challenge to growth, economic diversification, and human development in Zambia. Areas for development in this sector include investment in health, education, and water and sanitation; increased power generation capacity through upgrading and construction of new generation facilities and use of alternative energy sources; improving and expanding the rail network to reduce the burden placed on road infrastructure; and constructing additional inter-provincial and inter-district roads.

Financing of infrastructure will, therefore, have to be done using alternative funding mechanisms such as off-balance sheet or project finance models. The provision and financing of public infrastructure will also have to involve the private sector. It is therefore, cardinal to understand the role which project finance is, and can be playing in Zambia's infrastructure growth with the aim of promoting economic growth and development. Very little research exists on project finance in Zambia and the real impact that project finance has had on economic growth remains unclear. Although Kleimeier and Versteeg (2010) included some African countries in their study, a study on the effect of project finance on economic growth in African countries alone has not been done.

1.3 Research Objectives

Main Objective

The main objective of the research is to:

- analyse the use of project finance in Zambia infrastructure projects, using Maamba Collieries as a case study

1.4 Specific Objectives

The specific objectives include:

1. Assess the use of project finance in infrastructure delivery
2. Establish the factors that affect the growth of project finance
3. Identify the role of government and other stakeholders in promoting the use of project finance in Zambia
4. Establish success factors of project finance use in facilitating construction and operation of Maamba Collieries power plant

1.5 Research Questions

1. What is the current use of project finance in infrastructure delivery?
2. What factors affect the growth of project finance?
3. What role do the government and other stakeholders play in promoting the use of project finance in Zambia?
4. What are the success factors of project finance use, in facilitating the construction and operation of Maamba Collieries power plant?

1.6 Brief Research Methodology

The research systematically solved the research problem by using a qualitative approach. This implies that it was exploratory and non-experimental in design. The approach was arrived at after taking into account that information demand for each specific objective needed. As such, the approach investigated local knowledge and understanding of project finance, people's experiences, meanings and relationships, and social processes and contextual factors (such as social norms and cultural practices) that marginalise this type of financing. For an expert opinion, professionals from ZDA, PPP unit, ERB, ZESCO, Standard Chartered Bank, and Maamba Collieries were identified as key informants.

Semi-structured interviews were administered to the identified key informants to explore their thoughts, feelings, experiences, and beliefs about the topic, and to probe deeply into personal and sometimes sensitive issues. Furthermore, the participants and institutions chosen to take part in the study were purposively sampled. This sampling strategy placed group and individual participants according to preselected criteria relevant to a particular research question. For example, the study involves the Maamba thermal plant whose construction was funded by ABSA Bank, Standard Chartered Bank, and the Industrial and Commercial Bank of China, ERB issued the license whilst ZESCO signed an offtake agreement. The collected data was analysed thematically, a process that seeks to reduce and make sense of vast amounts of information, often from different sources, so that impressions that shed light on a research question could emerge.

1.7 Organization of the Study

The layout of the dissertation is as follows:

Chapter One covers the background of the study, statement of the problem of the study, general objective, specific objectives, research questions, the significance of the study, and organization of the study.

Chapter Two provides a review of literature that is relevant to the study undertaken.

Chapter Three discusses the research methodology employed in the collection and analysis of data. The subtitles in this chapter are research design, population, sample size, sampling procedure, data collection procedure, data analysis, and ethical consideration.

Chapter Four presents the research findings and discussions centered on the objectives of the study.

Chapter Five gives the conclusion of the study and recommendations based on the findings of the study.

1.8 Chapter one summary

The chapter gives a brief and initial overview of the general subject area for the research followed by the Problem Statement, the main objectives, the specific objectives for achieving the aims of the research and research questions based on

objectives. A brief of the research methodology and significance of the study have also been presented. The chapter also gives how the entire study report has been organised. Chapter two presents reviewed literature.

CHAPTER TWO LITERATURE REVIEW

2.1 Introduction

The previous chapter gave a background to the study, the problem statement, and the significance of the study. In addition to that, the specific objective, general objectives and research questions were outlined. To properly cover the scope of this research, this chapter probes several aspects of relevant literature bordering on the definition of project finance by different authors, history of project finance, characteristic features and structure of project finance deals, risks and mitigants involved in project financing. Furthermore, this chapter analyses project finance in terms of benefits, challenges, type of PPPs which can use project finance as a source of funding and its distinction from corporate financing. The chapter concludes with examples of how project finance has been used in some countries to deliver infrastructure.

2.2 Definitions of Project Finance

Davis (1996) describes Project Finance generally as the provision of funds for a single-purpose facility that generates the cash flow to repay the debt. Debt is secured by the project's assets and cash flows, not by the assets or general credit of the project's sponsors. It can be a non-recourse or limited recourse financing structure in which debt, equity, and credit enhancement are combined for the construction and operation, or the refinancing, of a particular facility in a capital-intensive industry.

In his definition, Davies states that funds are provided for the construction and operations of a single facility. The study used Maamba thermal plant as a case study, hence in Davis's definition, the thermal plant qualifies to be referred to as a single facility whose cash flows are used to repay debt. He further explains that cash flows and company assets are used to secure debt and not assets of project sponsors. This is in tandem with lenders of the Maamba thermal plant whose only hope of debt recovery lies in the cash flow of the power purchase agreement with ZESCO. Even though he has highlighted the capital-intensive nature of project finance, Davies has not elaborated on the duration of project finance projects.

According to Gatti (2008), Project Finance is the structured financing of a specific economic entity - the Special Purpose Vehicle (SPV), also known as the project company - created by sponsors using equity or mezzanine debt and for which the lender considers cash flows as being the primary source of loan reimbursement,

whereas assets represent only collateral. The SPV as described by Gatti is described in line with the study, is Maamba Thermal Plant, which is also the project company, created by Nava Bharat and Zambia Consolidated Copper Mines Investment Holdings who are project sponsors.

In addition to the above, the International Project Finance Association (IPFA) (2015) defines project financing as the financing of long-term infrastructure or industrial projects and public services based on a non-recourse or limited recourse financial structure, where by debt and equity are used to fund establishment and repayment is from the cash flows generated by the project.

IPFA adds one of project finance characteristic features to the definition by Davy and Gatti's: its long-term financial tenor. Further, debt and equity are mentioned as sources of capital.

Gardner and Wright (2011), define Project Finance as "the raising of finance on a Limited Recourse basis, to develop a large capital- intensive infrastructure project, where the borrower is a special purpose vehicle and repayment of the financing by the borrower will be dependent on the internally generated cash flows of the project".

Finnerty (1996) adds his voice with his explanation of Project Finance; Project financing may be defined as the raising of funds to finance an economically separable capital investment project in which the providers of the funds look primarily to the cash flow from the project as the source of funds to service their loans and provide the return of and a return on their equity invested in the project.' The terms of the debt and equity securities are tailored to the cash flow characteristics of the project. For their security, the project debt securities depend, at least partly, on the profitability of the project and the collateral value of the project's assets. Assets that have been financed on a project basis include pipelines, refineries, electric generating facilities, hydroelectric projects, dock facilities, mines, and mineral processing facilities. He further states that the term Project Financing is widely misused and perhaps even more widely misunderstood. To clarify the definition, it is important to appreciate what the term does not mean. Project financing is not a means of raising funds to finance a project that is so weak economically that it may not be able to service its debt or provide an acceptable rate of return to equity investors. In other words, it is not a means of financing a project that cannot be financed on a conventional basis.

Fight (2006) gives his views on project finance. He explains that the term features prominently in the press, more specifically concerning infrastructure, and public and private venture capital needs. The press often refers to huge projects, such as building infrastructure projects like highways, Eurotunnel, metro systems, or airports. It is a technique that has been used to raise huge amounts of capital and promises to continue to do so, in both developed and developing countries, for the foreseeable future. While project finance bears certain similarities to syndicated lending, there are a host of specific issues that mean that it is essentially a specialized discipline unto itself, effectively a discrete subset of syndicated lending.

Fight further states that Project finance is generally used to refer to a non-recourse or limited recourse financing structure in which debt, equity, and credit enhancement are combined for the construction and operation, or the refinancing, of a particular facility in a capital-intensive industry. Credit appraisals and debt terms are typically based on project cash flow forecasts as opposed to the creditworthiness of the sponsors and the actual value of the project assets. Forecasting is therefore at the heart of project financing techniques. Project financing, together with the equity from the project sponsors, must be enough to cover all the costs related to the development of the project as well as working capital needs.

The International Finance Corporation (IFC) of the World Bank Group (2020) contends that there are two basic types of project finance: nonrecourse project finance and limited-recourse project finance.

Nonrecourse project finance is an arrangement under which investors and creditors financing the project do not have any direct recourse to the sponsors, as might traditionally be expected (for example, through loan guarantees). Although creditors' security will include the assets being financed, lenders rely on the operating cash flow generated from those assets for repayment. Before it can attract financing, then, the project must be carefully structured and provide comfort to its financiers that it is economically, technically, and environmentally feasible, and that it is capable of servicing debt and generating financial returns that are commensurate with its risk profile. ***Limited-recourse project finance*** permits creditors and investors some recourse to the sponsors. This frequently takes the form of a pre-completion guarantee during a project's construction period, or other assurances of some form of support for the project. Creditors and investors, however, still look to the success of the project as

their primary source of repayment. In most developing market projects and other projects with significant construction risk, project finance is generally of the limited-recourse type.

The study adopted the definition of project finance by the International Project Finance Association. This is because it gives the broadest and more encompassing definition compared to the others given. Five aspects of project finance highlighted by IPFA include the following: Long-term tenor, a non-recourse or limited recourse financial structure, industrial projects or public services (SPV), debt and equity which are the sources of capital, and debt repayment based on generated cash flows.

2.3 History of Project Finance

Comer (1996:2) dates project financing techniques back to at least 1299 A.D. when the English Crown financed the exploration and the development of the Devon silver mines by repaying the Florentine merchant bank, Frescobaldi, with output from the mines. The Italian bankers held a one-year lease and mining concession that is they were entitled to as much silver as they could mine during the year. In this example, the chief characteristic of project financing is the use of the project's output or assets to secure financing.

