MCom

Assessment of the Role of Financial Institutions in Mineral Resources Financing in Namibia: A Mixed Methods Study

A **Dissertation**

Presented to

The **Development Finance Centre (DEFIC)**
Graduate School of Business
University of Cape Town

In partial fulfilment
of the requirements for the Degree of
Master of Commerce in Development Finance

By

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January 2022

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ACKNOWLEDGMENTS

Firstly, let me give all glory and honour to God, who gave me the strength to undertake this study. Without his guidance and blessings, I could not be able to achieve this.

With respect, I would like to acknowledge and dedicate this study to my mother and late father, who left us this year on 22 May 2021. Thank you for imparting the love of education in me. I know you both sacrificed to give us the best life we have today.

Thirdly, I would like to express my sincerest appreciation to all the extraordinary individuals in my life who encouraged and supported me in every step of this adventure of discovery and learning new ideas that will improve lives and uplift communities in Africa.

Fourthly, to my long-distance partner Tuhafeni, for his understanding and patience in every plan we delayed. His support and encouragement of working hard, remaining focused, and taking life easy by looking at the bigger picture of this journey.

To my siblings, entire family, and friends for their understanding, especially when under pressure and for being so supportive.

Fifthly, to my supervisor Prof Abdul Latif Alhassan, for his sincere guidance, patience, and good communication throughout this journey, despite his many commitments.

Lastly, also to all my lectures and classmates for uplifting me in all means.

ABSTRACT

The Namibian economy is considered natural resource-dependent, where the mining sector is essential in terms of revenue generation, employment, and infrastructure development. The Chamber of Mines of Namibia in 2020 has reported that the mining sector contributed about 10.1% of the Gross Domestic Product growth in 2020, increasing from 9.4% contribution of 2019. Nevertheless, the sector is experiencing challenges such as lack of access to capital, water and electricity and regulation uncertainty. This study analyses the role of commercial banks in financing the mining sector and the relationship between banking lending to mining and economic growth in Namibia over the period from 2006 to 2020 using a Convergent Parallel Design mixed research method. The role of financial institutions and their impact on economic growth as a function of providing service to the critical economic sector such as mining in Namibia are necessary to assess the natural relationships and challenges. Both the qualitative and quantitative methods were adopted to examine this research problem thoroughly. The Vector Error Correction Estimations techniques and the Granger causality approach have been applied to identify the long-run and short-run causality direction for all possible variables of the study from the secondary quantitative data. While the primary data were collected by semi-structured qualitative interviews with senior mining bankers of commercial banks in Namibia to provide insight into the role commercial banks played. Economic growth and commercial bank lending to mining show no long-run relationship, but a long-run relationship was observed between growth and lagged interest rate. There was no short-run relationship between growth and commercial bank lending observed. In contrast, the unidirectional causal relationship between GDP and commercial bank lending to mining running from GDP and commercial bank lending to mining was observed. The main findings from the interview that supported early findings are that the banks tend to finance mineral projects and provide services to the mining based on the macroeconomic factors and opportunism for profitability purposes but not necessarily contributing to economic growth and development. This study recommended that commercial banks craft policies that aim to increase financing of the mineral sector to acquire and develop human, and technical capacity to facilitate the projects. In addition, it recommends that the government develop monetary and fiscal policies that can increase confidence in the local financial system and promote the flow of funds into the mining sectors. This research has experienced the issues of lack of data

access; it is also ideal to suggest that financial strengthen their relationship and data sharing with institutions such as the Bank of Namibia and Namibia Statistic Agency that could be available for future research. Lastly, in-depth an investigation of the internal and external factors that financial institutions in Namibia are experiencing in financing the mining sector is recommended for further study.

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CHAPTER 1: INTRODUCTION

1.1. Background of the Study

The future demand for natural resources is estimated to grow exponentially by 2050. For example, the copper a widely-used metal demand growth could be between 275 and 350%, depending on the scenario, as the global human population grows toward 9 billion (Elshkaki, Graedel, Ciacci, & Reck, 2016). In addition, a significant percentage of the people in developing countries will live longer, and most are aspired to increase their living standards to enjoy infrastructures, services, and goods that the developed countries currently experience (United Nations, 2015). In the same vein, the growth development of innovative technologies such as electrical cars and robotics systems to address global challenges that affect the Earth will also drive the mineral demand due to environmental policies and ambition such as Paris Agreement, European Green deal and Sustainable Development Goals. Some of those targets are aims to reduce greenhouse gas emissions, increase low carbon "green" energy supply and support new environmental regulation as such terrestrial minerals and metals supplies are under tremendous pressure and overall, the situation is driving the minerals and metals demand exponentially.

For the past years, extensive studies had mixed feeling about the contribution of natural resources blessing on the economic growth and development in most economies, particularly in African countries, because there is no significant difference between a positive and negative impact (Gylfason, 2001; Gylfason, Herbertsson, & Zoega, 1999; Humphreys, 2005; Maystadt, De Luca, Sekeris, & Ulimwengu, 2014; Stijns, 2005; UNCTAD, 2014). In Namibia, the mining sectors are an extensive known contributor to government revenue through royalties/taxes, foreign exchange gain, direct and indirect employment (which is increasingly being replaced by technology), and social investment made into the surrounding communities. All are known to contribute to the Gross Domestic Product [GDP]; overall the industry contributions for 2020 was about 9.3% a decrease of 1% from 2019 (Chamber of Mines of Namibia, 2022). Namibia is a developing country with vast natural resources like diamonds, copper, gold, uranium, lead, silver, tungsten, tin, zinc, suspected oil, coal, and iron ore deposits. Hypothetically, the expectation is that countries rich in natural resources should have strong economic growth and better living conditions. But the truth on the ground is far

from the expectations, for example, in the Namibian context it has extreme inequalities income distribution, poor standard of living of the majorities and high unemployment (Sulla, Zikhali, Schuler, & Jellema, 2017).

While Namibia is rich in natural resources is one of the countries which had substantial economic challenges for the past years, namely the low GDP growth (that led to an increase in the public debt to GDP stood at 67% at the end of December 2021 as the government continues to borrow foreign capital to fund its budget deficit equal to 8% in 2020/201); massive cut in the capital expenditure, high unemployment youth rate (37.82%); and high properties price (Bank of Namibia, 2021a). Moreover, the government's international borrowing cost has increased, and become difficult to access finance for major project. The reason is due to the long-term downgraded issuer and senior unsecured ratings due to Moody's Investors Service ("Moody's") and Fitch Agency Ratings .. That is accurately what Venables (2016) urged that developing countries' economies find it tough to use natural resource wealth to improve their economic growth performance. Like other developing countries with vast resources, current mining investment is dominated by Foreign Direct Investment [FDI] mainly from China (39.5%), South Africa (29.7%), Mauritius (8.0%), Botswana (7.8%) and United Kingdom (4.2%), as for 2020 (Bank of Namibia, 2021a; Kaune & Mbazuvara, 2020). Those foreign investments in mining can finance infrastructure development and projects needed for sustainable economic growth and poverty reduction. Over the years, many African countries rich in natural resources have been advocating and amending their mineral resource legislation to attract foreign direct investment by amending company laws and policy, labour and social policies, and more private sector-friendly ownership and taxation regimes. However, majorities of those changes in legislation have not conveyed development benefits or redressed development challenges as much as planned, even though the commodities prices increase in recent years. That results in some governments to renegotiate contracts and nationalise assets.

The competition for FDI in the capital market is intense as African countries such as South Africa, The Republic of Congo, Morocco, Egypt and Mauritania are offering competitive conditions to individual and institutional investors due to their economic scale. That has made it hard for small economy countries such as Namibia to attract more capital into their economy. As the competition for capital intensifies, countries with strong financial

institutions are expected to support their economy by investing in risk sectors such as mining, but that is not always the case (African Development Bank, 2020). For example, Namibia has a massive pool of institutional savings that could finance high return investment projects to contribute to rapid, inclusive, and sustainable growth (African Development Bank, 2020). In the context of Namibia, the questions are such as: Having the mineral sectors being one of the risks and high return sectors, why is there no significant growth in domestic investment? What is the role of financial institutions in financing natural resources to uplift the Namibian economy's development? That has been struggling for almost four years with negative 2.85% growth since 2017 (Bank of Namibia, 2021a).

Economic growth is a critical variable used by economists, investors, companies, and even policymakers to measure the increase in an economy's capacity to produce goods and services compared from one period to another. The economy's growth needs the flow of capital from the supply to the demand. In finance, the capital flows from the capital owner to the borrower to develop or acquire other capital to produce goods and services. Therefore, financial institutions are fundamental constituents that play a vital role in stimulating financial development (credit extension) for economic growth and development in any country (Aurangzeb, 2012; Effiong, 2015; Kaushal & Ghosh, 2016). Economic growth is defined as the total economic output growth rate, including capital accumulation in this output. Thus, growth remains a necessary but insufficient condition for economic development (Rao, 2003).

On the other hand, economic development is a broader concept than economic growth, which involves only quantitative variables and qualitative, like poverty reduction. Economic development is explained as a process through which the economy transforms from one in which most people have extremely limited resources and choices to one in which they have much. More excellent resources and choices in their livelihood been education, employment, medical or housing (Rao, 2003).

Every nation's economic development and growth depend on the role of financial institutions and the ultimate financial development. Saqib Khan et al. (2015) have pointed out that policymakers and economists have generally agreed that financial development contributes to financial institutions and markets, such as commercial and investment banks, bonds, and stock exchanges, leading to economic growth. That means every nation's economic growth

depends on financial institutions' role and the ultimate financial development. In addition, countries with good governance, high literacy rate, free of corruption, robust reproductive health and family planning programmes, and political stability tend to have a strong economy as financial institutions play an intermediary role in supporting economic growth (DiJohn, 2008(Girma, 2008 #827; Nel, 2003; Sinding, 2009)).

Financial institutions' role is a primary financial intermediary between the different economic sectors, even stages. However, the nature of the position varies based on the sectors of the economy. For example, other financial institutions play different roles in the mineral and mining sectors that have changed significantly from stage to stage. Financial institutions range from commercial banks and building societies to pension funds, development banks, insurance companies, investment trusts, and issuing houses, all of which provide many services of both direct and indirect benefit to individuals or businesses. The commercial banks in the economic role in any nation is always an interesting area for researchers and practitioners to investigate. Commercial banks are the financial institutions that perform the functions of accepting deposits from the public and providing loans for investment to earn profit to individuals or corporations. While development banks are financial institutions owned mainly by the government, their mandates provide finance for viable enterprises and sustainable initiatives that contribute to the development by investing in significant infrastructure and projects that could increase economic growth and social development. In general, all those institutions expect to smooth the challenge of access to capital and low economic growth in countries like Namibia.

The interest in investigating the financial institution's role, mainly the commercial banks in Namibia, has not been investigated significantly in almost all the economic sectors. With Namibia being one of those countries depending on mineral resources for economic growth and development, it is essential to understand the relationship between the mining sector and other sectors. Even though multiple economic sectors could investigate the challenge of low economic growth and the expectation for the mining to contribute to growth with the capital assessed from the financial institution is the area of interest for this research. Mainly because while the country knows to have abundant natural resources, the mining sector’s contribution to GDP is shrunk from about 47 per cent in 1978 to 19.6 per cent by 1990 and reached 14.0 per cent in 2018. Despite the relative reduction in the GDP contribution mining remains the

primary earner of Namibia's foreign exchange at about 45% on average per year (African Development Bank, 2014). That background has motivated an investigation on the role of financial institutions in financing natural resources as there is a critical sector in countries like Namibia..

1.2. Statement of the Problem and Research Questions

The mining segment remains one of the most significant contributors to the Namibian economy from tax revenues by attracting foreign direct investment and foreign exchange earnings. However, the industry experienced many different challenges for the past years (Saqib Khan et al., 2015). Furthermore, the current pandemic of COVID-19 that caused health crisis and high death cases worldwide for approximately 6.23 million people as of the 30th of April 2022 (Johns Hopkins, 2022) has resulted in an unprecedented collapse in economic activities such as transportation that results in widespread declines in commodity prices such as oil, copper, and zinc. Many mining companies globally have closed or been on care maintenance for more than two years. The staff's salaries are heavily reduced, some of the employees lost their job, which resulted in higher unemployment rate than anticipated (Chamber of Mines of Namibia, 2022). Besides, the world is still unsure when the Covid-19 pandemic will end as no one can see the future but simply guessing (Charumilind et al., 2022). It is the researcher understanding that the longer it takes, the worse it damages the global economy and the humankind.

The global mining sector supply chain is significantly affected physically and economically. The producing mines and exploration projects globally are experiencing delays during the lockdown, with foreign investors pulling their investment in new demand projects related to the health sector. Those challenges are also in the Namibian mining sectors where mines like Skorpion Zinc and the Namib Lead and Zinc Project [NLZM] are put on care maintenances and may shut down soon (Chamber of Mines of Namibia, 2022). As a result, thousands of employees (including contractors) have lost their income, resulting in a downfall in government revenue (Bank of Namibia, 2021a; Chamber of Mines of Namibia, 2022).

Those challenges are critical to the mining sector, significantly that in 2020 it contributed directly about 10.1% of the GDP growth from the 9.4% GDP contribution of 2019. In total, it reported having generated about N$ 33.947 billion in revenue, of which about 36% (N$

12.305 billion) was used to compensate for goods and services from local suppliers. The sector is critical as it plays a significant role in a nation's long-term social and economic development with government revenues (N$ 4.113 billion for 2020); provide employment (14 591 direct employed and estimate 102 137 indirect in 2020); skills development and business opportunities for local communities (N$ 180.7 million); and support investments in education, health, clean technology and infrastructure (CMN, 2018). However, regarding the fixed investment in mining, volatile spending stands at N$4.848 billion in 2020 is observed, which is far low to N$17 billion records in 2014.

The economy has been in terrible shape, recording a negative growth of -0.8% in 2018. For 2020, the domestic economy recorded a contraction of 8.0% relative to a decline of 0.66% registered in 2019. So far, this is the highest contraction that the country has recorded, looking at the time series of 1981 – 2020, and the mining policies are not conducive for investment now (Sakaria, 2021). Due to weak performance in construction, wholesale and retail, real estate, and business activities, the economy continues to contract. The weak growth routine in the mining and construction sectors was due to a dam and new mines completions. No major construction projects are anticipated in Namibia as the airport project was cancelled after court cases and corruption issues but is generally due to the lack of capital. The decline of investment in Namibian mining has become a concern in the public and private sectors. Mining operations are in arrears, unable to buy new assets and equipment, paying suppliers, paying employees' salaries, or short fixed and variable expenditures. The Namibian mining investment has been vigorous in the past years compared to other sectors, yet extremely inconsistent as most significant investment initiatives are primarily foreign direct investment capital. There is diminutive local capital invested in Namibian mining now, and therefore, this limits local ownership and beneficiation from the exploitation of the mineral resources. More people are losing their jobs, and mines are reaching their life end. In contrast, no new mine deposits have been discovered to replace the old mines due to low exploration investment, and mainly that the Namibia mining sector investors are foreign than local (including the government).

The mining sector is, by nature, risk and complex, encompassing significant geological challenges, hazards related to safety, socio-economic impacts, ownership issues and nationalism challenges. The greatest challenge is determining if the mineral deposit

found/acquired are economically feasible, mainly located remotely. Literature has shown that despite the sector importance of economic development, the primary challenge of undertaking mining business in Africa and Namibia is the access to financing/capital resources in terms of capital expenditure and working capital (African Union, 2009; Hilson, 2020; Jemwa & Africa, 2020; S Amavilah, 1996). Some authors like Mahoso (2018) have highlighted that these challenges are attributed to the sector's riskiness, lack of asymmetric information, higher transaction cost, lack of managerial skills, and agency problems for junior mining companies.

It is significant to mention that 99% of our belongings are associated with the extractive sector in which a massive amount of capital has been invested over the years to extract the materials on the Earth's crust, which has to be supplied by investors and individuals or institutions. The supply to the demand side is a critical component of the mineral sectors as it is only the way the commodity could be made available.

As mentioned above, like in all economic sectors, a demand-side and supply-side have been commodity or capital. In natural resources, the demand for capital is the exploration and mining companies, while the supplies are financial investors/institutions through financial institutions. As prompt as the 1900s, there was a suggestion that banks play a pivotal role in the economic development of each society because they choose which firms get to use societal savings (J. A. Schumpeter, 1911). Nevertheless, in the 1990s, researchers like Levine and Zervos opposed that claim by arguing that financial institution does not promote economic growth. Instead, the institutions responded to developments in the real sector within the economy (Levine & Zervos, 1996). Gylfason (2001) also argues that capital from natural resources crowd out human capital, thereby slowing economic development.

According to the African Development Bank annual outlook report, Namibia has a considerable pool of institutional savings that could finance high-return investments such as the mineral sector to contribute to rapid, inclusive, and sustainable growth than depend on foreign direct investment. Moreover, the financial industry is expected to play a critical role as an intermediate between domestic savings into domestic investment. Numerous researchers believe that some great contrast exists in financial intermediaries' role in facilitating economic development sustainability.

The literature that explores the relationship between the financial sector and economic growth in Namibia has been reviewed to determine the current study by researchers such Tafirenyika Sunde (2010); Sunde (2013), and Eita (2009). The link between economic growth and the mineral sector has been explored by researchers such as Hartmann (1986), Malmström and Poulsen (2009), and Sheefeni and Simon (2016). Although several studies explore the linkages between mining and economic development in Namibia and those exploring the relations between financial institutions and economic development, no analysis explicitly focused on the link between financial institutions financing role on mineral resources and economic development. The author is unaware of any research carried out in this study area because no similar study is done in Namibia, and the link between financial institutions, mineral resources financing, and economic growth is still unknown. Therefore, this study provides valuable literature for practitioners and academics about the link between financial institutions financing role on mineral resources and economic development in Namibia. The study aims to answer the following descriptive questions:

1. What is the relationship between financial institutions' financing in mineral resources projects' contribution to Namibia's economic growth and development?
2. How do the financial institutions finance the mineral resources projects to uplift the Namibian economy's development?
   2.1 What strategies and financial products are available in Namibian financial institutions for natural resources (mineral resources)?
   2.2 Which mineral resources project stage and commodities benefit from Namibian financial institutions, and why?

1.3. Research Objectives

This study investigates the Namibian financial institutions' role in mineral resources projects financing and their contribution to economic development. The terms development and growth are used interchangeably in this thesis. To achieve the aim of the research study, the thesis is guided by the following objectives:

- To investigate the effect of financial institutions' financing in mineral resources projects' contribution to economic growth and development in Namibia.

- To explore how the Namibian financial institutions plays a significant role in financing mineral resources projects.
    - To examine the different support mechanisms for mineral resources in Namibia through other sources of funds.
    - To identify and study whether Namibian financial institutions do optimal restrictions in financing the four stages of mining (exploration, development, extraction, and closure) or not.

1.4. The motivation of the Study

The mining industry has been declared by the UN (2016) as a core activity affecting sustainable development due to its contribution to economic development worldwide through its wide-ranging production chain, involving complex operations and a myriad of different products. It is, therefore, become an area of interest for researchers to investigate and analyse issues associated with the sector, such as financing.

The Namibia mining sector has been heavily dependent on foreign direct investment capital than domestic investment capital. Although it has contributed to economic growth over the years, there are concerns about the lack of local participation that believe to affect currency exchange rates and lead to the exploitation of natural resources than expected contribution. Due to the continued decline of mining contribution to GDP and the lack of domestic investment capital in the mining sector, the researcher is motivated to investigate the financial institutions' role in financing the mining sector with economic growth. Because the consider the Namibian financial system that rank to be one of the well structure in Africa (International Monetary Fund, 2007). The literature has suggest that, among other things has potential not only encourage the accumulation of capital but also improve its productivity that results in positive economic growth especially in the country that has abundant natural resources (African Development Bank, 2020; Bakwena & Bodman, 2010)..

Understanding and improving the system is only through research. This study is motivated to fill the gap and contribute to the literature on financial institution financing for the natural resource as a significant economic growth and development sector in Namibia. There is a shortage of research available on this topic globally, even though the financial structure differs from country to country. Therefore, this study is critical to the researcher as it would

help advance appropriate research skills in development finance. Furthermore, the financial institution may find this study meaningful to study further their market or developed products for the natural resource project. Lastly, the results may also support policymakers in developing programs and policies to foster sustainable economic growth. Despite that Namibia's strong dependence on mining and the robust financial market with eight commercial banks, no study has been conducted to investigate the role of financial institutions on the financing of natural resources (mineral resources) and economic growth and development. Thus, the present study intends to assess the financial institutions' role in Namibia's economic growth in natural resources financing.

1.5. Scope of the Study

The study investigated the commercial banks defined by the Bank of Namibia and leaving out other financial institutions such as mutual funds, private equity, and pension funds currently regulated by the Namibia Financial Institutions Supervisory Authority [NAMFISA].

1.6. Organisation of the Study

This dissertation report is prepared to consist of five chapters. Chapter 1 is the introduction and background of the thesis. That was followed by Chapter 2, the literature review that provides an in-depth overview of the research area selected and the theoretical and empirical literature of the area. Chapter 3 outlines the method used to conduct the research in which the mixed method was employed and the adoption justification. That is followed by Chapter 4, which divides the analysis's findings into two main sections: the quantitative and the qualitative. Plus, it presents the integration of the findings. The last Chapter 5 presents the summary, recommendations, implications and advice for future research before the reference and Appendix.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

This chapter consists of seven sections, including the introduction: a brief definition of terms and concepts used, followed by a Mining and Financial Institutions overview in Namibia. It further characterises the financial institution's roles in the mining sector, followed by the theoretical literature, which gives the financial development and mineral resources – economic growth hypothesis, the empirical literature, and the conclusion.

2.2. Definitions of Terms and Concepts

According to this study's researcher, there is no universal definition of natural resources because they can be interpreted differently based on the author's geographical and understanding. UN, EC, IMF, and OECD (2003) defined "natural resources as natural assets occurring in nature sphere and can be used for economic production as well as human consumption. The assets that provide user benefits through raw materials and energy used in economics and subject primarily to quantitative depletion through human use. According to Kwon et al. (2002), "natural resources can be defined as objects, materials, creatures, or energy found in nature that mankind can use for their survival. Lastly, Kerr and Swarup (1997) described natural resources as non-man-made products, including the Earth's natural elements and environmental factors. Natural resources can be largely classified into renewable resources and non-renewable resources. Dubiński (2013) stated that these are natural resources mined and used by man and have always conditioned societies and states' economic and civilisational development. This was very clearly emphasised in the motto of the 18th World Mining Congress, held in 2000 in the United State of America. “Everything begins with mining.” However, Max Planck, the famous physicist, said “Mining is not everything but without mining everything is nothing.” In this study, the author agrees with both arguments, thus why the study would like to assess how the mineral resources are funded.

Other authors have looked into defining mineral resources based on the area they are coming from and how they clarified them. Where Calas (2017) specified *“mineral resource as a concentration of material of intrinsic economic interest (a deposit) in such form and quantity*

that there are reasonable prospects for eventual economic extraction. Portions of a deposit that do not have reasonable prospects for eventual economic extraction must not be included in a mineral resource". The study expands this definition by examining how financial institutions finance these mineral resources to uplift economic growth and development.

- **Mineral Resources Financing** can be defined as the monetary fund in terms of equity or debt, or both lend to the mineral resources sector under an agreement to pay it back later.
- **Mineral Project/Mineral Property/Mineral Asset** is the advanced exploration and development asset or production asset that provides the basis for economic evaluation and decision-making. The economically viable deposit must be demonstrated through the Pre-Feasibility Study or Detail Feasibility Study even if the finance is not secured or under construction & development.

The OECD (2001) subdivided natural resources into four categories: mineral and energy resources, soil resources, water resources, and biological resources. In which mineral resources can be defined as an occurrence of natural, solid, inorganic, or fossilised organic material in or on the Earth's crust in such form and quality (grade) and quantity that it has sufficient prospects for economic extraction, for example, metal ores and industrial minerals. Therefore, one category of non-renewable resources, mineral resources in Namibia, is more assessed in this research study.

2.3. Overview of Mining and Financial Institutions in Namibia

2.3.1. The Mineral Industry overview in Namibia

The history of mining can trace back more than 400 years based on archeologic evidence, but the well-documented one can trace as the 20s century following before mining began on a larger scale in the early years of the 20th century in the Otavi Mountain land (Salom & Kivinen, 2019). (African Development Bank, 2014; Chamber of Mines of Namibia, 2022)Even though Namibia is one of Africa's wealthiest countries regarding natural resources, about 27% of the population currently lives below the poverty line due to income inequality (National Planning Commission [NPC], 2016). Based on the Gini index, inequality is high in Namibia (59.1% in 2015) (Bank., 2019). Financial inequality in Namibia and South

Africa another major mineral producer, is quite similar due to the apartheid that ended only in 1994 (Blackie & Tarr, 2000).

Since independence in 1990, the sector has been performing well and remainders the dominant sector contributing an average of more than 10% of GDP mining sectors compare to other economic sector but far below the 1970s contribution (African Development Bank, 2014; Chamber of Mines of Namibia, 2022). Namibia is a major producer of several of the world's most essential minerals and metals, such as diamonds, uranium, copper, zinc, gold, lead, magnesium, semi-precious stones, and industrial minerals (African Development Bank, 2014; Chamber of Mines of Namibia, 2022; CMN, 2018). To provide the perspective, Table 1 presents the key statistical data on the mineral output in Namibia by volume and values.