Another form of project finance was used to fund sailing ship voyages until the 17th century. Investors would provide financing for trading expeditions on a voyage-by voyage basis. Upon return, the cargo and ships would be liquidated and the proceeds of the voyage split amongst investors. An individual investor then could decide whether or not to invest in the sailing ship's next voyage or to put the capital to other uses. In this early example, the essential aspect of project financing is the finite life of the enterprise. In corporate finance terms, we can also think of this mandatory liquidation as a fixed dividend policy. The idea of project finance predated the idea of permanent capital entrusted to a group of professional managers who would decide rather autonomously between paying dividends and reinvestment. Project financing has evolved through the centuries into primarily a vehicle for assembling a consortium of investors, lenders, and other participants to undertake infrastructure projects that would be too large for individual investors to underwrite. The more recent prominent examples of project finance structures facilitating projects are the construction of the Trans-Alaskan pipeline and the exploration and exploitation of the North Sea oil fields. In the late 1990s, the technique has become rather prevalent and is frequently

used to finance independent power plants and other infrastructure projects around the world as governments face budgetary constraint

2.4 Characteristic features of project financing

Comer (1996; 3) outlines and explains the following as characteristics of Project finance;

i. Capital-intensive. Project financings tend to be large-scale projects that require a great deal of debt and equity capital, from hundreds of millions to billions of dollars. Infrastructure projects tend to fill this category. A World Bank study in late 1993 found that the average size of project financed infrastructure projects in developing countries was the US $440 million. However, projects those were in the planning stages at that time had an average size of US $710 million.

ii. Highly leveraged. These transactions tend to be highly leveraged with debt accounting for usually 65% to 80% of capital in relatively normal cases.

iii. Long term. The tenor for project financings can easily reach 15 to 20 years.

iv. Independent entity with a finite life. Similar to the ancient voyage-to-voyage financings, contemporary project financings frequently rely on a newly established legal entity, known as the project company, which has the sole purpose of executing the project and which has a finite life "so it cannot outlive its original purpose. In many cases, the clearly defined conclusion of the project is the transfer of the project assets. For example, in a build-operate-transfer (BOT) project, the project company ceases to exist after the project assets are transferred to the local company.

v. Non-recourse or limited recourse financing. The project company is the borrower. Since these newly formed entities do not have their own credit or operating histories, it is necessary for lenders to focus on the specific project's cash flows. That is, "the financing is not primarily dependent on the credit support of the sponsors or the value of the physical assets involved." Thus, it takes an entirely different credit evaluation or investment decision process to determine the potential risks and rewards of a project financing as opposed to corporate financing. In the former, lenders "place a substantial degree of reliance on the performance of the project itself. As a result, they will concern themselves closely with the feasibility of the project and its sensitivity to the impact of potential adverse factors." Lenders must work with

engineers to determine the technical and economic feasibility of the project. From the project sponsor's perspective, the advantage of project finance is that it represents a source of off-balance-sheet financing.

vi. Controlled dividend policy. To support a borrower without a credit history in a highly-leveraged project with significant debt service obligations, lenders demand receiving cash flows from the project as they are generated. This aspect of project finance recalls the Devon silver mine example, where the merchant bank had complete access to the mine's output for one year. In more modern major corporate finance parlance, the project has a strictly controlled dividend policy, though there are exceptions because the dividends are subordinated to the loan payments. The project's income goes to servicing the debt, covering operating expenses, and generating a return on the investors' equity. This arrangement is usually contractually binding. Thus, the reinvestment decision is removed from management's hands.

vii. Allocated risk. Because many risks are present in such transactions, often the crucial element required to make the project go forward is the proper allocation of risk. This allocation is achieved and codified in the contractual arrangements between the project company and the other participants. The goal of this process is to match risks and corresponding returns to the parties most capable of successfully managing them. For example, fixed-price, turnkey contracts for construction which typically include severe penalties for delays put the construction risk on the contractor instead of the project.

viii. Costly. Raising capital through project finance is generally more costly than through typical corporate finance avenues. The greater need for information, monitoring, and contractual agreements increases the transaction costs. Furthermore, the highly-specific nature of the financial structures also entails higher costs and can reduce the liquidity of the project's debt.

ix. Many participants. These transactions frequently demand the participation of numerous international participants. It is not rare to find over ten parties playing major roles in implementing the project.

2.5 Structure and participants of the project finance deal

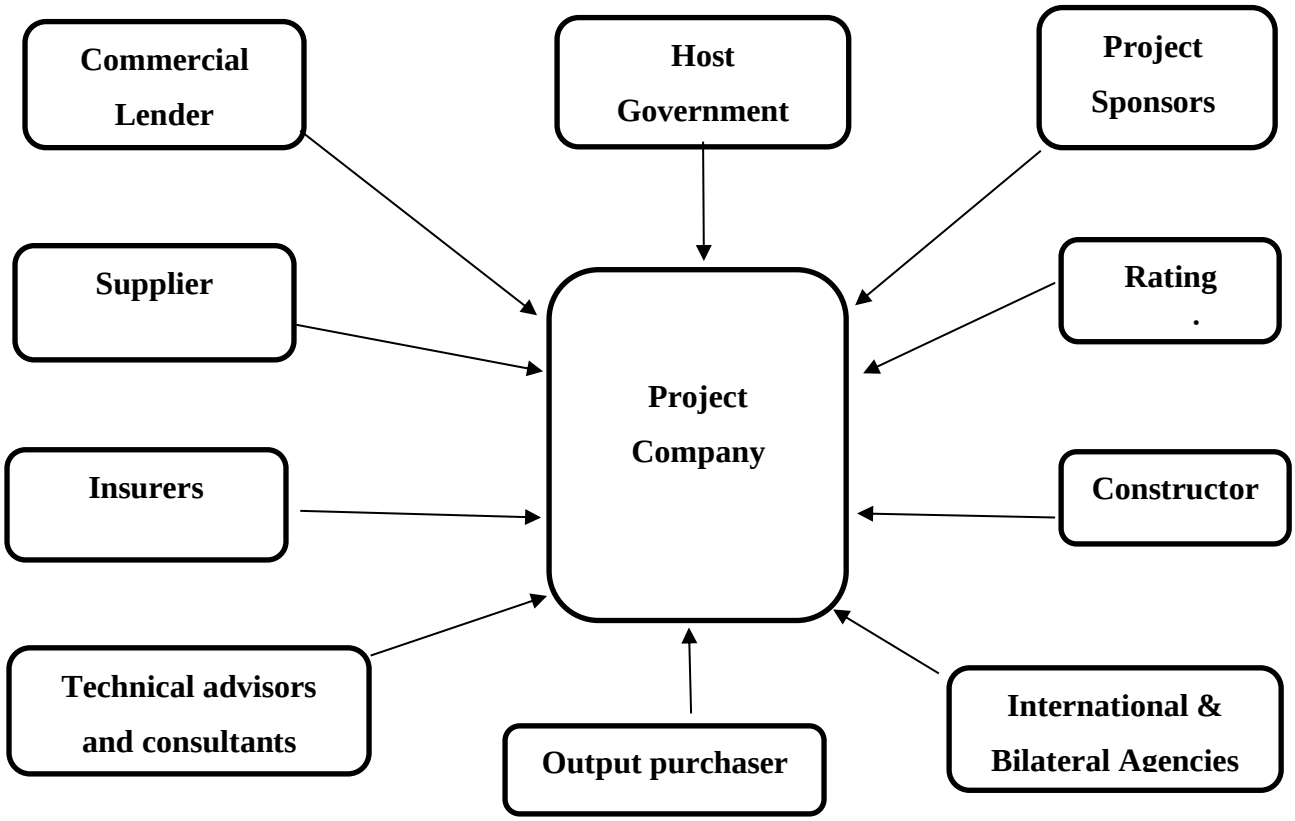

Figure 2.1 Structure and participants of a project finance deal

Source: Adapted from Hoffman (2008)

The project financing technique is a complex deal that invites a nexus of contracts with several stakeholders. Hoffman (2008), outlined the participants of the project finance as follows:

i. Project company - is the special-purpose entity that will own, develop, construct, operate and maintain the project. Sometimes the project company can also be the borrowing entity. However, in some deals, the project company may be different from the borrowing entity

ii. Project sponsor – is the entity, or group of entities, interested in the development of the project and that will benefit, economically or otherwise, from the overall development, construction, and operation of the project.

iii. Host government – is the government of the country in which the project is located. As such the host government is typically involved as an issuer of permits, licenses, authorizations, and concessions. It also might grant foreign exchange

availability projections and tax concessions. In some transactions, it is the borrower. The host government can be the owner of the project, whether majority or minority or can become the owner of the project at the end of a specified period, such as in a build-own-transfer structure. It might also be involved as an off-take purchaser or as the supplier of raw materials or fuel.

iv. Commercial lender – including banks, insurance companies, credit corporations, and other lenders, provides debt financing for projects. These institutions might be based in the host country or another country.

v. Supplier – the supplier provides raw materials, fuel, or other inputs to the project. Because of the importance of inputs to the project, the project sponsors and lenders are concerned with the underlying economic feasibility of supply arrangements, the economic terms of the contracts, and the ability of the supplier to perform the contracts.

vi. Insurers – insurance providers mitigate the risks inherent in project financings, whether casualty or political.

vii. **Technical advisors and consultants** – Technical advisors such as the financial advisor are retained by the project sponsor to provide financial advisory services to the sponsors (e.g., preparing the information memorandum, advice on the host country, currency concerns, structuring the transaction, and possible debt sources, etc.). Technical experts, such as fuel consultants, insurance consultants, engineers, and Environmental consultants are retained to advise the project sponsor and lenders on Highly technical matters, about which sponsors and lenders have limited knowledge or that they want to confirm.

viii. Output purchaser – is the purchaser of all or some of the products or services produced at the project. In most non-recourse and limited recourse project financings, the off-take purchaser provides the credit support for the underlying financing.

ix. International and Bilateral agencies – International or multilateral agencies include; the World Bank, the International Finance Corporation, regional development banks, and other international agencies that provide significant credit support for projects financed in developing countries. Unlike multilateral agencies, bilateral agencies are designed to promote trade or other interests of an organizing country. They are generally nationalistic in purpose and political in operation.

x. Contractor – is the entity responsible for the construction of the project. It bears the primary responsibility for the containment of construction-period costs.

xi. Rating agencies – when the projects are financed through access to public debt markets, rating agencies are consulted to provide credit ratings for the underlying debt.

2.6 Types of sponsors of a project finance deal

Different types of sponsors exist under project finance and they all have different objectives. Ghatti (2008) identifies the following types of sponsors:

i. Industrial sponsors, who see the initiative as upstream or downstream integrated or in some way as linked to their core business.

ii. Public sponsors (central or local government, municipalities, or municipalized companies) whose aims center on social welfare.

iii. Contractor/sponsors, who develop, build, or run plants and are interested in participating in the initiative by providing equity and/or subordinated debt

iv. Purely financial investors

2.7 Risks and mitigants involved in project financing

Project financing incurs a lot of risks, especially in developing countries with poor constitutionalism and weak democracies. Lenders are concerned with the safety of the huge sums of dollars usually involved in these gigantic projects. Project advisors have the task of identifying these risks and have assigned them to the party who is best suited to be responsible for controlling them. Table 2.1 outlines the risks and gives out mitigation measures.

Table 2.1 Risks types and mitigation measures

S/N	Risk type	Mitigation Measures
1	Country	Political risk insurance against force majeure events or allocating risk to the local company
2	Political	Political risk insurance as well as flexible tariff agreements that incorporate adjustments for these types of contingencies
3	Industry	Thorough industry analysis and insight into the industry's underlying dynamics

S/N	Risk type	Mitigation Measures
4	Project	The selection of contractors, developers, and operators who have proven track records
5	Customer	Off-take agreement, i.e., a contract which guarantees the purchase of the throughput
6	Supplier	Long-term agreements that guarantee that the project will have access to critical inputs for the duration of the project's life
7	Sponsor	carefully evaluating the project sponsor's track record with similar transactions
8	Contractor	Scrutinising the contractor, specifically the contractor's experience with similar projects, reputation in the field and cash flow
9	Operating	Allocate the risk to the operator through ccontracted incentive schemes
10	Product	Using older, tested designs and technologies
11	Competitor	Exclusive agreements, offtake agreements, and supply arrangements all contribute to defending a long-term competitive advantage
12	Funding	The choice of an experienced financial advisor as well as seeking capital from a broad range of sources represents two ways to mitigate this risk
13	Currency	Currency swap
14	Interest rate	Arranging for long-term financing at fixed rates mitigates the risk inherent in floating rates. Furthermore, projects can enter into interest rate swaps to hedge against interest rate fluctuations

S/N	Risk type	Mitigation Measures
15	Risk allocation	allocate the risks to the parties that are most suited to control and address the risks

Source: Comer (1996)

2.8 Benefits of using project financing in infrastructure delivery

Project finance helps finance new investment by structuring the financing around the project's own operating cash flow and assets, without additional sponsor guarantees. Thus, the technique is able to alleviate investment risk and raise finance at a relatively low cost, to the benefit of sponsor and investor alike. Thus, the technique is able to alleviate investment risk and raise finance at a relatively low cost, to the benefit of sponsor and investor alike. Though project finance has been in use for hundreds of years, primarily in mining and natural resource projects, its other possible applications—especially for financing large greenfield projects (new projects without any prior track record or operating history)—have only recently received serious attention. International Finance Corporation (IFC)(2020) highlights how beneficial the use of project finance is in infrastructure delivery by providing examples of project finance projects in Argentina,Hungary,China and Mozambique, which it funded and supported. The IFC records the following details on funded projects:

i. In Argentina, in 1993, project finance structuring helped raise US$329 million to finance investment in the rehabilitation and expansion of Buenos Aires' water and sewerage services based on a new 30-year concession awarded to Aguas Argentinas. The investment, financed with IFC support, has helped improve water quality and service to a city of more than 6 million people. At that time, private sector participation in a water concession in a developing country was an untested idea, and there was virtually no precedent for a private company operating in such an environment raising substantial resources in international capital markets.

ii. In Hungary, in 1994, project finance structuring helped finance a 15-year concession to develop, install, and operate a nationwide digital cellular network. The $185 million joint venture project was an important part of the government's privatization and liberalization program. Because of difficulty attracting commercial

financing at that time, the project relied heavily on $109 million in debt and equity financing from IFC and the U.S. Overseas Private Investment Corporation (OPIC).

iii. In China, in 1997, Plantation Timber Products (Hubei) Ltd. launched a $57 million greenfield project to install modern medium-density fibreboard plants in interior China, using timber plantations developed over the past decade, to support China's fast-growing construction industry. As part of the limited-recourse financing for the project, IFC helped arrange $26 million in syndicated loans, at a time when foreign commercial banks remained cautious about project financing in China's interior provinces.

iv. In Mozambique, in 1998, project finance structuring helped establish a $1.3 billion greenfield aluminium smelter. Mozal, the largest private sector project in the country to date, is expected to generate significant benefits in employment, export earnings, and infrastructure development. IFC fostered the project by serving as legal coordinator and preparing an independent detailed analysis of economic results and environmental and developmental impacts. IFC also supported the project with $120 million in senior and subordinated loans for its own account.

Yescombe (2002) adds to the long list of benefits of Project finance by outlining the following benefits:

i. Third-party due diligence: the public sector may benefit from the independent due diligence and control of the project exercised by the lenders, who will want to ensure that all obligations under the Project Agreement are clearly fulfilled and that other Project Contracts adequately deal with risk issues

ii. Transparency: as project financing is self-contained (i.e., it deals only with the assets and liabilities, costs, and revenues of the particular project), the true costs of the product or service can more easily be measured and monitored. Also, if the Sponsor is in a regulated business (for example power distribution), the unregulated business can be shown to be financed separately and, on an arm, -length basis via a project finance structure.

iii. Additional inward investment:for a developing country, project finance opens up new opportunities for infrastructure investment, as it can be used to create an inward investment that would not otherwise occur. Furthermore, successful project

finance for a major project, such as a power station, can act as a showcase to promote further investment in the wider economy.

iv. Technology transfer: For developing countries, project finance provides a way of producing market-based investment in infrastructure for which the local economy may have neither the resources nor the skills. Thenceforth, there are also skills transfers during project finance deals.

2.9 Challenges faced with Project Finance usage

For all its advantages, project finance cannot be said to offer a "free lunch." On the contrary, it has rigorous requirements. To attract such finance, a project needs to be carefully structured to ensure that all the parties' obligations are negotiated and are contractually binding. Benkovic and Milosavljevic (2017), caution that project financing does not result in less expensive capital under all conditions and in all projects, therefore the costs of contracting are also very important. It is those costs and the negative effects accompanying them that may prevail over all the advantages of the project financing. Therefore, some of the disadvantages of Project Financing are pointed out in Table 2.2.

Table 2.2 Disadvantages of Project Finance

S/N	Disadvantage	Description
1	Complexity of risk allocation	Project financings are complex transactions involving many participants with diverse interests. This results in conflicts of interest on risk allocation amongst the participants and protracted negotiations and increased costs to compensate third parties for accepting risks.
2	Increased lender risk	Since banks are not equity risk takers, the means available to enhance the credit risk to acceptable levels are limited, which results in higher prices. This also necessitates expensive processes of due diligence conducted by lawyers, engineers and other specialized consultants

S/N	Disadvantage	Description
3	Higher interest rates and fees	Interest rates on project financings may be higher than on direct loans made to the project sponsor since the transaction structure is complex and the loan documentation lengthy. Project finance is generally more expensive than classic lending because of: ➢ the time spent by lenders, technical experts and lawyers to evaluate the project and draft complex loan documentation; ➢ the increased insurance cover, particularly political risk cover; ➢ the costs of hiring technical experts to monitor the progress of the project and compliance with loan covenant; ➢ the charges made by the lenders and other parties for assuming additional risks.
4	Lender supervision	In order to protect themselves, lenders will want to closely supervise the management and operations of the project (Whilst at the same time avoiding any liability associated with excessive interference in the project). This supervision includes site visits by the lender's engineers and consultants, construction reviews, and mmonitoringing construction progress and technical performance, as well as financial covenants to ensure funds are not diverted from the project. This lender supervision is to ensure that the project proceeds as planned, since the main value of the project is cash flow via successful operation.
5	Lender reporting requirements	Lenders will require that the project company provides a steady stream of financial and technical information to enable them to monitor the project's progress. Such reporting includes financial statements, interim statements,

S/N	Disadvantage	Description
		reports on technical progress, delays and the corrective measures adopted, and various notices such as events of default.
6	Increased insurance coverage	The non-recourse nature of project finance means that risks need to be mitigated. Some of this risk can be mitigated via insurance available at commercially acceptable rates. This however can greatly increase costs, which in itself, raises other risk issues such as pricing and successful syndication.
7	Transaction costs may outweigh the benefits	The complexity of the project financing arrangement can result in a transaction whose costs are so great as to offset the advantages of the project financing structure. The time-consuming nature of negotiations amongst various parties and government bodies, restrictive covenants, and limited control of project assets, and burgeoning legal costs may all work together to render the transaction unfeasible.