Table 1. Annual Values in N$ billion and Quantity produce by Namibia mining sector

	Commodity Price	2016	2017	2018	2019	2020
Diamond (carats)	US$7191.00	11,311.44 (1,573,000)	13,415.02 (1,865,529)	15,030.48 (2,090,179)	13,040.92 (1,813,506)	10,812.57 (1,503,625)
Uranium (tonnes)	US$618.43	2.52 (4,082)	3.08 (4,981)	4.03 (6,514)	3.99 (6,458)	3.95 (6,382)
Copper (tonnes)	US$137068.37	2,246.69 (16,391)	2,119.90 (15,466)	2,080.29 (15,177)	2,047.80 (14,940)	2,157.59 (15,741)
Zinc (tonnes)	US$42497.80	7,054.08 (165,987)	7,716.71 (181,579)	7,375.96 (173,561)	7,223.39 (169,971)	3,944.31 (92,812)
Gold (kg)	US$25920.39	1,230.52 (47,473)	1,368.47 (52,795)	1,429.28 (55,141)	1,360.28 (52,479)	1,374.97 (53,046)
Lead (tonnes)	US$32175.55	478.19 (14,862)	447.72 (13,915)	452.65 (14,068)	443.48 (13,783)	572.27 (17,786)
Tin (tonnes)	US$511.64	- -	- -	- -	0.00 (7)	0.24 (473)
Iron (tonnes)	US$2373.61	20.12 (8,478)	5.82 (2,450)	119.05 (50,154)	36.86 (15,530)	96.24 (40,544)
Industrial Minerals (tonnes)		(1,613,290)	- (1,696,187)	- (1,774,008)	- (1,041,407)	- (987,872)

Source: Compute data from the Chamber of Mines Annual Report Review 2020. The values in ( ) quantity mined per year.

Table 1 present the past five years annual Namibia mining sector mineral productions in quantity and estimated values computed at the current commodity average price as of 02

October 2021. The data shows that while diamond volume is low compared to other commodities, it has the highest value although moving up and downs. Zinc has been the leading commodity produced by volume in Namibia over the years. But the shutdown of the Skorpion Mine has a decrease of more than a half volume in 2020. Gold and Copper production has been relatively stable over the years. While there was tin produce, production was significantly low by volume and quantity. The monetary value of industrial minerals cannot precisely be estimated due to the wide variety of commodities and the limit to get price data.

Namibia is currently the fourth largest exporter of non-fuel minerals in Africa and among the world's top 10 diamond producers (KPMG., 2014). In 2018, the Namibian large-scale mining sector directly contributed about 14% of the GDP growth of 22% from 2017. A health performance resulted from production increases in uranium by Husab Mine, which came in operation and diamonds by Namdeb and Debmarine improved the efficiency of their operation, which grew by 64.8% and 13.7%, respectively. The formal mining sector generated some N$33.545 billion in revenue in nominal terms, of which about 40% (N$13.418 billion) was spent on goods and services from local suppliers. Minerals contributed about 54% of export earnings and about 7% of the tax revenue annually. The formal mining sector generates revenue from corporate taxes and royalties, PAYE, and dividends (CMN, 2018). Besides serving as a critical revenue stream for the government, the mining industry is a significant lifeline for various sectors of the economy, such as transportation and manufacturing. However, informal small-scale mining in the Erongo region in the western part of Namibia is unidentified due to a lack of information.

The mining sector employed more than 20 700 individuals directly and indirectly. The amount of about N$147.8 million and N$73.1 million was spent on skills development and corporate social responsibility by the mining sector, respectively (CMN, 2018). There are about 16 operating mining companies in terms of ownership, of which five are 100 per cent foreign-owned, and only ten operations have local shareholders with less than 20 per cent, and one operation with the Namdeb arrangement is an exception 50% owned by the government. The government has advocated for local ownership over the years; thus, several mineral exploration licenses were issued to Namibians. By the last part of 2018, more than 60 percentages of all Exclusive Prospecting Licences (EPLs) were awarded to Namibian

individuals or registered companies. The deficiency of financial resources and access to invest among the Namibians has shared the significant factors contributing to them trading their mining licence ownership with the foreign in terms of loans. Those loans are paid back once discovered of the mineral deposit goes into production. Such an agreement is not a beneficial economic arrangement, and the government is looking forward to finding other means to empower the citizens. Economic growth and development from mining for the Namibian people are questionable as it did not broad-based translate into sustainable socio-economic development.

Apart from local ownership and adequate, sustainable socio-economic development, the mining sector has other significant challenges due to local investment. Those challenges include technical skills shortages, water supply, stakeholder demands from shareholders, declining ore grades, escalating energy costs and sustainability due to import energy dependence. In addition, limited links have been made between mining permits and national policy and legislative objectives. The mining sector has different interests, but the main stakeholder considers the banking institutions' financial institutions for this work's appeal. This is because the banking institutions act as intermediaries to provide financial services such as lending to mines and investment advisors.

2.3.2. Financial Institutions overview in Namibia

In Namibia, there are more than 600 financial institutions across the country. The financial institutions are regulated by the Namibian governing institutions established through Namibian Government Acts. There are two types of financial institutions public (government) and private (companies) institutions. Banks are under the public umbrella, such as the Development Bank of Namibia [DBN] and non-banking institutions, namely the pension funds such as the Government Institutions Pension Fund [GIPF]. While under private institutions, there are commercial banking examples First National Bank [FNB] and non-commercial banks for Old Mutual. By law, non-banking financial institutions are only required to invest 35 per cent of their total assets in the domestic economy Bank of Namibia (2021b), including the mining sector.

Three independent authorities regulate financial entities in Namibia now. Firstly, a central bank called the Bank of Namibia [BON] was established by Act No. 8 of 1990. BON banking

institutions regulated by the financial act controls all commercial banks in Namibia. This is because those commercial banks are expected to drive economic growth by providing credit to the critical sectors of the economy. Nevertheless, it is not clear whether banks are significantly impacting the economy (Paavo, 2017). Secondly, the Treasury Department, Ministry of Finance, also regulated by the government State Finance Act 31 of 1990, controls all public finance institutions. Thirdly, the Namibia Financial Institutions Supervisory Authority [NAMFISA] is an independent institution established under Act No. 3 of 2001 that presents how to regulate and supervise non-banking financial institutions in the financial industry in the public interest is fully funded by charges imposed on this industry. As of 2021 February, NAMFISA regulated 636 entities, including financial intermediaries, namely, Building societies, Credit unions, Mutual savings banks, Savings banks, financial advisers or brokers, Insurance companies, and investment schemes country-wide 1st quarter of 2019. All those institutions mentioned above have different mandatories to contribute meaningfully to the overall performance of the country's economic growth and financial and price stability.

This could be in mining projects, but most corporate decisions on investing local involve a financial institution's participation either directly through project finance or indirectly in the form of insurance. All financial institutions have a vital role in Namibia's productive activity, but in mining, they are significant given the massive amounts of initial investment required. A typical FDI mining project involves an investment of US$700mn to 1 billion and is unlikely to go ahead without financial backing from a syndicate of financial institutions as well as political risk insurance and other types of insurance. Equity used to be the only way to finance projects in countries with high political risks where mineral resources are often found. Nevertheless, mining is usually funded through project finance because of the liberalisation of investment financial and technical assistance from multilateral and bilateral agencies, where funds are repaid from the project's cash flow. The assets are used as collateral. There is a significant limit recourse to the sponsoring companies' assets. Those are typical of large projects requiring considerable investment and high risks. This study's interest is on banking institutions in which the researcher classified them as development banks and commercial banks. For this study, the researcher researched only the eight commercial banking institutions.

2.3.3. Names of Licensed Commercial Bank

Commercial banks are financial institutions that aim to earn profit by accepting deposits from the public and giving loans for investment. Generally, the interpretation is that commercial banks are the primary providers of debt financing to mining projects. However, in most cases, they do not take straight equity and primarily provide the projects finance because of various challenges.

Commercial banks are public suppliers of funds for supporting natural resources economic activities in Namibia. Without their services, many projects today will not be in operation. Namibia has eight public banking institutions: First National Bank Namibia Limited [FNB], Bank Windhoek Namibia Limited [BWN], Standard Bank Namibia Limited [SBN], Nedbank Namibia Limited [NBN], Bank BIC Namibia Limited [BIC], Trustco Bank Namibia Limited [TSN], Letshego Bank Namibia Limited [LSN] and Banco Atlántico [BAN] (branch of foreign banking institution)(Bank of Namibia, 2020). Among other responsibilities, BON is responsible for supervising all commercial bank activities in Namibia. Non-banking financial institutions dominate the Namibian financial sector, but the above commercial banks are relatively large as they accounted for around 70 per cent of GDP in 2017.

Table 2 shows the annual distribution of loans and advances by financial institutions to various economic sectors. It is evident that over the five years if not more than a half is closed to the half loans that have been given to individuals. The real estate and business services have also received a large portion of the loans, followed by the trade and accommodation sectors. The mining and quarrying sector that is the interest sector for this research has received only about 2% of the total portion of loans and advance records on the economy. Although the amount has been increasing slightly, the part is significantly lower considering the mining sector contribution to the GDP. The other sectors of the economy proportion have been between 2% to 8%, quite also an unfair portion.

Table 2. Namibian sectoral distribution of loans and advances

Sector	2016	2017	2018	2019	2020
Agriculture and Forestry	4%	3%	5%	4%	4%
Construction	4%	3%	4%	3%	3%

Electricity and Water	1%	1%	2%	3%	2%
Financial and Insurance Service	5%	3%	6%	7%	8%
Fishing	1%	1%	1%	1%	1%
Government Services	3%	3%	2%	6%	5%
Individuals	45%	61%	49%	46%	44%
Manufacturing	2%	2%	2%	3%	3%
Mining and Quarrying	2%	2%	2%	2%	2%
Real Estate and Business Services	12%	10%	13%	11%	11%
Trade and Accommodation	19%	10%	10%	7%	6%
Transport and Communication	2%	1%	2%	2%	2%
Other	3%	2%	3%	6%	9%
Total in N$ Million	85,064	91,651	96,907	103,866	104,963

Source: Bank of Namibia reports

2.4. The role of a financial institution in the mining sector

The financial institution attracts financial deposits and provides financial capital from the owner of capital to the rent of capital. The overall role of a financial institution in the economy is to ensure sustainable economic growth and development. The financial institution's role in the mining sector depends on the mineral life cycle phase of the project. Companies at the prospection and exploration phase are risky, and the future cash flow cannot estimate with certainty. Therefore, they are more financed with equity. Such capital is from private investors, venture capital funds and stock exchanges. Thus, the financial institution is rare to involve in that phase. However, a financial institution such as a commercial bank usually is involved once the project reaches the construction phase to provide debt finance in the project finance structure.

Investment banks are also known to act as project promotors or investors to mobilise, save and secure equity and debt finance sources on foreign markets and negotiate lending terms. That plays a vital role in coordinating households and firms' saving and investment decisions. They also work as financial intermediation in transferring foreign capital, facilitating transactions, and allocating resources. In addition, banks play a significant role in providing hedge assurance to cover the issue arising from fluctuations in metal prices and exchange rates. That is simple to reduce the risks to their customers. Another function that the financial institution plays is to provide insurance cover with both risks associated with the construction and operation of the mine and political risk and legal risks through facilitating risk

management (Levine, 1997). The financial institution is also known to play a management role in monitoring business financial behaviours by evaluating and ranking them based on their financial and non-financial performance. In conclusion, nowadays, financial institutions such as banks have multi-disciplinary expert teams who can assist mining corporations with identifying opportunities in the mining and metals risk and help them navigate risks and challenges. Overall, they can collaborate with internal and external teams to provide holistic solutions on financing and working capital management, business transaction facilitation, and investment banking that include research and advisory on merge and acquisition, project and export financing.

2.5. Theoretical Literature

This research study is associated with two domain hypotheses: the financial development – economic growth hypothesis and natural resources – economic growth hypothesis.

2.5.1. Financial Development and Economic Growth Hypothesis

The first domain is the financial development – economic growth hypothesis that massive research in the literature in which researchers and practitioners explore the links between financial development and economic growth and development. But there is still a debate on the role of the financial sectors in economic growth. Numerous papers have been written on this topic. See, for example, Levine (2005), Aziakpono (2011) and Abusharbeh (2017). The ongoing debate on the link between financial development/banking and economic growth. The majority of researchers believe that financial development and economic growth have a positive relation, and some understand that there is no significant link between the two. In this part, the evolution of the theories behind financial development – economic growth theories are presented:

Lombard Street hypothesis

The first researcher to point out the role of finance in economic development was Walter Bagehot in 1873. In his book titled “Lombard Street: A description of the money market.” He argues that if English traders would like to trade their commodities at much lower prices than traders using their wealth to make higher returns on their investment, they should use borrowed capital. Because even after paying for the interest on their loans, they should

borrow at low-interest rates to make more profit than competitors. He further argues that the English traders have become a trade on borrowed money essentially and that it is only by the refinement of their banking system that they can do the sort of trade they do, or to get through the quantity of it and to make the best of their banking system and to work it in the best way that it is capable of (Bagehot, 1873; Levine, 1997).

Schumpeter economic model

Another earliest theory on financial development and economic growth dates back to J. Schumpeter (1934). In his classic work for 1934, he recognises and highlights the role of banking in promoting economic growth and development. He also argues that financial institutions can identify and finance initiative innovation for the entrepreneur in the environment; those moves will create investments and job opportunities that will result in future economic growth. That will be due to the new products and improvement on the ageing equipment. The Schumpeter economic model is that banks as key agents provide capital to businesses to explore, research, and develop an effective method to improve their production and product quality. Schumpeter is supported in the literature by various researchers as they agreed that identifying the best production technologies from entrepreneurs and allocating capital through financial intermediaries might boost economic development (Acemoglu, Aghion, & Zilibotti, 2003; Blackburn & Hung, 1998; Galetovic, 1996; Goldsmith, 1969).