Source :Flight(2006

2.10 Types of PPPs which can use project finance as a source of funding

Several acronyms are used in practice for the different types of concessions or contracts. Even though the same acronyms usually refer to different forms of contract, Yescombe (2002) identifies and explains the following types:

a) Build-Own-Operate-Transfer ("BOOT") projects

The Project Company constructs the project and owns and operates it for a set period, earning the revenues from the project in this period, at the end of which ownership is transferred back to the public sector. For example, the project company may build a power station, and own it for 20 years during which time the power generated is sold to an Offtaker (e.g., a state-owned electricity distribution company), and at the end of that time ownership is transferred back to the public sector.

b) Build-Operate-Transfer ("BOT") projects (also known as Design-Build Finance-Operate ["DBFO] projects)

In this type of project, the Project Company never owns the assets used to provide the project services. However, the Project Company constructs the project and has the right to e m revenues from its operation of the project. (It may also be granted a lease of the project site and the associated buildings and equipment during the term of the project-this is known as build-lease-transfer ("**BLT")** or build-lease operate-transfer **("BLOT").** This structure is used where the public nature of the project makes it inappropriate for it to be owned by a private sector company -for example, a road, bridge, or tunnel-and therefore ownership remains with the public sector.

c) Build-Transfer-Operate ("BTO") projects

These are similar to a BOT project, except that the public sector does not take over the ownership of the project until construction is completed.

d) Build-Own-Operate ("BOO") projects

These are projects whose ownership remains with the Project Company throughout its life-for example, a power station in a privatized electricity industry or a mobile phone network. The Project Company, therefore, gets the benefit of any residual value in the project. (Project agreements with the private sector also normally fall into this category.)

2.10.1 Differences between Project Finance and Corporate Financing

Comer (1996) tabulates(Table 2.3) the major differences between project financing and direct financing (Corporate Financing).

Table 2.3 Differences between project finance and corporate financing

DIMENSION	CORPORATE FINANCE	PROJECT FINANCE
Financing vehicle	Multi-purpose organization	Single-purpose entity
Type of capital	Permanent on the indefinite time horizon for equity	Finite-time horizon marches the life of the project

DIMENSION	CORPORATE FINANCE	PROJECT FINANCE
Divided policy and re-investment decision	Corporate management makes decisions autonomous from investors and creditors	Fixed divided police immediate parent; no reinvestment allowed
Capital investment decision	Opaque to creditors	Highly transparent to creditors
Financial structures	Easily duplicated; common forms	Highly tailored structures which cannot severally be re-used
Transaction costs for finance	Low cost due to competition from providers, routinized mechanism, and start to turn doctrines	Relatively higher cost due to documentation and larger sensation period
Size of financing	Flexible	Might require critical mass to cover high transaction casks
Basic for credit evaluation	Overall financial health at corporate enlists forms on the balance sheet and cash flow	Technical and economic feasibility, forms on project's assets, cash flow, and construction management
Cost of capital	Relatively lower	Relatedly higher

Source: Comer (1996

2.10.2 Global use of project finance in infrastructure delivery

The growth of project finance over the years, from the 1990s has been driven mainly by the worldwide process of deregulation of utilities and privatization of public sector capital investment. This has taken place both in the developed world as well as developing countries. It has also been promoted by the internationalization of

investment in major projects: leading project developers now run worldwide portfolios and are able to apply the lessons learned from one country to projects in another, as are their banks and financial advisers. Governments and the public sector generally also benefit from these exchanges of experience. Kwaku and Mawutor (2014) explain that in 2010 alone, Russia, Brazil, China and India have signed over 200 non-recourse finance deals worth over $130 billion. With the aid of project financing, Brazil financed the construction of Jirau Hydroelectric dam estimated at $5.4 billion in 2007. Similarly, India had accessed funds through project finance to develop the Mumbai metro 2 and the 3960mw Krishanpatnam Ultra Mega Power Plant at an estimated cost of $3.6 Billion. Taiwan's $13 billion high speed railway linking 345 km is one of the world's largest project finance schemes. In whole, the specific regions in the continent (Africa, Europe, Asia, Pacific and the Middle East) have benefited tremendously from project finance. Table 2.4 shows the value of projects financed through project finance schemes globally as at the end of the period 2010 and the corresponding percentage values of all projects finance in 2010

Table 2.4 Regional allocation of project finance transactions

REGION	Value in 2010 (US$ Million)	PERCENTAGE (%)
Americas	25,534.50	12.27
Asia Pacific	98,708.30	47.42
Europe/Middle East&Africa	83,931.20	40.32
Grand total	208,173.90	100.00

Source: Thompson Reuters Project Finance International (2010)

2.10.3 Sectoral structure of the global project financing market

Kwaku and Mawutor (2014), further categorise contribution of project finance in the stated regions in each sector. They highlight the energy and power sector as highly predominant. Sectorial contribution of project finance globally is given in Table 2.5.

Table 2.5 global sectorial representation of project finance

	2015		2016		2017		2018		2019	
Sectors	Volume, million, US $	%	Volume, million, US $	%	Volume, million, US $	%	Volume, million, US$	%	Volume, million, US$	%
Power	106.8	38.5	136152	50.9	122813	53.5	137628	48.7	78619.1	43.2
Oil & Gas	56.1	20.2	45992	17.2	37665.2	16.4	54068.8	19.1	44131	24.3
Transportation	62.8	22.6	46085.3	17.2	42359.2	18.5	50513.7	17.9	25493.9	14
Petrochemicals	13.4	4.8	14485.2	5.4	2072.9	0.9	3536.7	1.3	12183.9	6.7
Leisure & Property	10.4	3.8	8221.1	3.1	9051.5	3.9	13288.2	4.7	6203.5	3.4
Industry	12.1	4.4	6752.5	2.5	7198	3.1	2704.9	1	976.4	0.5
Mining	8.7	3.2	4213.5	1.6	3992.8	1.7	7632	2.7	7277.8	4
Water & Sewerage	6.1	2.2	3371.1	1.3	1707.9	0.7	4789.6	1.7	3441.1	1.9

	2015		2016		2017		2018		2019	
Sectors	Volume, million, US $	%	Volume, million, US $	%	Volume, million, US $	%	Volume, million, US$	%	Volume, million, US$	%
Telecommunications	0.8	0.3	1302.5	0.5	2408.2	1.1	7390.8	2.6	3352	1.8
Waste & Recycling	0.3	0.1	851.1	0.3	285.8	0.1	1132.5	0.1	168.1	0.1
Total	**277.5**	**100**	**267416.1**	**100**	**229638.2**	**100**	**282685**	**100**	**181847**	**100**

Source: Mayorova (2019)

Mayorova (2019) tabulated and narrates that in 2015 the largest share of the volume of project financing agreements belonged to the power. sector which further strengthened its leading position, reaching a share of 53.5% in 2017. However, in 2018 and during the first 9 months of 2019, there was a tendency towards the reduction of the share of the sector, while the volume of financed projects in the power sector still continued to grow. A significant share of the world market belongs to the industry of oil and gas production and processing, however this indicator gradually decreased from year to year: in 2015 - 20.2%, in 2016 - 17.2%, in 2017 - already 16.4%. Mayorova, further explains that the situation changed in 2018, when the volume of financing of such projects increased from 37,665.2 USD to 54,068.8 million USD. Its competitor, the transportation industry, also has a high share of project financing in the world, but its fluctuations are not one-sided: whereas in 2016 it decreased to 17.2%, in 2017 this figure increased by 1.3 percentage points, declined again by 0.6 percentage points in 2018 (although project financing volume increased). The rest of the industries are not significant in the global project financing market, as their share did not exceed 5.2% during the years covered under analytical review. However, it is necessary to note a sharp decline in project financing within the petrochemical industry from 5.4% to 0.9% in 2017. The sector of waste and recycling, which in 2017-2019 amounted to only 0.1%, traditionally constituted the smallest share of the project financing market.

To support Mayorova's findings, World Bank (2011) explains that the key reason for this attraction of most PPPs by the energy sector is due to shorter gestation periods of energy projects coupled with lower construction risk. Additionally, energy projects also tend to have greater revenue visibility in the form of contracted revenues through power purchase agreements, making them even more attractive. Furthermore Public-Private Partnership (PPP) has become the most valuable instrument for green energy projects financing. It overcomes the shrinkage of available public financial resources and makes it possible for the development of energy infrastructures. Cooperation between private and public actors is often pivotal in green energy investment decisions, since through cooperation parties compensate each other to their mutual advantage by sharing risk: the private sector needs guarantees to face the policy and the financing risks entailed by the time gap between a project's planning phase and its

actual implementation, whereas the public sector needs capital investment and management expertise.

2.10.4 Contribution of the research to literature

The research is aimed at closing the knowledge gap identified in Section 1.8. In closing the gap, the study consulted a lot of literature. Table 2.6 summaries the key literature consulted and reviewed.

Table 2.6 Content Analysis of Key literature reviewed

S/N	Author	Objectives	Methodology	Conclusion	Comments, critique (if any)
1	Davis (1996)	To introduce some of the aspects of project finance	Literature Review	An important aspect of Project finance debt is non-recourse or limited recourse	Even though he has highlighted the capital-intensive nature of project finance, Davies has not elaborated on the length of project finance projects.
2	Gatti (2008)	To introduce some of the aspects of project finance	Literature Review	Project finance is the structured financing of a specific economic entity - the Special Purpose Vehicle (SPV), also known as the project company	The SPV Gatti describes in line with the study is Maamba Thermal Plant, also the project company, created by Nava Bharat and Zambia Consolidated Copper Mines Investment Holdings, project sponsors. He further states the source of loan reimbursement as cash flows from the SPV making his definition closer to Davis's.

S/N	Author	Objectives	Methodology	Conclusion	Comments, critique (if any)
3	International Project Finance Association (IPFA) (2015)	To introduce some of the aspects of project finance	Literature Review	Inclusion of long-term financial tenor to Davis and Gatti's project finance definition. Not only had that but debt and equity which are the sources of capital also mentioned.	The study adopted the definition of project finance by the International Project Finance Association. This is because it gives the broadest and more encompassing definition compared to the others given. Five aspects of project finance highlighted by IPFA include the following: Long-term tenor, a non-recourse or limited recourse financial structure, industrial projects or public services (SPV), debt and equity which are the sources of capital, and debt repayment based on generated cash flows.

S/N	Author	Objectives	Methodology	Conclusion	Comments, critique (if any)
4	Gardner and Wright (2011)	To introduce some of the aspects of project finance	Literature Review	Finance raised on a Limited Recourse basis	Other authors argue that financing is on either a non-recourse or limited recourse basis.
5	Fight (2006)	To introduce some of the aspects of project finance	Literature Review	It is a technique that has been used to raise huge amounts of capital and promises to continue to do so, in both developed and developing countries, for the foreseeable future.	The author has not documented any information about project finance projects in developing countries.
6	International Finance Corporation (IFC)(2020)	To introduce some of the aspects of project finance	Literature Review	Clearly states the two basic types of project finance: nonrecourse project finance and limited-recourse project finance	The definition has added light to the study though could not state how long a project finance deal takes.
7	**Comer** (1996)	History of Project Finance	Literature Review	Project financing techniques back to at least 1299 A.D. when the English Crown financed the exploration and the development of the Devon silver mines	The author provided a clearly documented history of project finance. The information contained in this book can be used for further

S/N	Author	Objectives	Methodology	Conclusion	Comments, critique (if any)
				by repaying the Florentine merchant bank, Frescobaldi, with output from the mines.	research on the history of project finance.
8	Comer (1996)	To outline the characteristic features of project finance	Literature Review	Ten project finance characteristic features were outlined	The information provided lays a firm foundation on which project finance deals can be done
9	Hoffman (2008)	To analyse the Structure and participants of a project finance deals	Literature Review and Interviews	Eleven participants in the project finance deals were identified.	The identified participants in the literature were in tandem with the ones who took part in the Maamba thermal Plant Project and provides guidance for future deals.
10	Ghatti (2008)	To provide a list of the types of project finance sponsors in existence	Literature Review	The research revealed that three types of sponsors exist for any project finance deal, and these are: **Industrial sponsors**- who see the initiative as upstream or	Ghatti (2008) has not provided an explanation of roles the Purely financial investors play in sponsoring project finance deals.

S/N	Author	Objectives	Methodology	Conclusion	Comments, critique (if any)
				downstream integrated or in some way as linked to their core business, **public sponsors-**(central or local government, municipalities, or municipalized companies) whose aims center on social welfare **Contractor/sponsors-** who develop, build, or run plants and are interested in participating in the initiative by providing equity and/or subordinated debt and **purely financial investors**	
11	Comer (1996)	To outline the risks in project finance projects and mitigation measures	Literature Review	15 risks in project finance projects were outlined and mitigation measures were equally stated.	Comer (1996) provides a comprehensive outline of risks likely to be encountered in project finance deals.

S/N	Author	Objectives	Methodology	Conclusion	Comments, critique (if any)
12	International Finance Corporation (IFC)(2020)	To highlight the benefits of using project financing in infrastructure delivery	Literature Review	A detailed account on how the IFC raised millions of dollars for project finance projects in Argentina, Hungary, China, and Mozambique has been given.	The IFC only gave benefits of project finance use in relation to the projects it supported in the four countries.
13	Yescombe (2002)	To highlight the benefits of using project financing in infrastructure delivery	Literature Review	Four significant benefits of project finance use are- i.Third-party due diligence ii. Transparency iii. Additional inward investment iv. Technology transfer	Yescombe (2002) conclusively stated the benefits of project finance use applicable to any project.
14	Benkovic and	To identify the challenges faced	Literature Review	Project financing does not result in less expensive capital under all conditions	The authors magnified cost as the most significant challenge in project

S/N	Author	Objectives	Methodology	Conclusion	Comments, critique (if any)
	Milosavljevic (2017)	with project finance usage			finance use as other cost were not highlighted.
15	Flight(2006)	To identify the challenges faced with project finance usage	Literature Review	Seven(7) disadvantages and explanations which can prove as challenges for project finance use have been outlined	The author provides insights on the challenges encountered when using project finance and this lays a foundation for more research on the matter
16	Yescombe (2002)	To identify the types of PPPs which can use project finance as a source of funding	Literature Review	Four types of project contracts under PPPs that can be funded through project finance are; build-own-operate-transfer ("boot") projects build-operate-transfer ("bot") projects (also known as design-build finance-operate ["dbfo] projects)	The main types of concession agreements have been stated

S/N	Author	Objectives	Methodology	Conclusion	Comments, critique (if any)
				build-transfer-operate ("bto") projects build-own-operate ("boo") projects	
17	Comer (1996)	To differentiate project finance from corporate financing	Literature Review	Nine dimensions on which project finance differs from corporate finance were stated	The author has not concluded which financing model is better than the other based on the dimension compared.
18	Kwaku and Mawutor (2014)	To prove the global use of project finance in infrastructure delivery	Literature Review	Examples of projects funded through project finance from different continents given	The author provided a detailed project finance transaction to prove its global use in infrastructure delivery.
19	Mayorova (2019)	To tabulate the global sectorial representation of project finance	Literature Review	Ten sectors received project finance financing as at 2019	The author established that climate change made the power sector attract the most project financing and this

S/N	Author	Objectives	Methodology	Conclusion	Comments, critique (if any)
					was supported by the World Bank (2011)

2.10.5 Summary of Chapter two

This chapter reviewed literature on the financing technique called project finance. In order to properly cover the scope of this research, this chapter started by stating how different authors define project finance. History of project finance, characteristic features and structure of project finance deals, risks and mitigants involved in project financing were later discussed. The chapter went on to analyse project finance in terms of benefits, challenges, type of PPPs which can use project finance as a source of funding and its distinction from corporate financing. The chapter concluded with examples of how project finance is used in some countries to deliver infrastructure as shown in Table 2.5. Chapter three discusses the methodology.

CHAPTER THREE METHODOLOGY

3.1 Introduction

Wellington (2015) quotes the definition of Methodology from the Shorter Oxford English Dictionary as the 'science of method' or, more historically, as 'treatise on method'. His own interpretation of methodology is this: ''*the activity or business of choosing, reflecting upon, evaluating and justifying the methods you use. No one can assess or judge the value of a piece of research without knowing its methodology"*. Thus, the aim of methodology is 'to describe and analyse methods, throwing light on their limitations and resources, clarifying their suppositions and consequences, relating their potentialities to the twilight zone at the frontiers of knowledge. This chapter presents the methodology of this study in terms of its design, sources of data, data collection methods, description of the study population and sample size, as well as data analysis

3.2 Research Design

Oppenheim (1966) defines research design as a programme to guide the research in collecting, analyzing and interpretation of observed facts. This research is a non-experimental design and specifically an exploratory study on the different aspects of project finance. The study can also be considered cross sectional because the investigation took place at one point in time and the information collected was both retrospective and current at the time. This study mainly employed a qualitative approach because this approach was able to provide an in-depth understanding on the research topic. Detailed information was needed on each of the specific objectives, hence the use of qualitative approach. In addition, a desk review was incorporated in order to get further details on how project finance was used in construction of Maamba Collieries power plant.

3.3 Source of Data

Some of the information on the use of project finance in Zambia's infrastructure projects was from reading materials, especially those on project management, finance and economics. The main sources of data were the key informants from ZDA, ZESCO, ERB, PPP unit, Standard Chartered Bank, and Maamba Collieries Limited. In addition, a desk review provided literature on the execution of the Maamba Collieries power plant.

3.4 Data Collection Methods

Fellows and Liu (2008) argue that an interview is considered as an effective way of generating unbiased responses from interviewees in exploratory researches. The responses generated are usually consequent upon the interview-format adopted; unstructured, semi-structured or structured. This research is conducted using Semi-structured interviews. According to Dawson (2007), semi-structured interviewing is perhaps the most common type of interview used in qualitative social research. In this type of interview, the researcher wants to know specific information which can be compared and contrasted with information gained in other interviews. To do this, the same questions need to be asked in each interview. However, the researcher also wants the interview to remain flexible so that other important information can still arise. For this type of interview, the researcher produces an interview schedule. This may be a list of specific questions or a list of topics to be discussed. This is taken to each interview to ensure continuity. Three different interview schedules were produced for this study.

3.5 Description of Study Population

Population is the entire set of a well defined group. Nachmias and Nachmias (1981) define population as the aggregate of all cases that conform to some designate set of specifications and a sample is defined as a subset of the entire population.

In this research, interviews were conducted mainly with key respondents from the selected institutions who provided relevant information in relation to project finance in Zambia. The institutions included Zambia Development Agency (ZDA), Energy Regulation Board (ERB), Zambia Electricity Supply Cooperation (ZESCO), Standard Chartered Bank Zambia, Public Private Partnership (PPP) unit and Maamba Collieries. These institutions were selected for their specialized knowledge and experience in handling the Maamba thermal Plant which was funded through project finance. The respondents had at least three years' experience in their positions, which include; Cooperate Affairs Manager, Operations Manager, Engineer, Infrastructure Development Specialist, Economist, Director of Investment Promotion and Investment Banking Director.

3.6 Sampling Procedure and Sample Size

Sampling is the process of selecting units (e.g., people, organizations, and time periods) from a population of interest, studying these in greater detail and then

drawing conclusions about the larger population to study them in greater detail. Different types of sampling exist but this research adopted purposive sampling. Patton (2001) notes that purposeful sampling is a technique widely used in qualitative research for the identification and selection of information rich cases for the most effective use of limited resources. Units are selected based on one or more predetermined characteristics and the sample size can be as small as one (n=1). In addition to knowledge and experience, Bernard (2002) and Spradley (1979) explain the importance of availability and willingness to participate, and the ability to communicate experiences and opinions in an articulate, expressive, and reflective manner.

This study used purposive sampling to pick out institutions and key informants from the selected institutions, whose positions made them ideal for meeting the objectives of the study. These respondents were not only purposively sampled, but also conveniently selected due to proximity and availability to take part in the study. Furthermore, the number of respondents chosen interview were good enough to prevent data saturation. A total of twenty (20) key informants were interviewed, and these represented the following institutions; ZDA, ERB, ZESCO, Standard Chartered Bank Zambia, PPP unit, and Maamba Collieries. The institutions were selected based on their participation in the construction of coal-fired power plant at Maamba Collieries.