Solow Growth Model

The third economic growth model is the first neoclassical growth model, Solow Growth Model, built on the Keynesian Harrod-Domar model. The Nobel Prize-winning economist Robert Solow developed the Solow Growth Model (Masoud, 2014; Solow, 1956). This Model is referred to as the Neoclassical Growth Model developed in 1946, which emphasises that a steady economic growth rate is driven by three economic forces that come into play: labour, capital, and technology. They claim that the growth rate of the whole economy in the steady-state equilibrium is equivalent to the growth rate of the labour force and is independent of the saving and investment rate in the economy. Another claim is that achieving short-term economic equilibrium is merely by adjusting those three forces to grow the economy, but long-term growth is solely determined by advancing technology.

Endogenous Growth Theory

The fourth economic theory is the Endogenous Growth Theory. The Endogenous Growth Theory is diverging from the Solow Growth Model. It implied that the economic growth is generated internally by endogenous forces but not through exogenous forces such as the technology advance as the Solow Growth Model claimed (Bencivenga & Smith, 1991; Masoud, 2014; Romer, 1994). For example, advancement in mineral separation technology could lead to mines that could not mine out due to technology limits, which will increase the mineral product that is also more likely to be affected economic development in a country. The endogenous factors contributing to economic growth invest in education, health, and telecommunications innovation knowledge sectors. The spillover of such an investment is the one that led to economic growth. Another key implication of the Endogenous Growth Theory is that if the government can formulate policies that encourage more market competition and stimulate innovation in products and processes, it can grow. However, the main argument of the Endogenous Growth Theory is that financial intermediations have significant roles in economic growth when liquidity risk effectively manages to encourage savers to invest their capital in a productive instrument that can induce economic growth and development. In agreement, Levine (2005) point out that economic growth will be through payment services, mobilising and pooling savings, information acquisition and process, investment monitoring and governance, risk diversification and minimising intertemporal risk.

2.5.2. Mineral Resources and Economic Growth Hypothesis

The second domain of research that considers and has been explored is the link between the natural resource, specifically mineral resources – economic growth. The relationship between the natural resources (mineral resources) dependence and economic growth has been a topic for discussion and debate for years. In this research, the researcher follows the distinction between resource abundance (resource stocks or rents per person) and resource dependence (resource rents or revenues as a share of exports or GDP), as presented by Lashitew and Werker (2020).

Some of the earliest research has been devoted to seeking clarity on the impact of mineral resources on economic growth. Others investigate the effect of increased export revenues from mineral resources exports and other economic sectors-the current divided view on the

relationship between mineral resources and economic development. Singer (1950) and Prebisch (1950) argued that mineral resources are a backbone for economic growth in any country and can cause a substantial long-term positive effect on economic growth. Countries following exporters of minerals tend to observe a significantly high domestic consumption level when the commodity price is high, creating job employments and revenues. Supported by Esfahani, Mohaddes, and Pesaran (2014), they argue that the abundance of natural commodities is a blessing as it increases the national economic prosperity of a country like Botswana.

On the contrary, Gylfason and Zoega (2006b) argued several critical negative linkages between natural resources and economic growth discussed in the literature, such as Dutch disease and ineffective governance. That also agreed with Isham, Woolcock, Pritchett, and Busby (2005) and Sachs and Warner (1995), the founder of what is known as the resource curse hypothesis and supported by Kalumbu and Sheefeni (2014) argument that countries that heavily depend on minerals tend to face a long-run negative influence on the growth of the economy after the boom due to the balance of trade deficit and Dutch disease. The link highlights that rich natural resource abundance can lead to Dutch disease. The hypothesis argument is that a country that depends primarily on raw material exports such as minerals experience a rapid economic growth phase when commodity prices surge drives up the currency's exchange rate. Such growth would decrease economic growth in other sectors such as manufacturing and service regarding quantity and quality products and services. The boom and busts of the commodity tend to lead to financial instability in those countries, triggered by balance of trade deficit plus it also leads to the reduction on investment in the other tradable sector. The effect of commodity volatility is correspondingly to affect the labour stability as employees tend to non-mineral resources such as agriculture and tourism when the commodity price is high, then return when the price drops as wages decrease.

While those two domains continue to be explored separately, the interaction between financial institutions, mineral resource (dependence) and economic growth has not been studied thoroughly yet. There are several previous research that seeks to investigate the relationships between the natural resources and political or government institutions found in the literature (Acemoglu, Johnson, & Robinson, 2001; Eicher, García-Peñalosa, & Teksoz, 2006; Knack &

Keefer, 1995; Lashitew & Werker, 2020; Papyrakis & Gerlagh, 2004)., but not the financial institutions.

2.6. Empirical Literature

Financial institutions have a crucial role in any economic activity, and when it comes to the mining industry, given that a massive amount of initial capital investment is required and commodities price dynamic, they are expected to play intermediaries between lenders and borrowers. That mean the banking institutions have to facilitate capital in society through loans and equity from the saving of the individuals and other institutions. Equity is commonly used to be the only way to finance mineral projects in countries with a high political and economic risk level where mineral resources are often found, for example, in countries like Democratic Republic Of Congo, Venezuela, Zimbabwe, Sudan and Mali etc. (Grieg-Gran, 2002). The mineral sector is one of the industry's most countries, depending on government income sources and economic development. However, the mining sectors cannot be developed without the financial capital that has to come from investors through banks. The role of financial institutions on economic growth and development has come under review over the years. It has been that some of the research papers presented below are from the different sectors such as agriculture, manufacture or generalise, meaning not linked to any economic activity. Research on the role of banking institutions in mineral project financing as it influences economic growth and development has not been explored significantly as far as the researcher's knowledge.

While there are still different results around the relationship between economic growth and financial development, according to Caporale, Rault, Sova, and Sova (2015) and Chebab, Mazlan, Ngah, and Chin (2020) the early empirical study presented a positive relation between financial development and GDP per capita was by Goldsmith in 1969.Bencivenga and Smith (1991) In 1969, Goldsmith's primary task was to describe and analyse the financial structures of individual countries and groups of countries, both spatial vs temporal, over their development and explain the relationship between financial development and economic growth (Revell, 1970). In that study, he uses cross-section analysis and time-series data. A series of data for 35 countries, 19 developed and 16 least developed, was used in the analysis. Notable, the data used were varied as while developed countries' data date as far as the 1880s

with five dates to 1860, that is not the case for the developing countries with majorities data start in the 1900s. For analysis purposes, the data collected up to 1963 was split and broken down into parts. The main conclusion from the study was that developed countries was found to have a higher financial inter-relation ratio than least developed countries, and it also point out the importance of financial institutions in financing course that is contrarily linked to the economy growth. While his study was not directly linked to the mining sector and financial institution and economic growth, it was comprehensive and demonstrated the positive relationship between financial intermediation and economic growth. According to Bencivenga and Smith (1991) the positive relationship between economic development and GDP per capita is present to be due to the improved in efficiency of financial intermediation before the volume of investment

Gylfason and Zoega (2006) investigate the relationship between natural resources and economic growth through saving and investment using annual World Bank data from 1965 to 1998 for a cross-section sample of 85 countries. They employed a time series test of Endogenous Growth Models to show how economic growth depends on the abundance of natural resources and the quality of the capital stock in the long run. Some of the findings that aligned with this study are: economic growth is inversely related to natural resource abundance but directly relates to human capital development and investment and foreign saving – in the form of current account deficit, and the direct relationship between investment and the development of the financial system and domestic gross saving and investment on growth with the maturity of the financial system. The main recommendation is for the more efficient allocation of quality capital for new investment that can at least counties need to reform their economic and institutional reforms to pave the way for sustainable economic growth. The research is relevant as it gives insight that there is evidence that domestic savings and investment capital can contribute to economic growth, which could happen only through the maturity financial system.

The study by Hartmann (1986) was one of the early researchers that studied the impact of mining on Namibia's economic development. He employed regression analysis to determine the relationship between the contribution of mining to the economic development of SWA/Namibia. The principal limit that he states during his was the lack of reliable data on the subject as the was an intensive effort to search for available statistics and to revise, verify

and arrange from various sources. Using the information and data for 35 years, his main conclusion was that mining does have a significant role in the economic development, but it has a cyclic impact on the economy as a whole or specific macro-economic factors of the economy, namely production, employment, taxation, investment and financial flows in the country. That indicated that the sector significantly influences extraneous economic factors and non-economic factors. Another finding related to this study was that there was limited domestic investment capital inflow into mining, not due to insufficient surplus savings. He justifies that was due to the underdevelopment of the domestic capital market and the continuity dependence on finances from foreign investors by multi-national mining companies. This research has provided better insight into the history of mining and economic development in Namibia; however, it was done many years ago while the country was under the South African minority government. Therefore, it has become interesting to research this area in the new Namibia

Malmström and Poulsen (2009) explored the relationship between diamond exports as a share of GDP and Namibia's economic growth using a Vector Error Correction [VEC] methodology to determine how Namibia can avoid the resource curse phenomenal. The finding contradicts the famous results for Sachs and Warner (1995), as the Namibian diamond exports revenues were estimated to have a positive relationship with the economic growth. The study was limited to one commodity, while the Namibian mining sector has more than one commodity. It did not explore the relationship between the financial institutions and the mining sector as well as the economic growth.

Sheefeni and Simon (2016) investigated the link between primary commodities exports and economic growth in Namibia by using quarterly data from 1998 to 2014. They applied the time-series econometric techniques such as unit root, cointegration and the Granger-causality test within the vector auto-regression [VAR] approach to analyse the causal relationship. Their findings were that unidirectional causality ran from primary commodities export to economic growth. However, their data were not separated into the sector to determine the relationship of mining contribution on economic growth nor the link between financial sectors. United Nations Environment Programme. Division of Technology and Economics (2002) analysed the role of financial institutions in sustainable mineral development by charting the investment process in the mining industry (from early exploration to mine closure

and land reclamation) and identifying the key stakeholders at each stage as well as their role in shaping the environmental and social side of mining projects. The methodology employed in obtaining information/material was through a series of face-to-face discussions with key decision-makers (usually Heads of Mining Finance) in banks, financial institutions, insurance companies, technical consultancy firms and some major mining companies. The discussion highlighted that the financial institutions investing in mineral exploration, mine site development, and metals production are increasingly aware of these activities' environmental and social risks. Hence, it suggested that the report will also help other stakeholders interested in promoting sustainable development to understand better the issues related to mining project financing—however, there is no relationship between mining financing and economic growth.

In Namibia, banking's economic growth role has not been explored, but two studies not directly linked have been found. Paavo (2018), in his Master thesis, investigated the impact of commercial banks development on economic growth in Namibia. Data collected quarterly on GDP and various commercial banks development indicators, covering from March 2005 to December 2016. The methodology employed in determining the existence of the short-run and long-run relationships was the Auto-Regression Distributive Lag [ARDL]. Furthermore, it employed the Granger causality test in determining the causal relationship between banking sector development and economic growth. Results show a positive short-run link between banking sector development and GDP growth, channelled through net interest income and banks' funding liabilities.

Furthermore, the causality test indicated a bi-directional causality between economic growth and the banking sector development, entailing that the banking sector's development would enhance GDP growth and vice versa. Therefore, it is recommended that commercial banks develop economic growth in Namibia and recommend reforms in the banking industry to ensure increased lending to support the economy. However, the investigation does not show a relationship between mining financing and economic growth as it was too general.

Tafiremyika Sunde (2010) aimed to determine the relationship between financial sector development and economic growth. The motivation factors were that no similar study was ever done in Namibia, and the association between financial development and economic growth is still not known publicly. The study was meant to be the source of valuable literature

to policymakers and academics in Namibia. The method employed was the Granger causality test to establish the relationship among the financial sector indicators and economic growth indicators after using the unit root and cointegration tests. The finding was that the relationship between financial development and economic growth was by and large bidirectional. Saude (2010) referred that the financial sector also grows when the economy grows and vice versa. The financial sector variable used to determine this relationship was the logarithm of the ratio of private sector credit to GDP, Granger caused the variables, the logarithm of GDP, and the logarithm income per capita. The concern with this study was the sample size used due to the limit of the Namibian economy's data. The limit of the data is a concern in Namibia.

2.7. Conclusion

Natural resources, primarily mineral resources, are essential for the development of any country. Hence, the literature explicitly elaborates on essential factors within the financial institutions and mining sector. Besides, none of the literature studies has a third party that makes it so non-comparable because there is an enormous gap between this study's objective and theirs.

CHAPTER 3: METHODOLOGY

3.1. Introduction

This chapter consists of four sections, including the introduction, and it is organised as follows: the introduction, followed by the research designs; the third section, which discusses the mixed-method research strategy divided into two phases: Phase 1, quantitative research, which includes the content analysis, the quantitative data analysis and reliability and validity of the study; Phase 2, detailed the qualitative research, which contains the interviews, sample selection, qualitative data analysis, and the establishing authenticity and trustworthiness—finally, the conclusion to the chapter.

3.2. Research Approach

. This research follows the mixed-method research approach that was introduced in the middle-late 1980s (Creswell, 2013). The motivation is that it permits the researcher to collect data and analysis processes to analyse the relationship between financial institutions financing toward the mineral resource's projects and economic growth in Namibia from various sources and financial institutions. Its aid minimises the uneven results that appear when a quantitative or a qualitative approach due to their deficiencies or biases is utilised (Abro, Khurshid, & Aamir, 2015; Greene, Caracelli, & Graham, 1989; Kopinak, 1999). Different researchers define this research approach in different terms: Levitt et al. (2018) define research design as a qualitative, quantitative, and mixed methods approach that provides specific direction for procedures in a research study. The mixed-method approach combines the multiple techniques in a single study in which the research uses various data collection and analysis methods. The purpose of a research design is to ensure that the evidence obtained supports the researcher to answer the initial question as evident as possible.

The research approach's choice is guided by this study's research questions and objectives, data types, and the analysis approach. The research question posed in this study has started with "what", "why", "how", and "which" that, by nature, are a mix of research questions. To answer such questions, the qualitative data have to be analysed to answer the subjective from the understanding the problem. In contrast, the quantitative data must be collected to answer objective questions based on the numerical data analysis with statistical methods. The

quantitative approach addresses the first two research questions through regression analysis and questionnaire, while the qualitative approach manages the sub-questions of question 2 by getting the information through the questionnaire/survey.

Depending on philosophical assumptions, researchers could use broad genetic types of research designs singly or integrated to explore and seek their research objectives and questions. The three typical approaches described in the literature are exploratory, explanatory, and descriptive. This study looks at the descriptive research designs to describe the study's characteristics. The aim is to respond to the question, “what are the roles of financial institutions in financing natural resources to uplift the Namibian economy's development, and what strategies and financial products are available in Namibian financial institutions for natural resources (mineral resources)?” Selecting this research approach is significant to answer the research questions regarding the validity, objectively, accurately, and economically as possible (Kerlinger & Lee, 2000).

3.2.1. Research Design: Convergent Mixed-Methods Parallel

In examining this study's objectives and questions, the study adopted a convergent mixed-methods parallel research design (descriptive and explanatory research) to assess financial institutions' role in natural resources financing in Namibia. The convergent similar mixed methods approach is a type of research design in which quantitative and qualitative data are collected in parallel, analysed separately, and then merged (Creswell & Clark, 2011). According to Creswell (2003), a mixed-method approach involves collecting quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks. In comparison, Teddlie and Tashakkori (2003) define it as a practice for collecting, analysing, and “mixing” quantitative and qualitative data at some point in the research process within a single study. The mixed methodology is appropriate for this study because the researcher believes that neither quantitative nor qualitative methods are sufficient to capture the current trends and details of a financial institution's roles in financing mineral resources in Namibia. The researcher’s intention is to explore, develop a complete understanding by comparing quantitative and qualitative results from the two-research approach. It is done to have a depth understanding of the relationship between the two sectors. Identify the financial institution's mandatory legal

requirements and know the Namibian financial structures in financing mineral resources projects and how they impacted the economic growth.

3.3. Research Strategy

The research strategy is the general plan for answering the research questions already defined. The case study strategy is employed for quantitative and qualitative research. The case study strategy is vital for this research to assess the financial institution's role in financing the mining sector for economic growth and sustainable development. That aligns with Saunders, Lewis, and Thornhill (2000) defined a case study as the progress in details, intensive knowledge about a single case or the small numbers of related cases. This strategy is selected as anticipated by the limited available source of information, and the researcher must observe and analyse multiple sources of information to build a case study. This approach helps answer the questions of "what" and why".

Furthermore, the case study is the best approach to get a deep understanding of the financial institution's current role by using the semi-structured questionnaire, on which the bank' executives or senior officer members are interviewed to respond to the set of questions defined in Chapter 1. Thus, the qualitative data combined with quantitative data collected from a secondary source provides insight into the role of financial institutions on the mineral sector financing in Namibia economic growth.

3.3.1 Quantitative Design

3.3.1.1. Quantitative Sampling

This research employed annual time series data sample set from 2006 to 2020. The study period is selected intentionally to encompass the following three reasons: (a) it is the period that contains most of the necessary data points to carry out the investigation. (b) before 2006 the financial institutions had not recorded those data in sectors as required in this study. (c) the impact of the global financial crisis in 2008. For the time series data, the Namibian commercial banking sector and mining sector since 1990 is a better description of population study. As presented in Table 3 the data are drawn from a publicly available data source such as an online database, quarterly reports, and annual reports for the institutions, namely the

World Bank/IMF, Namibia Statistics Agency, Bank of Namibia, and the Chamber of Mines of Namibia, and Commercial banks.

Table 3. Source of variable data

Variables	Data Sources
Gross Domestic Product	Bank of Namibia; World Bank
Domestic Commercial banks' lending	Bank of Namibia; Ministry of Finance; Commercial banks
Number of permanent employees	Chamber of Mines of Namibia
Government taxation revenue from mining	Ministry of Mines and Energy; Chamber of Mines of Namibia; Bank of Namibia; Ministry of Finance
Real Interest rate	Bank of Namibia; Namibia Statistics Agency
Official exchange rate	Bank of Namibia;

Section 3.3.1.4 presented the description of the variable and source used in this research study. The advantage of this approach is that the data is collected from various sources already collected for various purposes.

3.3.1.2. Regression Model

In this section present the empirical Model utilised in this research. The study adopted a regression analysis to examine the effect of financial institutions' financing in mineral resources projects' contribution to economic growth and development in Namibia. The methodology involves regressing GDP dependence, while the following variables are independent: commercial banks' lending, the number of permanent employees in mining, government taxes revenue from mining, interest rate, and exchange rate. The independent variables are selected based on the main factors associated with financial institutions and the mining sector. A log-linear regression model is implemented as it permits linearity to be accomplished in the data and detect the relationship between the variables in the Model. With reviewed works of literature and research objectives, the functional form below adopted the Model:

$$GDP = F(CBLM, MEP, GTM, ITR, XR) \quad (1)$$

To capture the effect of financial institutions' financing in mineral resources projects' contribution to economic growth, the following equation 2 is the econometric form of the models for estimating the effect:

$$GDP_t = \beta_0 + \beta_1 CBLM_t + \beta_2 EMP_t + \beta_3 GTM_t + \beta_4 ITR_t + \beta_5 XR_t + \varepsilon_t \quad (2)$$

Where:

GDP	-	Gross Domestic Product
CBLM	-	Domestic Commercial banks' lending
MEP	-	Number of permanent employees
GTM	-	Government taxation revenue from mining
ITR	-	Real Interest rate
XR		Official exchange rate
t	-	represents time in the year
β0	-	a constant
ε	-	the Model's random error (residual) term
β1 – β5	-	parameters to be assessed

3.3.1.3. Description and Measure Variables

This section of the study presents the description and measurement of variables and the theoretical justification from prior studies. Furthermore, a priori expectation is given in line with a few empirical works of literature.

3.3.1.3.1 Dependent Variable

Gross Domestic Product (N$)

In assessing the role of financial institutions in financing natural resources to uplift the Namibian economy's development, the author has used the total GDP as the dependent variable. The mining yearly percentage growth rate of GDP at market prices is based on constant local currency. GDP is the total sum of gross value added by all resident producers in the economy plus any product taxes less any subsidies not included in the value of the products. It is calculated by dividing the total contribution of the mining sector by the overall GDP. This approach has been used in studies by Aryee (2001).

3.3.1.3.2 Independent Variables

There is not much existing theoretical literature, and prior empirical investigations looked at the three dimensions (Financial Institutions' financing – Mineral resources – Economic growth and development) like in this study. Therefore, the author used the following macroeconomic factors as independent variables contributing to the variations of mining sectors' influence on GDP per GDP. The approach is evaluated by using regression and coefficient analysis. That analysis helps find the patterns relationships among different economic sectors on how they influence GDP growth to decide upon the future trends on how GDP is likely to perform (Kunda & Chihana, 2017).

Domestic Commercial banks' lending (N$)

Commercial - Domestic lending to the mining sector refers to financial resources provided to the mining sector by commercial banks, such as loans, purchases of non-equity securities, trade credits and other accounts receivable, which establish acclaim for repayment. Most studies agree that financial lending to productive sectors positively impacted the development of the real sector in the economy (Morina & Özen, 2020); (Uukelo, 2007). The rise in financial lending results in rising projects, likely to create more job opportunities as those projects will need human capital to run the operation. This study expects financial lending to mineral resources to contribute to economic growth positively.

Number of permanent employees

The variable refers to the total direct employment consisted of permanent employees, temporary employees and contractors as by the end of each year. It employed permanent employees as one of the independent variables to determine the effects of mining contribution to GDP as this is one of the significant factors required in mineral resources' operations. Bottge and Interior (1986) said the development of mineral deposits has a likely impact on increasing the number of employees expected to affect economic growth positively. In addition, when there is high employment available in the sector, it is anticipated to have development possibilities for mineral resources and attracts mining-related training Dubiński (2013) also enhance economic growth.

Government taxation revenue from mining (N$)

This referred to the total revenue to government from the mining sector that sources from corporate taxes, royalties, mining licence application fees and export levies, respectively. In

general, government revenue impacts economic growth by meeting the various governmental needs. Magu (2013); Egbunike, Emudainohwo, and Gunardi (2018) found a direct relationship between economic growth and income tax and that an increase in VAT leads to positive effects on the rate of economic growth. However, Ojong, Anthony, and Arikpo (2016) argue that there is no significant relationship between mining company income tax and economic growth. The study expects a direct connection between the government revenue of Namibia and economic development.

Real Interest rate (%)

The real interest rate is measured as the amount by which the nominal interest rate is higher than the inflation rate. A real interest rate is adjusted to remove the impact of inflation to reflect the real cost of funds (cost of debt) to the borrower and the real yield to the lender or an investor. When using cointegration and error-correction models, Odhiambo (2010) found strong support for the positive impact of interest rate reforms on financial development; however, in his previous study, the financial development resulted from interest rate reforms not Granger cause investment and economic growth. The study is with the exception that if the lending rate increase, the economic growth may decrease as the potential investor's willingness will be influenced by the effects of the real interest rates.

Official Exchange Rate (N$/USD)

The official exchange rate is when the national authority or government determines the exchange rate in the value of a domestic currency in terms of the money of another nation's currency. The exchange rate is the price of one currency expressed in terms of another currency. For this study, the official exchange rate can be calculated as a yearly average based on the monthly daily exchange rate of the domestic currency and foreign currency, and in the Namibian context, the daily exchange is published by the Bank of Namibia at around 10:30 am. The Namibian national' local currency unit is relative to the U.S dollar. In this study, the researcher expects a high official exchange rate to impact the country's GDP positively.3.3.1.4. Descriptive Statistics Analysis

To understand and determine whether the quantitative data collected are symmetric or not, the data is subjected to descriptive statistical analysis. The descriptive statistical analysis

produces the mean, median, minimum, maximum, standard deviation, kurtosis, and skewness. In addition, with descriptive statistical analysis, the data residual is also being determined.

3.3.1.5. Unit Root Analysis

The unit root testing is carried out in the study to assess the time-series data stationarity in each variable. According to Nkoro and Uko (2016), the time-series data have unit roots if they are non-stationary, otherwise considered stationarity, indicating that the data average does not change over time. The data series with unit roots tend not to return to a long-run trend (deterministic) path. It is essential to determine if the data series has a unit root or not as the data series are said to be suffering from random shocks, and such if data with the unit root are used in the regression analysis, they tend to give misleading results (Gujarati & Porter, 2003). When analysing the data using regressions analysis, the underlying assumption is that the data are stationary that the means of the average, variance, and covariance are not time-dependent. To convert the non-stationary data into stationary data using methods such as transforming the data, rolling statistics, and differencing approach.

There are several methods of testing the data stationarity in which the most common is the Augmented Dickey-Fuller [ADF] test (Dickey & Fuller, 1981), Dickey-Fuller test [DF], Durbin-Watson [DW] test and the Philips-Perron [PP] test (Phillips & Perron, 1988), among others. While the choice of the testing method depends on the set-up of the problem, which is of interest to the researchers, the most common methods are the ADF test (Dickey & Fuller, 1981) and the DF. But before using the formal methods, the simple approach is to plot the time series under study to determine the possible features of the series and run the traditional regression. If the data has an upward or downward trend, it demonstrates that the series' meaning has changed with time.

The ADF test is employed to test the stationarity and determine the order of integration of this study. The ADF was chosen not just because of its popularity and wide usage but also to address the weakness of autocorrelation in the error terms by adding the lagged difference term of the dependent variable that cannot manage by a method DF test. Below is the ADF test regression equation employed:

$$\Delta X_t = \alpha_0 + \alpha_1 t + \alpha_2 \Delta X_{t-1} + \alpha_3 \Delta X_{t-3} + \cdots + \alpha_n \Delta X_{t-n} + \varepsilon_t \quad (3)$$

Where,

X_t = variable under deliberation
Δ = difference operator
α = coefficient of time
t = time trend
n = number of lags
ε_t = stochastic error term

The test hypothesis the null hypothesis (H0: $\delta = 0$) suggests the existence of a unit root, and the alternative hypothesis (H1: $\delta < 0$) represents stationarity. To confirm stationarity existence or not, the ADF value and the critical value are compared. If the ADF value is lower than the critical value, the data is non-stationary or stationary. To convert the non-stationary data into stationary data using methods such as transforming the data, rolling statistics, and differencing approach.