3.7 Data Analysis

According to Schwandt (2003), data analysis is a practice in which raw data is ordered and organised so that useful information can be extracted from it or it is a process of evaluating data using analytical and logical reasoning to examine each component of the data provided. Qualitative data analysis is the process of examining and interpreting qualitative data to understand what it represents. Qualitative data is defined as any non-numerical and unstructured data; when looking at customer feedback, qualitative data usually refers to any verbatim or text-based feedback such as reviews, open-ended responses in surveys, complaints, chat messages, customer interviews, case notes or social media posts. The analysis of data was carried out using thematic analysis. The data were first transcribed, and then grouped in themes. Analysis and interpretation were done theme by theme, picking on the common

responses among the interviewees. The thematic areas for data analysis were guided or picked based on the objectives of the study.

3.8 Ethical Consideration

The Belmont Report (1979) identifies three basic ethical principles of research as; Respect for persons, Beneficence and Justice. All of the three ethical guidelines and principles were taken into account when conducting this research. The full details of the purpose of the study were made available to all respondents and verbal consent was obtained from respondents. In addition, respondents were informed that the interview would be recorded, however if they felt uncomfortable with that, notes would be taken instead. Before commencement of the interview, respondents were also assured of anonymity and confidentiality.

3.9 Summary of Chapter three

This chapter looked at the methodology. It thus discussed the research design, data sources, data collection methods, population, sample and sampling procedure, and data analysis. The chapter also described how ethical considerations were tackled.

The next chapter presents findings and discussions.

CHAPTER FOUR FINDINGS AND DISCUSSION

4.1 Introduction

This section presents the findings from the study. Thematic analysis was used to come up with different themes in relation to the use of Project Finance in Zambia infrastructure projects – the case of Maamba Collieries.

4.2 Use of project finance to close the infrastructure gap-the Zambian case

In order for Zambia to close the infrastructure gap, most of the respondents mentioned that project finance would be one of the most ideal ways to go about it; especially recognizing the government's suggestion to reduce expenditure. One of the respondents specified that, *"Zambia's economy is on the recovery route and the Minister of Finance has been emphasizing on cutting expenditure in all sectors of the economy, hence project finance can be used as an alternative source for financing and help in eradicating Zambia's infrastructure backlog*." Further, another responded reported that, *"Zambia has a huge infrastructure gap which cannot be closed by Ministry of finance funding…GRZ has serious liquidity problems and the little money available is needed by many social sectors leaving little for infrastructure growth."*

4.2.1 Findings

The importance of using project finance to close the infrastructure gap in Zambia as mentioned by respondents as summarized as follows;

- Project finance enables government to make savings and boost its reserves
- It reduces risks in investing in infrastructure projects hence government can take on huge projects
- It brings about technological transfer and use of private sector expertise
- It enhances transparency in the procurement or public goods and bidding process of contractors

With regards to reduction in risk of investing in infrastructure, one respondent explained that, *"… it would not jeopardize the financial standing of any sponsor, as risks will be allocated among a number of sponsors, hence making it possible to undertake huge high risk infrastructure projects."* The aspect of technological transfer and use of private sector was used in an example, *"The contractor who was engaged to construct Maamba thermal plant trained a number of young engineers from the local institutions."* – Respondent. Finally, an observation was made,

"Procurement of public goods has been labeled as highly corrupt as tenders are awarded to underserving bidders at the expense of a poor tax payer. Project sponsors … select a renowned formidable contractor who can execute the works to a required standard on an agreed schedule." This in turn enhances transparency.

4.2.2 Discussion

It is important for Zambia to use project finance in the process of closing the infrastructure gap. This study finds that project finance would not only enable the government to make savings and boost its reserves, but government can also take on huge projects because it reduces risks in investing in infrastructural projects. Karikari (2015), Wang (2012), and Kleimeier and Versteeg (2010) also found similar importance of project finance as further explained that its use freed up public funds due to the reduction in operation cost as there was transfer of risk to the private sector. With a reduction on operation cost and more funds available, government can be able divert funds to other infrastructural projects and this can contribute to the development of the country. This study also reveals that project finance brings about technological transfer and use of private sector expertise. Similarly, Karikari (2015) reported that project finance leads to harnessing the expertise, innovation and experiences of the locals as the newly acquired infrastructure can be used for future development. Interestingly, at the Maamba power plant, local engineers were trained on a number of things with regards to construction, management and utilization of the power plant hence the transfer of skills and technology to the local experts. Participants in this study also suggested that in Zambia, project finance also enhances transparency in the procurement or public goods and bidding process of contractors. It is therefore evident that project finance is important for Zambia to close the infrastructure gap.

From the literature, it is encouraging to find that project finance is being used world over to deliver infrastructure. This financing technique benefits both the developed and undeveloped regions in infrastructure delivery. The International Finance Corporation (ibid) confirms this by explaining that, in the past twenty years there has been a new wave of global interest in project finance as a tool for economic investment. Project finance helps finance new investment by structuring the financing around the project's own operating cash flow and assets, without additional sponsor guarantees. Thus, the technique is able to alleviate investment risk and raise finance at a relatively low cost, to the benefit of sponsor and investor alike. Though project

finance has been in use for hundreds of years, primarily in mining and natural resource projects, its other possible applications—especially for financing large greenfield projects have only recently received serious attention.

4.3 Factors that affect the growth of project finance in Zambia

It is revealed from the interviews that there are a number of factors that constrain the growth of Project Finance in Zambia. However, institutions or companies that are involved in these agreements may have their own challenges that may be different from the main challenges at national level.

4.3.1 Findings

The following are the challenges gathered from respondents;

- Lack of financial resources dedicated to PPP projects
- Political interference and policy inconsistencies between governments
- Lack of political will to promote private financing, as it merely ends in political rhetoric
- Guidelines and regulations are not clear to both authorities and the private sector
- Decision making is usually slow
- Government bureaucracy prolongs contracts
- Most government department have inadequate expertise capacity in economics, law, finance and so on

With regards to political interference, one respondent amplified, *"... for example, concession agreements for Kasumbalesa Border Post between ZRA and Baran Trade and Investment Limited was cancelled in 2012. The agreement was later on restated or restored."* Another respondent mentioned that, *"When politicians want to gain political millage, they usually say what people want to hear. They may claim to do everything in their power to support PPP but that usually that just ends in political rhetoric."* To explain the aspect of inadequate expertise in government departments, a respondent said, *"Project financing are usually technical high-risk undertakings in need of expertise in law, finance, economics and so on. Most governments departments lack capacity in these fields."*

In addition to that, given the complexity of the process and the large sums of money at stake, project financing is a document-intensive process and project finance lawyers

play a crucial role in managing that process. In many ways the legal skills required to close a project finance transaction are often as much to do with process management as legal analysis and drafting. As it is not unusual for a project's sponsors, lenders and advisers to be based in different jurisdictions across differing time-zones, keeping on top of the complex set of documents required for the closing of a project financing can be a significant undertaking and it is important that the lawyers work together to ensure that signing arrangements do not become overly complex or contingent. Unfortunately, the research finds inadequate expertise in economics, law, finance and so on, in most government departments, hence this factor also affects growth of project finance in Zambia.

From the literature, the study finds other factors that limit project finance growth in other jurisdictions. The factors include civil unrest, guerrilla sabotage of projects, work stoppages, any other form of force majeure, exchange controls, monetary policy, and inflationary conditions

4.3.2 Discussion

A number of factors that affect the growth of project finance are identified in this study. Lack of political will to promote private financing as well as political interference and policy inconsistencies between governments were among the identified constraints to growth of project finance in Zambia. Kleimeier and Versteeg (2010) also noted that a problem that can arise in LDCs is political (or sovereign) risk, a cost that is especially difficult to deal with. Politics may be a threat to growth of project finance because changes in government for example, may affect continuation of a project that was started by another government (Jamali, 2004). This study also finds that guidelines and regulations on project finance were not clear to both authorities and the private sector. This consequently slows down the decision-making process. In addition, most government department in Zambia have inadequate expertise capacity in economics, law, and finance and so on. Similarly, Kleimeier and Versteeg (2010) also found that the public sector was often considered too inefficient as it lacked the managerial capabilities to design, build, and operate such complex projects, this constrains growth of project finance in LDCs. Despite the existence of constraints to growth of project finance in Zambia, Maamba Collieries Limited did not have significantly big challenges in using project finance to facilitate the power

plant project. The government and ERB contributed to the processes of the project in their respective expectations.

4.4 Zambian government's role in promoting project finance

It is gathered from respondents that the government of Zambia approved a Policy Framework for the implementation of PPPs in 2008. This policy framework was a vital step because it provided that there had to be institutional structures that would be responsible for ensuring that PPPs were done in a structured manner. In the following year, the PPP Act No. 14 of 2009 was enacted in parliament.

4.4.1 Findings

The government, through ERB facilitates the issuance of the Investment Endorsements. *"An Investment Endorsement is a document that guarantees a developer that a license will be issued by ERB upon completion of the project subject to meeting the prescribed conditions,"* – Respondent. In addition, ERB allows the sale of power produced by the PPP Company at a cost reflective tariff to an off taker which is ZESCO. This is important because it enables the SPV to meet its loan or debt obligation as it breaks even.

It was suggested that another way the government can promote the use of project finance is by providing tax holidays on profits and dividends for investors. This was evident from the Maamba Power Plant project where a respondent mentioned that, *"...we were given a five-year tax holiday on profits and dividends."*

Training technocrats to ensure that all relevant skills are available in processing and implementing of a project finance deal is an important role for the government its stakeholders. *"In addition to that GRZ is training technocrats like lawyers, economist, accountants and so on, so as to equip them with necessary skills to hand large PPP contracts,"* – Respondent.

The government can also promote project finance by facilitating immigration for experts from other countries who come to work on projects in the country. *"Government has offered a free facilitation immigration of experts from other countries required during the construction and operation of the plant [Maamba Power Plant],"* – Respondent.

4.4.2 Discussion

The central governments need to play critical roles in ensuring that project finance is promoted in any country. In the Zambian case this study reveals that government approved a Policy Framework for the implementation of PPPs in 2008. This policy framework was a vital step because it provided that there had to be institutional structures that would be responsible for ensuring that PPPs were done in a structured manner. Jamali (2004) and Klein (1999) also found similar results on this role and further emphasized that the policy framework established by government had to be stable and efficient. The government, through ERB facilitates the issuance of the Investment Endorsements. These endorsements are important for the investor because they act as guarantee that a license would be issued to them as soon as they completed the project, thereby acting as a motivation on the part of the investor. Tax holidays act as means of promoting project finance. To this effect, the government of Zambia provided tax holidays for five years, on dividends and profits for Maamba Collieries power plant. The government can also promote project finance by facilitating immigration for experts from other countries who come to work on projects in the country. This was done in particular for the experts who came to work on the Maamba Collieries power plant.

4.5 The success factors of project finance in facilitating the construction and operation of Maamba collieries power plant

In spite of the factors that inhibit growth of project finance in Zambia, Maamba Collieries Limited did not have significantly big challenges in using project finance to facilitate the power plant project.

4.5.1 Findings

The government contributed to the processes of the project in their respective expectations. This was elaborated by a responded who said, *"Enough support was received from the Zambian government and other stakeholders, such that there were few bottlenecks to our deal. The Energy Regulation Board facilitated the power purchase agreement with ZESCO as an off taker in the contract."* The remarks from the respondent were supported by the reviewed literature in which ERB (2011) reported that ZESCO and MCL were granted consent in August 2011, to enter into a Power Purchase Agreement (PPA), under which 265.5MW of the 300MW from the coal powered thermal plant will be sold to ZESCO for a period of 20 years. The

project, which would be the first coal fired thermal power plant in Zambia, would not only contribute to meeting local energy demands, but would also help to diversify electricity generation sources in the country.

On the financing part, the World Finance Magazine (2016) explained that the project was being funded on a debt-equity ratio of 70:30. Sponsors have contributed equity of $253m, while debt totalling $590m was raised from a consortium of lenders comprising large international commercial banks and development financial institutions on a limited recourse project finance basis. The banks included the Industrial and Commercial Bank of China, Bank of China, Standard Chartered Bank and Absa Bank, which have been secured on the basis of the insurance cover of Sinosure, the export credit agency of China. This was the first private power project in Sub-Saharan region to receive export credit agency insurance cover from Sinosure. Furthermore, the domestic ABSA Bank Zambia was also contributing, along with a number of developmental financial institutions, including Development Bank of Southern Africa, Industrial Development Corporation of South Africa and Africa Finance Corporation.

To highlight the financial success which the project recorded, ZDA (2011) explain that Churchill & Sagan, a Panama City based private firm helped Maamba Collieries Limited in Zambia finalize and secure a financial commitment in excess of $800m.This private firm provided a security loan to secure final commitments from the banking partners and structured the collateral loan after four years of work, navigating through bureaucratic hurdles.

4.5.2 Discussion

The construction and operation of Mamba Thermal Plant using project finance is an eye opener to sectors in need of infrastructure growth. The study reveals how all stakeholders were coordinated from the start to the completion of plant construction stage. The plant is now operational and supplying the national grid with power national contribution shown in the table 4.1

Table 4.1National Installed Generation Capacity by Technology in 2015 and 2022

Technology	% Share of Installed Capacity	
	2015	2022
Coal	0.0	10.0
Diesel	3.8	2.5
Heavy fuel Oil	2.1	3.3
Hydro	94.1	81.5
Solar	0.0	2.7
Grand Total	100	100

Source: ERB 2015&2022 Energy Sector Reports

Table 4.1 shows that as at 2015, the national power grid was never supplied with power from coal as the source. The completion of the project was necessitated by the engineering, procurement and construction contract which the project signed with SEPCO, one of the largest thermal power construction groups in China, to bring much needed expertise to the project. The project further employed circulating fluidized bed combustion technology for the power project, which is known and recognized as an environmentally friendly technique with the additional ability to use thermal-grade fuels of diverse origins and qualities. The success side of the use of project finance in the construction and operation of Maamba Thermal Plant was finally witnessed and confirmed when 330MW representing 10% of our national installed energy was evacuated through a 330 kV Double Circuit Transmission Line from the Power Plant at Maamba to Muzuma substation

4.6 Summary of Chapter four

The chapter presented the research findings. The research findings have been analyzed thematically because the data involved is qualitative. The chapter handled all objectives of the research as guided by the research questions. The findings are based on information gathered from interviews as well as literature. The interviews provide results on the Zambian perspective while literature consulted highlights all

the aspects of project finance on the global stage. Hence the discussed results represent both local and global project finance data. The next chapter concludes the research.

CHAPTER FIVE CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The previous chapter presented the findings of the study and data analysis. This final chapter brings together the salient points and findings made during the research. This chapter provides summary of findings, conclusions and recommendations. The overall objective of this study was to analyze the use of project finance in Zambia infrastructure projects, using Maamba Collieries as a case study. The study aimed at achieving four objectives. The first objective was to investigate the use of project finance in infrastructure delivery. The second objective was to examine the factors that affect the growth of project finance and identifying the roles of government and other stakeholders in promoting the use of project finance in Zambia was the third objective. The final objective was to establish success factors of project finance use in facilitating construction and operation of Maamba Collieries power plant.

The study answered Four Research questions:

1. What is the current use of project finance in infrastructure delivery?

2. What factors affect the growth of project finance?

3. What role do the government and other stakeholders play in promoting the use of project finance in Zambia?

4. What are the success factors of project finance use, in facilitating construction and operation of Maamba Collieries power plant?

5.2 Conclusions

The key conclusions of this study based on specific objectives are summarized as follows:

5.2.1 Investigate the use of project finance in infrastructure delivery

This dissertation has investigated the involvement or the use of project finance as financing technique for infrastructure development dating back as early as 1299 A.D when the English Crown financed the exploration and the development of the Devon silver mines by repaying the Florentine merchant bank, Frescobaldi, with output from the mines. An investigation through interviews and literature reveals the following cardinal reasons for using project finance in infrastructure delivery:

a) Project finance enables government to make savings and boost its reserves

b) It reduces risks in investing in infrastructure projects hence government can take on huge projects

c)It brings about technological transfer and use of private sector expertise

d)It enhances transparency in the procurement or public goods and bidding process of contractors

5.2.2 Examine the factors that affect the growth of project finance

The factors affecting project finance growth have been examined both locally and internationally through interviews conducted as well as the literature. The following factors affect growth of project finance both globally and locally:

a) Lack of political will to promote private financing

b) Lack of financial resources dedicated to PPP projects

c)Political interference and policy inconsistencies between governments

d)Lack of political will to promote private financing, as it merely ends in political rhetoric

e) Guidelines and regulations are not clear to both authorities and the private sector

f) Decision making is usually slow

g) Government bureaucracy prolongs contracts

h) Most government department have inadequate expertise capacity in economics, law, finance and so on

i)Civil unrest, guerrilla sabotage of projects, work stoppages, any other form of force majeure

j) Exchange controls, monetary policy, and inflationary conditions

5.2.3 Identify the role of government and other stakeholders in promoting the use of project finance in Zambia

From the literature consulted during research, the host government's role has identified as the most influential. The host government's influence might include: approval of the project, control of the state company that sponsors the project,

responsibility for operating and environmental licenses, tax holidays, supply guarantees, and industry regulations or policies, providing operating concessions. This is affirmed by the findings from the data collected during interviews.

5.2.4 Establish success factors of project finance use in facilitating construction and operation of Maamba Collieries power plant

The following have been identified from the literature reviewed and interviews as key success factors:

a) The first project finance funded project to receive export credit agency insurance from Sinosure in Sub Saharan Africa.

b) US843 million dollars raised for the project by project sponsors from banks

c)To guarantee the completion of the project, an engineering, procurement and construction contract with SEPCO, one of the largest thermal power construction groups in China was signed, to bring much needed expertise to the project.

d)The project employed circulating fluidized bed combustion technology for the power project, which is known and recognized as an environmentally friendly technique with the additional ability to use thermal-grade fuels of diverse origins and qualities.

e) To ensure a long-term customer base, the project secured long-term purchase agreements with ZESCO, the local state-owned utility.

f) As a security mechanism over PPA receivables, the project entered into an escrow agreement with ZESCO, which regulates the flow of revenues received under the PPA. The Zambian Government also provided a guarantee that will remain in place until the escrow account mechanism is operational to the satisfaction of the project and its lenders.

g) Successful completion of 300MW thermal plant and contribution of 9.9% to Zambia's installed energy capacity.

5.3 Recommendations

Project financing technique for infrastructure delivery is relatively a newcomer in the efforts to addressing the infrastructure gaps in the Zambian setup. A number of aspects

have been identified from the study that could yield useful results for both academic research and practical Project Finance use. The recommendation include:

a) The Zambian Government immediately takes into account the benefits of Project Finance in the reduction of the infrastructure gap and promote its use.

b) The Zambian Government creates an enabling environment Project Finance use by effecting Policy changes which may include changes to the existing legislation to facilitate the establishment of special purpose vehicles, changes to the legal system governing the public sector, changes to procurement systems and the manner in which unsolicited bids are considered, and strengthening public sector institutional capacity to support the use of project finance.

c) Government agencies (ERB, ZDA, PPP Unit) who, in the researcher's view, have the requisite training to engage and capacity build decision makers (ministerial teams) in project finance and PPPs so that they appreciate some of the reforms that stakeholders ask for and promote political will.

d)Government should remove the PPP unit from State House to reduce Government bureaucracy due to security issues and be placed under a department which is easily accessible by all stakeholders

5.4 Limitations of the Study

The study encountered hurdles when accessing the PPP unit which has been placed under State House from the Ministry of Finance. To access the unit for data collection, government bureaucratic processes proved to be a huge challenge. Efforts to collect secondary data from their PPP documents proved futile, and this limited the data on PPPs in Zambia.