3.3.1.6. Cointegration Analysis

After the stationarity analysis, the subsequent research examines a long-run relationship between the model variables. Granger (1981) and Engle and Granger (1987) initially formalised the cointegration test concept. Cointegration is an econometric concept that states that macroeconomic variables can exhibit long-run equilibrium relationships even though the variables may be non-stationary at the level. An estimation procedure to evaluate the long-run relationship between the set of variables must be employed variable is assumed to be stationary-integrate of at least order one. The approach adopted is based on the argument that linear regression limits analysis time series due to spurious correlations. A correlation happens when two or more variables are reflected causally related to either unknowing or coincidental factors. The co-integrate test examined scenarios where two or more non-stationary time series variables are integrated to be unable to diverge from equilibrium in the long run. With the cointegration test, the analysis can present if the variables' average distance will remain relatively constant although the variables series move independently. The most common cointegration tests are the Engle-Granger Two-Step Method, Auto Regressive Distributed Lag [ARDL], and Johansen Test (Trace and Maximum Eigenvalue tests) and the Phillips-Ouliaris test.

The Johansen test for the Maximum Eigenvalue test that tests the co-integrating relationship between several non-stationary time series data was the best option in this study. The Johansen test has some significant features: research studies can simultaneously test more than one co-integrating relationship due to more than two variables. The Johansen test can also address the underlying error-correction model when carried forward to the next step as in the Engle-Granger test. The Johansen test's condition is that it needs the error term in the long-run relationship to be stationary. Although the Johansen cointegration tests have difficulties performing analysis when unique numbers of lags of each variable are required, the study still considers it. Dizaji (2012) states that this is unlike ARDL, which provides flexibility by incorporating different variables' different lags. Due to the time series with few observations, the ARDL method is used. This method has been applied in literature in the time series analysis research with observation range between 18 and 38 (Alhassan, 2016; Narayan & Narayan, 2004; Tang & Nair, 2002).

The mathematical procedure to test the co-integrated in the VEC model for *m* integrating the relationship between *K* different series in X_t:

$$\Delta X_t = \alpha\beta' X_{t-1} + \sum_{i=1}^{p-1} \Phi_i^* \Delta X_{t-1} + \alpha_t - \sum_{j=1}^{q-1} \Theta_i a_{t-1} \quad (4)$$

Where,

ΔXt = represents the first difference defined as $X_t - X_{t-1}$ Variable under deliberation

Φ_i = the autoregressive coefficients

Θ_j = the moving average coefficients

β = the coefficients for the *m* co-integrating vectors

t = time trend

The Maximum Eigenvalue test evaluates the number of liner combinations in the time series data, whereby the Eigenvalue is the non-zero vector—using the Maximum Eigenvalue test when the null hypothesis (H0: $\delta = \delta_0$). The rejected hypothesis means that there is only one likely outcome of the variable to produce a stationary scenario. It goes on to test $\delta \leq j \; \forall j < K$ where again *K* is the number of series examined. In the scenario whereby $\delta_0 = m - 1$ and the

null hypothesis (H_0: $\delta = 0$) are rejected, favouring the alternative, *M* likely linear combinations.

3.3.1.7. VAR/VECM and Causality Analysis

While the Johansen Cointegration Test has been considered to determine if the variables are co-integrated or have a long-run relationship, it is also crucial to guide selecting the approach for the next step. The next step is to investigate the short-run causality relationship between the dependent variable and the independent variables of the defined economic model. The short-term dynamic relationships between the variables tested; if the variable co-integration exists, the VECM is be applied; otherwise, the VAR model is considered. A short description of the two models is discussed below:

The first possible approach is the VAR model that is usually employed to stationary series with first differences to original series and not co-integrated. The VAR is a progress for the autoregressive distributed lag model [ADL] that examine the linear interdependencies among the multiple time series and their differential. The VAR is recommended as a better approach to determine the relationship between the time series variables data that are non-stationary and no- cointegration that can determine with Johansen Cointegration Test. VAR approach analysis considers all variables endogenous and can perform simultaneously and sequentially. The mathematical procedure for the VAR model is as follow:

$$\Delta X_t = \gamma_0 + \gamma_1 + \Delta\, \gamma_{t-1} + \lambda V_{t-1} + \cdots + \varepsilon_t \quad (5)$$

Where, Δ = first difference operator, λ = adjustment speed and all other variables remained as defined previously

The second approach to determine the short-run dynamic between variables is the VECM. The VECM is employed to analyse the time series variable short-run dynamic relationships based on the condition that cointegration is detected in the system with Johansen's method. As Hansen (2005) argues based on the Granger representation theorem, if the variables are co-integrated, there must also be an error correction model that describes the short-run dynamics or adjustments of the co-integrated variables towards their equilibrium values. The VECM has an advantage over the VAR as it can employ even if the variables are not stationary at the level. It permits short-run adjustment dynamics whilst controlling for the

long-run behaviour of the model-dependent variables. Such advantages are that the VECM combines levels and differences and can be estimated instead of a VAR in levels. Transformed the VAR equations establish the mathematic function of the VECM is into VECM specifications as follows:

$$\Delta X_t = \gamma_0 + \gamma_1 + \Delta\, \gamma_{t-1} + \lambda \bigvee_{t-1} + \cdots + \gamma\, ECT_{t-1} + \varepsilon_t \quad (6)$$

Where Δ = first difference operator, $ECTt_{-1}$ is an error correction term with one period lag that should be negative and significant to validity the long-run equilibrium relationship of the model as presented by the t-statistic and its p-value. The γ is the short-run coefficient of the error correction term which should be between -1 and 0, in which the value closer to -1 be there estimated more significant. A coefficient of 0 suggests no one-time adjustment period later, while the value of 1 indicates a total adjustment over the period. The coefficients of the first-differenced variables indicate the short-run impact. And all the variables are described as before. The overall merit of VECM compared to the VAR is that the resulting VAR from VECM representation has more efficient coefficient estimates. That means the VECM approach can identify structural coefficients and take the relevance of unit root tests seriously.

To end, the Granger causality test was used to examine the causal relationship between the variables and determine whether one variable's present lagged values influence another. The test is considered a hypothesis test to determine one variable's possibility in forecasting the other in simple language. Under this analysis, the equation below is used to detect the causal relationship:

$$X_t = b_0 + \sum_{i=1}^{p} b_i\, Y_{t-1} + \sum_{j=1}^{q} d_i X_{t-1} + e_t \quad (7)$$

$$Y_t = c_0 + \sum_{i=1}^{p} c_i\, Y_{t-1} + \sum_{j=1}^{q} \delta_i X_{t-1} + w_t \quad (8)$$

3.3.1.8. Diagnostic Analysis

Once the VAR/VECM model has been produced, a series of diagnostic examinations are commonly recommended to ensure that the formulated model is correct. The examinations carried out in this research included the Jarque Bera Test for normality distribution, Durbin-

Watson Test for autocorrelation, Student zed Breach-Pagan test for heteroskedastic and CUSUM test for model stability.

3.3.2. Qualitative Design

Qualitative research is an inquiry process where the researcher develops a "complex, holistic picture, analyses words report detailed views of informants, and conducts the study in a natural setting" (Cresswell, 1998; Creswell & Poth, 2016). In the mixed research approach, while data can collect concurrent, the information is analysed distinctly, and the results from the two analyses can combine in the interpretation process. For this research, qualitative data are collected through a semi-structured interview process.

3.3.2.1. Population and Sample

A population is a comprehensive group of all the institutions that can potentially be involved in a study as a subject that researchers seek to investigate. The broad population refers to all the financial institutions registered or unregistered in Namibia by three regulators: BON, MoF, and NAMFISA in Namibia. However, this study covers only the population of the registered eight commercial banks under the BON. They are private suppliers of funds for supporting natural resources economic activities in the country. Without their services, many projects today will not be in operation. Even though non-banking financial institutions dominate the Namibian financial sector, commercial banks are relatively large as they accounted for around 70 percent of GDP in 2017. Some points are discussed in Chapter 2, section 2.3.2 a). In addition, the process of selecting only some of these institutions for studying purposes is referred to as sampling (Matthews & Ross, 2010). Within this study, the questionnaire participants target are the senior staff members or executives of registered eight commercial banks in Namibia as listed in Section 2.3.3

3.3.2.2. Qualitative Data Collection

Data collection is the process in which the research data and information are gathered. In the qualitative approach, data collected are commonly non-numerical and descriptive, meaning that the data gathered are texts to provide feeling, narrative, or subjective views on the topic. Data are collected to answer the "how" and "why" research questions. The typical

instruments used to collect data in the qualitative approach were in-depth interviews, observation, documents review and open end- questionnaires. In this study, a semi-structured interview was employed.

Before taking the interview, the preparation process follows four phases to develop the interview form as suggested by Castillo-Montoya (2016) research question and interview question alignment, construct inquiry-based conservation and seek feedback on interview protocols to conduct the pilot interview.

The characteristic of the semi-structured interviews that fit this study are those described by Kabir (2016): the interviewer and respondents would communicate in a formal interview, an 'interview guide' have to be developed by the interviewer to be used during the process, there would be a list of questions and topics that need to be discussed during the conversation commonly in the predefined order, and lastly, the interviewer has to follow the interview guide but is flexible to ask additional follow-up questions. The sample questionnaire is found in the Appendix. The interview was to be prearranged with the financial institutions. The interviewee group is the senior executive staff at the financial institutions that deal with mineral resource projects' financing. A single person represents for each financial institution. The key questions answered through the interview are: What strategies and financial products are available in Namibian financial institutions for natural resources (mineral resources)? Which mineral resources project stage and commodities benefit from Namibian financial institutions, and why? Due to the current Covid-19 crisis that limits the movement and face-to-face interview, the web interview is planned through an internet platform such as Microsoft Teams and Zoom / Google Meet. This method's advantage is that it permits the interviewer to restructure the questions to elicit the relevant information required while at the same time analysing information drawing from the informant's experiences, knowledge, and opinion.

3.3.2.3. Qualitative Data Analysis

Data analysis is the process that the researchers use to organise, exploit, search and arrange the data to enhance their knowledge and understanding of the data and interpret them. As mentioned in this study, the structured interview process would employ thematic analysis to assess the primary qualitative data collected. The thematic analysis is defined by Boyatzis

(1998) as the approach of seeing and making sense out of seemingly unrelated texts that can be qualitative data.

The focus of the data analysis is to help answer the research questions and research objectives. The thematic analysis is the appropriate approach that can help identify and analyse the patterns of the meaning in the interview information collected (Virginia Braun & Clarke, 2006). This approach enables the researcher to identify patterns and themes within the data collection by transcribing, reading, re-reading, analysing, and interpreting the data. That allows the researcher to refine and restructure the interview questions to fit the research questions if needed. Numerous researchers have published framework and guides of how to conduct different versions of thematic analysis depend research objectives (Attride-Stirling, 2001; Harper & Thompson, 2011). For this research the following main six steps are considered for the analysis as presented by Virginia Braun and Clarke (2006); V Braun, Clarke, and Rance (2015): (1) data familiarising, (2) manual coding generation, (3) themes generation, (4) review themes, (5) define and name the themes, and (6) write-up the results. It is essential to point out that the thematic analysis used adopted by Clarke *et al*. is designed to be a recursive approach and not a linear approach. That means that the process allows the researcher to conduct the analysis in the cycle steps as new themes and insight come to light allowing the researcher to learn and improve the results output through the interactive process.

3.3.2.4. Trustworthiness

Lincoln and Guba (1985) have proposed four alternatives for assessing qualitative research's trustworthiness: credibility, dependability, conformability, and transferability. The researcher determines all four aspects to analyse if the qualitative research process is accurate.

3.4. Ethical issues

Even though this research did not involve a vulnerable individual or any psychological experiments, ethical considerations were still crucial to ensure no fabrication of data and information captured accurately from individuals voluntarily. To conduct this research, the ethical guidelines for the university were followed firstly by obtaining an ethics clearance that allowed the researcher to go search for information for the study. The clearance is essential

for the entire research process to guarantee privacy and confidentiality issues for those who volunteered and agreed to be interviewed and the organisations. Participants' confidentiality was discussed in a consent writing letter sent with sample questions and at the beginning of the interview before agreeing to participate. The interview was recorded using the Microsoft Teams and stored safely. To present the findings from the interview, all information that could identify them or the institution they represent was removed and not included in the research.

3.5. Conclusion

As presented above, the mixed-methods approach has chosen to build knowledge on pragmatic grounds and assert the truth on the current practice. A methodological approach for mixed methods (quantitative and qualitative methods) is selected for numerical and information, collected sequentially or concurrently. It helps to understand the researcher better and know which variables and analysis approaches to use. The chapter was divided into four sections: the introduction followed the research approach, then the research strategy, which was also divided into two sections to provide an in-depth inside about the research design for this study and the conclusion. The researchers believed it to be the most appropriate way for finding answers to their research questions, and therefore, the same applies to this research.

CHAPTER 4: FINDINGS AND ANALYSIS

4.1. Introduction

This chapter is divided into two sections. The first chapter presents the quantitative results divided into six sections: the introduction, the descriptive statistics analysis, and the correlation matrix, followed by the stationery test – unit root testing, the cointegration results, the vector autoregressive and causality test and end with the summary. The second section presents and analyses the semi-structured interviews conducted with senior staff members within the Commercial Bank that deal with financing and investing in the mineral resources sector in Namibia. It is divided into three sub-sections: demographic details, responses from the semi-structured questionnaire with discussions that answer the three last research questions for this study, the integration of findings and a summary.

4.2. Quantitative Research Findings and Analysis

4.2.1 Descriptive Statistics

Table 4. Descriptive Statistics

	Gross Domestic Product	Mining Employees	Mining Taxes Revenue	Exchange Rate	Lending Interest rate	Commercial Bank Lending
	N$ million	N$ million	N$ million	%	%	N$ million
Mean	120.819	7887	36.105	10.604	9.996	1.118
Median	117.423	7633	36.181	9.750	9.844	1.136
Std. Dev	46.246	922	16.599	3.282	1.664	0.564
CV	38%	12%	46%	31%	17%	50%
Kurtosis	-1.621	-0.851	-1.686	-1.400	0.717	-0.953
Skewness	0.022	0.082	0.085	0.391	0.998	0.001
Minimum	54.149	6281	12.368	6.767	7.723	0.167
Maximum	181.555	9390	58.659	16.463	13.737	2.038

Source: Researcher's estimate from research data

Table 4 above summarises descriptive statistics for the six variables: GDP, CBLM, MEP, GTM, XR, and ITR. The GDP is a dependent variable in this study. It was N$133 billion in 2020, a 9.26% low to the highest GDP recorded in 2015, but above the study period average GDP of 121 billion. In general, the overall economy has declined since 2015 at an average of 0.7%. The Namibian government received a significant tax revenue from N$12 368 million in 2006 to N$58 536 million in 2020, an average of N$36 105 million per year (42% to the GDP in 2020). The number of people employed in the mineral sector per year has been between 6 281 to 9 390 in the same period but is the most negligible dispersion. Although commercial banking lending to mining increased yearly, it has been below 2% of the GDP over the years. A significantly lower proportion considers that mining contributes to the economy. In this study, commercial banking lending to mining is a high dispersion variable with 50%, although deemed a low-variance since CV<1.

The analysis of the skewness measures the presence or lack of symmetry around the average in a given distribution. Table 4 above shows that all variables are positively skewed towards the right side and are typically distributed. However, the Lending Interest rate and Exchange Rate are not that too positive skewness with 0.990 and 0.391, respectively. Commercial banking lending symmetrical datasets indicate that the distribution is ideally close to the mean with 0.001 towards the Namibian economic growth and development.

Another related statistic measured is the kurtosis which assesses how heavily the distribution's tails differ from a normal distribution. The results indicate that all the variables show a platykurtic distribution except the interest rate, which offers a leptokurtic distribution. For the platykurtic distribution, this presents that the data are negative excess kurtosis, more having flat tails than the leptokurtic distribution. However, those variables offer a desirable opportunity for investors in terms of the investment returns because there is a slight probability that the investment would experience extreme returns.

4.2.2. Correlation and Multicollinearity Analysis

The Pearson product-moment correlation coefficients result in Figure 1. The correlation matrix analysing all six variables included in this study, and the study’s interest is more focused on the correlation between GDP and other variables. The matrix shows that the correlation coefficient of most of the underlying variables is above 0.5 with GDP, except that

of interest rate, which is below 0.5. As presented in the table, there is the strongest correlation between GDP and government tax revenue from the mining sector of 99.200%. The mining tax revenue also ranks the strongest correlation with other independent variables.

The degree of multicollinearity was investigated independently between variables to analyse the data relationship further. Data with multicollinearity are challenging to interpret their coefficients and can reduce the model's power to recognise statistically significant independent variables. The level multicollinearity was determined based on the correction coefficient threshold greater than 0.90, giving the max VIF of 10. The result agrees with the literature and the expectation of this study by directly connecting the government revenue of Namibia and economic development. The interest rate ranks the least regarding its correlation with GDP. In line with existing literature on the interest rate, a significant negative relationship was observed between interest rate and GDP Bhat and Laskar (2016); Kinyondo (2018); Semuel and Nurina (2014). When the interest rate increases, the GDP also increases if the potential investor risks investing even though the lending rate is high.

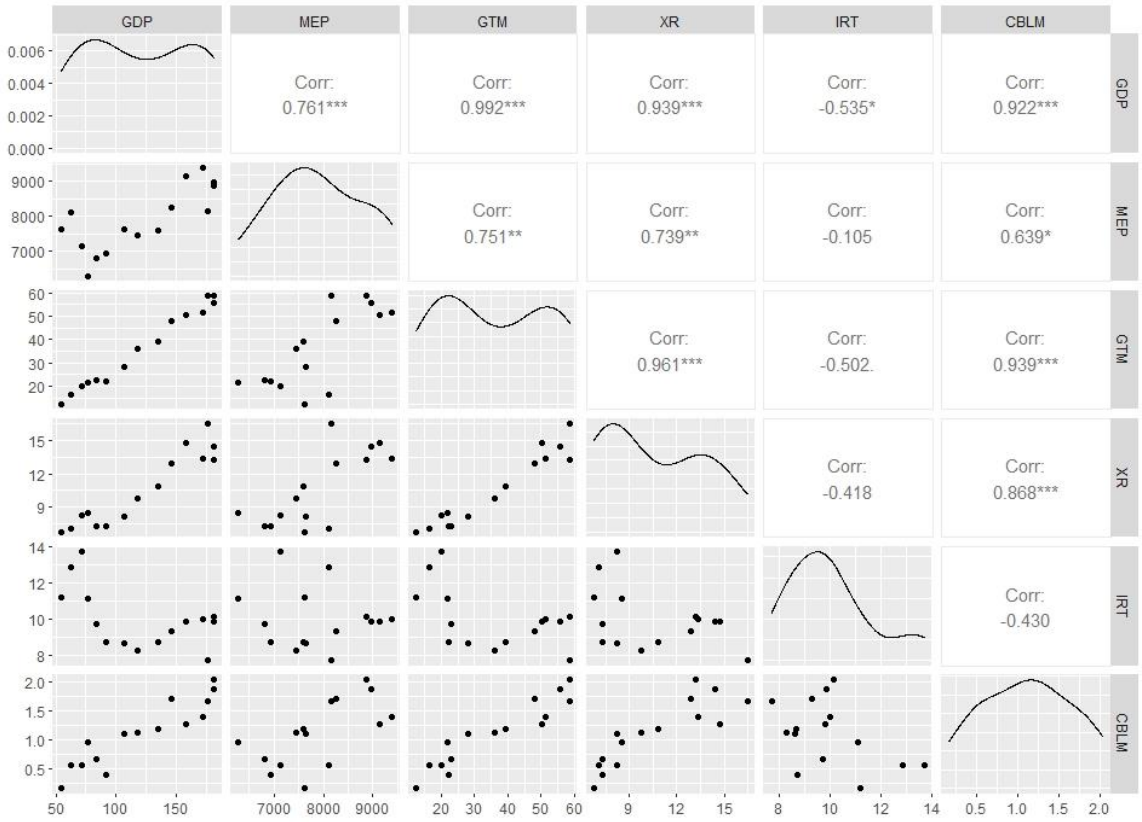

Figure 1. Pair-wise correlation among the variables (Compilation with R)

The results above in Figure 1 show probability evidence of multicollinearity between GDP, GTM and XR; XR and CBLM; GTM and XR; and CBLM and GTM. Hence, the inclusion of these highly correlated factors in the same empirical economic model has a probability of causing multicollinearity difficulties that can result in the challenge to focus, and thus further analysis. The Variance Inflation Factor [VIF] was employed to test the multicollinearity test to determine the variables that have to be included in the model. Four models were considered for analysis, and four equations were formulated for further investigation to choose the best model, and then the results are shown below in Table 5.

Model 1: GDP ~ MEP + IRT + CBLM + XR + GTM
Model 2: GDP ~ MEP + IRT + CBLM + XR
Model 3: GDP ~ MEP + IRT + CBLM + GTM
Model 4: GDP ~ MEP + IRT + CBLM

Table 5. Multicollinearity Test by VIF and Regression Model Result

Variable	Model 1	Model 2	Model 3	Model 4
Gross Domestic Product	-	-	-	-
Mining Employees	3.851	2.487	3.587	1.798
Interest Rate	2.376	1.397	1.944	1.306
Commercial Bank Lending	13.505	4.168	10.383	2.182
Exchange Rate	18.581	5.680	-	-
Tax Revenue	61.213	-	18.713	-
Parameter	Model 1	Model 2	Model 3	Model 4
Adjusted R-squared	0.986	0.953	0.984	0.931
Multiple R-squared	0.991	0.9668	0.989	0.946
Residual standard error	5.504	9.968	5.872	12.15
F-statistic	195.9	72.83	214.6	63.94
P-Value	0.000	0.000	0.000	0.000

Source: Researcher's estimate from research data

There are various remedial measures to deal with multicollinearity issues, such as Principal Component Regression, Ridge Regression, Stepwise Regression, etc. Nevertheless, in this study, a combination of approaches excluding the explanatory variables is applied, for which the VIF values are above 10 and Analysis of Variance (Chefranov et al., 2014).

Model 1 shows that only Mining Employees and Interest rate variable did not present the high level of multicollinearity, while others offer the VIF above 10 present high correlations and is cause for worry. The high VIF of Commercial Bank Lending could be ignored at this stage as that was the variable of interest. However, the Tax Revenue and Exchange Rate VIFs need to be adjusted. The second model that excludes Taxes revenue only shows that their VIF level was a bit high in Exchange Rate with 5.68, but since that value was below the cut-off, this model was considered for further analysis. The third model was the exclusion of the Exchange Rate; this demonstrates that Taxes revenue and Commercial Bank Lending level of VIF was high above the cut off at 18.713 and 10.383, respectively; this led to the elimination of this model for further analysis. The last model (Model 4) excluded the Tax Revenue and Exchange Rate variables; this model shows that all the VIFs levels were below 10; it was suggested for further analysis.

To summarise the analysis on the selection of the model used in ANOVA, the results are presented in Table 6. As the interest was to select the good fit model between Model 2 and Model 4, the results show a degree of freedom of Model 2 and a significant p-value of 0.000 which 28% less than the p-value of Model 4. Furthermore, the F-Statistic for Model 2 is significant high than for Model 4 with 13.90%, which lead to the conclusion that Model 2 is significantly better than Model 4. Hence, the cointegration and regression analyses were limited to Model 2 with Mining Employees, Interest Rate, Commercial Bank Lending and Exchange Rate as explanatory variables in this research.

Table 6. Analysis of Variance Results

Anova Models	Degree of Freedom	P-Value	F-statistic	Interpretation
Model 1 vs Model 2	1	0.00087 ***	23.805	Model 1 ≫ Model 2
Model 1 vs Model 3	1	0.15710	2.382	Model 1 ≪ Model 3
Model 1 vs Model 4	2	0.00033 ***	22.306	Model 1 ≫ Model 4
Model 2 vs Model 3	0	-	-	Model 2 = Model 3
Model 2 vs Model 4	1	0.03047 *	6.3426	Model 2 ≫ Model 4
Model 3 vs Model 4	1	0.00012 ***	37.102	Model 3 ≫ Model 4
Significance. Codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘’ 1				

Sources: Researcher’s estimate from research data

Table 7. Ordinary Least Squares Regression characteristic for Model 2

Variables	Coefficients	Std. Error	t-value	Pr(>|t|)
Intercept	-5.336	29.710	-0.180	0.861
Number of permanent employees	0.012	0.005	2.660	0.024*
Real Interest rate	-5.599	1.892	-2.958	0.014*
Domestic Commercial banks' lending	31.183	9.643	3.234	0.009**
Exchange rate	4.872	1.934	2.518	0.030*
Residual standard error: 9.968 on 10 degrees of freedom, Multiple R-squared: 0.9668; Adjusted R-squared: 0.9535; F-statistic: 72.83 on 4 and 10 DF; and p-value: 0.000				
Significance. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				

Sources: Researcher's estimate from research data

The model goodness of fit test was subjected to the Ordinary Least Squares regression [OLS] to determine its tolerability without considering the stationarity of explanatory variables. The results are presented in Table 7. An R-squared value for the model is 0.967 and an adjusted R-squared of 0.954. Generally, it means the model can explain about 96% of the variations in the GDP growth. The F-statistic is 72.83, and the corresponding p-value is 2.348e-07, which indicates that the comprehensive regression model is significant. Also, all the explanatory variables are statistically significant with CBLM at the 0.05 significance level, while MEP, IRT and XR and statistically significant at a 1% significance level.