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APPENDICES

APPENDIX A: Introductory letter

March 17, 2017

University of Zambia,
School of Engineering,
Great East Road Campus,
P.O. Box 32379
LUSAKA

Dear Sir/Madam,

RE: PERMISSION TO CONDUCT ACADEMIC RESEARCH IN YOUR ORGANISATION –MR KENNEDY MUSONDA

Mr Kennedy Musonda (Student number: 514706377) is a Postgraduate Student in the School of Engineering at University of Zambia. Having completed the prerequisite of the Master's coursework program in the Master of Engineering in Project Management, he needs to undertake research work as part of his Dissertation for a Maters of Engineering degree.

Mr. Musonda is conducting a research entitled *"A CRITICAL ANALYSIS OF UPGRADING OF INFRANSTRUCTURE IN NEWLY UPGRADED SCHOOLS"*.

In reference to the above, we seek your assistance to provide him with all the support that he needs to successfully accomplish his research work.
The responses you will provide will be treated confidentially and only for the purpose of the Academic research. We hope this request will meet your favourable considerations.

Yours Faithfully

Prof. M. Muya
Dean - School of Engineering

APPENDIX B: Ethical Clearance

THE UNIVERSITY OF ZAMBIA
DIRECTORATE OF RESEARCH AND GRADUATE STUDIES

Great East Road Campus | P.O. Box 32379 | Lusaka10101 | Tel: +260-211-290 258/291 777
Fax: (+260)-211-290 258/253 952 | E-**mail**: **director.drgs@unza.zm** | Website: **www.unza.zm**

APPROVAL OF STUDY

IORG No. 0005376
NASRECREC IRB No. 00006465

27th March, 2017

REF NO. NASREC-2017- MAR – 010

Mr. Musonda Kennedy,
The University of Zambia,
School of Engineering,
P.O. Box 32379,
LUSAKA.

Dear, Mr. Musonda,

RE: " AN ANALYSIS OF THE USE OF PROJECT FINANCE IN ZAMBIA INFRUSTRUCTURE PROJECTS: A CASE OF MAAMBA COLLIERIES"

Reference is made to your protocol dated as captioned above. NASREC resolved to approve this study and your participation as Principal Investigator for a period of one year.

REVIEW TYPE	**ORDINARY REVIEW**	**APPROVAL NO. NASREC-2023 MAR - 010**
Approval and Expiry Date	Approval Date: 27th March, 2017	Expiry Date: 26th March, 2018
Protocol Version and Date	Version - Nil.	26th March, 2018
Information Sheet, Consent Forms and Dates	• English.	To be provided
Consent form ID and Date	Version - Nil	To be provided
Recruitment Materials	Nil	Nil
Other Study Documents	Questionnaire.	

Specific conditions will apply to this approval. As Principal Investigator it is your responsibility to ensure that the contents of this letter are adhered to. If these are not adhered to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.

CONDITIONS OF APPROVAL

- No participant may be involved in any study procedure prior to the study approval or after the expiration date.

- All unanticipated or Serious Adverse Events (SAEs) must be reported to NASREC within 5 days.

- All protocol modifications must be approved by NASREC prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address.

- All protocol deviations must be reported to NASREC within 5 working days.
- All recruitment materials must be approved by NASREC prior to being used.

- Principal investigators are responsible for initiating Continuing Review proceedings. NASREC will only approve a study for a period of 12 months.

- It is the responsibility of the PI to renew his/her ethics approval through a renewal application to NASREC.

- Where the PI desires to extend the study after expiry of the study period, documents for study extension must be received by NASREC at least 30 days before the expiry date. This is for the purpose of facilitating the review process. Documents received within 30 days after expiry will be labelled "late submissions" and will incur a penalty fee of K500.00. No study shall be renewed whose documents are submitted for renewal 30 days after expiry of the certificate.

- Every 6 (six) months a progress report form supplied by The University of Zambia Natural and Applied Sciences Research Ethics Committee as an IRB must be filled in and submitted to us. There is a penalty of K500.00 for failure to submit the report.

- When closing a project, the PI is responsible for notifying, in writing or using the Research Ethics and Management Online (REMO),both NASREC

- and the National Health Research Authority (NHRA) when ethics certification is no longer required for a project.

- In order to close an approved study, a Closing Report must be submitted in writing or through the REMO system. A Closing Report should be filed when data collection has ended and the study team will no longer be using human participants or animals or secondary data or have any direct or indirect contact with the research participants or animals for the study.

- Filing a closing report (rather than just letting your approval lapse) is important as it assists NASREC in efficiently tracking and reporting on projects. Note that some funding agencies and sponsors require a notice of closure from the IRB which had approved the study and can only be generated after the Closing Report has been filed.

- A reprint of this letter shall be done at a fee.

- All protocol modifications must be approved by NASREC by way of an application for an amendment prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address or methodology and methods. Many modifications entail minimal risk adjustments to a protocol and/or consent form and can be made on an Expedited basis (via the IRB Chair). Some examples are: format changes, correcting spelling errors, adding key personnel, minor changes to questionnaires, recruiting and changes, and so forth. Other, more substantive changes, especially those that may alter the risk-benefit ratio, may require Full Board review. In all cases, except where noted above regarding subject safety, any changes to any protocol document or procedure must first be approved by NASREC before they can be implemented.

Should you have any questions regarding anything indicated in this letter, please do not hesitate to get in touch with us at the above indicated address.

On behalf of NASREC, we would like to wish you all the success as you carry out your study.

Yours faithfully,

Dr. Mususu Kaonda

VICE-CHAIRPERSON
THE UNIVERSITY OF ZAMBIA NATURAL AND APPLIED SCIENCES RESEARCH ETHICS COMMITTEE - IRB

CC: Director, Directorate of Research and Graduate Studies
Assistant Director (Research), Directorate of Research and Graduate Studies
Assistant Registrar (Research), Directorate of Research and Graduate Studies

APPENDIX C : Interview Guide – Maamba Collieries LTD

1. What position do you have in this company?
2. How long have you served in that position?
3. What main activities is your company involved in?
4. How was Maamba Collieries Ltd constituted?
5. Maamba collieries Ltd has been using Project Finance to construct and operate the power plant, what is your understanding of project finance?
6. What has the use project finance by Maamba Collieries Ltd brought to Zambia's Energy sector?
7. As one of the users of project finance, what problems did you encounter when finalizing the deal with the Zambian government?

APPENDIX D: **Interview Guide – Zambia Development Agency**

1. What position do you have in this institution?
2. How long have you served in that position?
3. What is your understanding of project finance?
4. Has project finance in Zambia been used substantially to facilitate infrastructure development? (If yes, why do you say so?)
5. What projects in Zambia are you aware of that used project finance to facilitate infrastructure development?
6. How did your institution contribute to facilitate the construction of coal-fired power plant at Maamba Collieries Ltd?
7. Why does Zambia need to use project finance to facilitate infrastructure development?
8. What are the factors that constrain the growth of project finance in Zambia?
9. What has the government done in order to promote the use of project finance?

APPENDIX E: **Interview Guide – Finance Institution/Bank**

1. What position do you have in this institution?
2. How long have you served in that position?
3. What is your understanding of project finance?
4. Has project finance in Zambia been used substantially to facilitate infrastructure development? (If yes, why do you say so?)
5. What projects in Zambia are you aware of that used project finance to facilitate infrastructure development?
6. Describe how financial institutions are involved in the project finance process
7. How did your institution contribute to facilitate financing for the construction of coal-fired power plant at Maamba Collieries Ltd?
8. Why does Zambia need to use project finance to facilitate infrastructure development?
9. What are the factors that constrain the growth of project finance in Zambia?
10. What has the government done in order to promote the use of project finance, especially for finance institutions?

APPENDIX F: **Interview Guide – PPP Unit**

1. What position do you have in this institution?

2. How long have you served in that position?

3. What is your understanding of project finance?

4. Has project finance in Zambia been used substantially to facilitate infrastructure development? (If yes, why do you say so?)

5. What projects in Zambia are you aware of that used project finance to facilitate infrastructure development?

6. How did your institution contribute to facilitate the construction of coal-fired power plant at Maamba Collieries Ltd?

7. Why does Zambia need to use project finance to facilitate infrastructure development?

8. What are the factors that constrain the growth of project finance in Zambia?

9. What has the government done in order to promote the use of project finance?

APPENDIX G: **Interview Guide – Energy Regulator**

1. What position do you have in this institution?

2. How long have you served in that position?

3. As an institution mandated to run Zambia's energy sector, do we have enough infrastructure to generate enough energy for both domestic and industrial use?

4. As a country, we have potential to develop power sources from solar, biomass, coal and maximize the 6,000 (MW) megawatts unutilized hydropower potential, why has ZESCO not invested heavily?

5. Have u considered partnering with the private sector to develop the power sector?

6. What is your understanding of project finance?

7. What are some of the power projects which have been financed through project finance in Zambia?

8. How are you promoting the use project finance to facilitate infrastructure development in the energy sector?

9. What are some of the benefits of the use of project finance in Zambia's energy sector?

APPENDIX H: Article Publication Acceptance Letter

From: Mohammad Nassar <**editor@asrjetsjournal.org**>

To: **kmuzo@yahoo.co.uk** <**kmuzo@yahoo.co.uk**>

Sent: Friday, 24 February 2023 at 11:17:32 GMT+2

Subject: [ASRJETS] Editor Decision: Accept the Paper: OPPORTUNITIES ON THE USE OF PROJECT FINANCE IN ZAMBIA INFRASTRUCTURE PROJECTS: THE CASE OF MAAMBA COLLIERIES

Dear Author:

We have reached a decision regarding your submission to American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS).

Our decision is to: Accept the paper.

Please read the details within the attachment carefully.

With Best Regards.

Principal Contact
Editor In Chief
Dr. Mohammad Othman
American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS)
Email: **editor@asrjetsjournal.org**
Phone: mobile: 00962788780593

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