4.2.3. Testing of Unit Root

The ADF unit root test has been used to measure and test the data series' stationarity for the variables exploited in the study. While the study chose the ADF test because of its popularity and wide usage and addressed the error terms' weakness in autocorrelation the Kwiatkowski-Phillips-Schmidt-Shin and Phillips Perron results were used to identify the difference. However, the results was found to agreed. It adds the lagged difference term of the dependent variable that the DF test method cannot manage. In line with Mulenga (2020) suggestion to visualise the data graphically, this was done in Figure 2. That was done before the ADF test. The graph in Figure 2 plots the data's movement of both variables over the study period. The GDP, permanent employees, exchange rate and commercial bank lending variables showed an upward trend while only interest rate displayed a downward trend over the study period. For commercial bank lending variables, the graph leads to having a possible non-stationarity at the level over the study period.

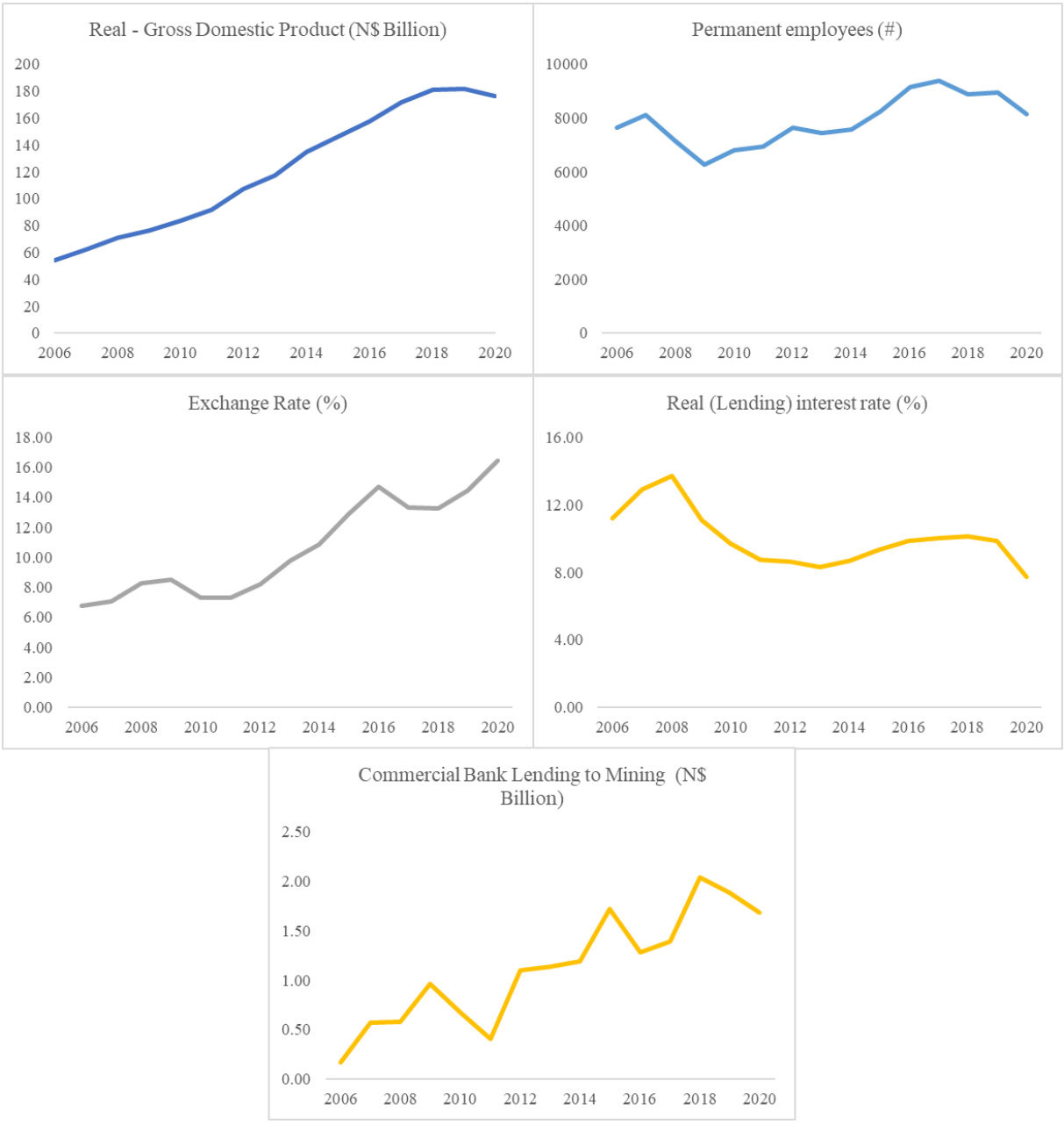

Figure 2. Variable Line Graphs

Table 8 below summarises the ADF test results executed at levels 1(0) and the first difference 1(1). At constant level 1(0), all the variables have a unit root at 1%, 5% and 10% significance levels. While at first difference level 1(1), Interest rate, and Commercial Bank lending are stationary at 1% significance levels, then at 5% significance levels GDP, mining employees and exchange rate also become stationary. The test results show that all variables are

stationary at 10% significance levels at first difference 1(1). That indicates that the series under investigation have moving average and/or autocorrelation over time.

As shown above, the null hypothesis of the series which are non-stationary or contain a unit root is rejected based on the critical values. The results indicate the rejection of the null hypothesis at 1%, 5% and 10% significance levels, respectively. As suggested in the literature, the Johansen Cointegration test can be run when the variables are integrated of the same order.

Table 8. Results from the ADF Test

	t – statistic		CV 1%		CV 5%		CV 10%	
	Level	1st Order	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
Gross Domestic Product	-1.788	-1.524	-5.392	-2.326	-3.872	-1.645	-3.251	-1.282
Mining Employees	-1.233	-1.844	-5.392	-2.326	-3.872	-1.645	-3.251	-1.282
Exchange Rate	0.227	-1.761	-5.392	-2.326	-3.872	-1.645	-3.251	-1.282
Real interest rate	-2.651	-3.139	-5.392	-2.326	-3.872	-1.645	-3.251	-1.282
Commercial Bank Lending	-0.420	-7.185	-5.392	-2.326	-3.872	-1.645	-3.251	-1.282

			CV 1%		CV 5%		CV 10%	
	Level	1st Order	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
Gross Domestic Product	-1.788	-1.524	Reject	Reject	Reject	Reject	Reject	FTR
Mining Employees	-1.233	-1.844	Reject	Reject	Reject	FTR	Reject	FTR
Exchange Rate	0.227	-1.761	Reject	Reject	Reject	FTR	Reject	FTR
Real interest rate	-2.651	-3.139	Reject	FTR	Reject	FTR	Reject	FTR
Commercial Bank Lending	-0.420	-7.185	Reject	FTR	Reject	FTR	Reject	FTR
Reject = Unit Root (Non- Stationary)				FTR = No Unit Root (Stationary)				

Note: *CV=Critical* Value Reject the null hypothesis when the 1st Order is greater than the estimated level at a different significance level. Source: Researcher's design from research data

4.2.4. Johansen Cointegration Results

As emphasised in Chapter 3, after the stationarity analysis, the subsequent research examines a long-run relationship between the model variables. To test for the existence of the permanent association among the variables, the Johansen Cointegration Maximum Eigenvalue test was employed with the Null hypothesis H0 = No cointegration. As Enders (2004), if any equilibrium relationship exists among a set of non-stationary variables, it implies the assumption that a cointegration in their stochastic trends is considered integrated. Before analysing the cointegration, the study employed four information criteria to determine the optimal lag length for Model 2 in Table 9. All the four information criteria methods suggest that the optimal lag length is two is considered in this study.

Table 9. Information Criterion Test Results

Akanke's Information Criterion	Hanna-Quinn criterion	Schwarz criterion	Final Prediction Error criterion
2	2	2	2

Source: Researcher's design from research data

Table 10. Johansen Cointegration Maximum Eigenvalue Test Relationship

		With linear trend "None."		Without linear trend and constant in cointegration "const."		With the linear trend in cointegration "Trend."	
CE(s)	Eigenvalue	t-stat	C.V	t -stat	C.V	t -stat	C.V
r <=0	1.000	NaN*	33.32	NaN*	34.4	NaN*	37.52
r <=1	1.000	NaN*	27.14	NaN*	28.14	NaN*	31.46
r <=2	1.000	356.57*	21.07	NaN*	22	388.34*	25.54
r <= 3	0.747	10.07	14.9	17.91*	15.67	364.85*	18.96
r <=4	0.489	7.35	8.18	8.74	9.24	8.58	12.25
Maximum Eigenvalue test indicates the minimum of at least three (3) cointegrating eqn (s) at the 0.05 level as in assumption case of the trend, linear trend and constant							

Source: Author's Compilation with R Output

As presented in Table 10, there is an indication of a long-run relationship between the study variables. The analysis shows that the first hypothesis and second hypothesis, $r = 0$ and $r <= 2$, test for the presence of cointegration. It is pure that since the test statistic exceeds the 5%

level significantly in three cases (NaN, which mean there it means there is a result, but it cannot be computed to do a considerable value). The third hypothesis tests $r \leq = 2$ against the alternative hypothesis of $r > 2$ also provide clear evidence to reject since the test statistic exceeds the 5% level significantly (356.57 > 21.070) when considering that there is no drift term in the model. Similarly, the linear trend in cointegration also provides clear evidence to reject the hypothesis since the test statistic exceeds the 5% level significantly (388.34 >25.54), while the other case without linear trend and constant in cointegration "const" could not present results. Then the fourth hypothesis tests $r \leq = 3$ against the alternative hypothesis of $r > 3$ provides presented a shred of evidence to reject since the test statistic in the model without linear trend and constant in cointegration with 364.85 > 18.960 and the model with a linear trend in cointegration with 17.91 > 15.67, expect in the Linear trend "none" that cannot be rejected. Lastly, the fifth hypothesis, the null hypothesis, shows no cointegration and is rejected in all three cases. The alternative is accepted in all the cases as the t-statistic is lower than critical values. The results demonstrate a long-run relationship amongst the study variables marked by a rank matrix of at least three (3) to four (4) cointegrating equations at a 5% significance level. But for this analysis, three cointegrating equations are considered assuming that the data has a linear trend. The existence of the cointegrating equation indicates that the variables share the same stochastic trend (long-run relationship). Therefore, it can be explained that there is a long-run equilibrium relationship between the explanatory variables and economic growth in terms of GDP in Namibia. The results imply that causality must be at least in one direction between GDP and CBLM and another independent variable. The results were compared with the Johansen Cointegration Trace Statistic, which yields similar results for the permanent relationship between the examined variables. Hence, from the cointegration test, it can be settled that there are three cointegrating vectors.

The Johansen cointegration test revealed the cointegration between time series variables under considerations containing three cointegrating equations. Consequently, the unrestricted Vector Auto Regression [VAR] cannot apply in such cases, but the VECM is a unique model of the VAR case that considers the cointegrating relations among the variables. With VECM short-run dynamics and long-run equilibrium, relationships are to be studied.

Before discussing the results from the VECM, it is essential to provide a grasp of the inter-temporal framing of the long-run normalised coefficient (standard error in parentheses)

results. The first normalised cointegrating coefficients are reported in Table 11 and will be discussed below.

Table 11. Eigenvectors, normalised to the first column: Normalized Cointegrating Coefficients (Cointegration vectors)

	GDP.l1	MEP.l1	IRT.l1	CBLM.l1	XR.l1
GDP.l1	1.000	1.000	1.000	1.000	1.000
MEP.l1	0.012	0.016	-0.021	0.027	-0.029
IRT.l1	21.454	-3.078	6.141	11.570	19.744
CBLM.l1	6.767	-200.206	-40.024	24.970	5.428
XR.l1	-14.244	11.948	-1.208	-25.268	-10.521

Note that the rule of interpreting the long-run coefficients obtained using R is to be interpreted in opposite sign; if you get a (-) ve sign, you are to interpret the result as (+)ve sign and vice-versa.
GDP=Gross Domestic Product; MEP=Mining Employees; IRT=Interest Rate; CBLM= Commercial Bank Lending and XR= Exchange Rate

Source: Author's Compilation with R Output

The normalised cointegration results prove that long-run relationships were at least three cointegration relationships between the GDP and independent variables and could be extended to the VECM models. The first normalised equation can be based on the GDP, present that there is a negative relationship between the number of permanent employees in mining per total number of employees [MEP] and gross domestic product [GDP], suggesting that the increase in employment in the mining sector could lead to the decline in the overall economy. That means a 1% increase in MEP will lead to a 0.002% decrease in the GDP. In the same vein, there is a negative relationship between the interest rate and GDP, implying that the interest rate increases the economy's decline. That means that a 1% increase in interest rate will lead to a 21.454% decrease in the GDP. Furthermore, credit of the commercial bank lending negative relationship with GDP while the exchange rate was found to have a positive relationship with the economy. That implies a 1% increase in CBLM will lead to a 6.767% GDP decline.

On the other hand, while leading to a growth of about 14.244% in the economy, the exchange rate increases by 1%, respectively. It is essential to highlight that these cointegrating vectors

are all normalized to the first variable, and the loading matrix ˆα is adjusted accordingly. As mentioned already, the presence of a long-run relationship among variables implies that VECM is appropriate to examine the short-run equilibrium relationships among these five variables in the economic model. Therefore, the following section present and discuss the VECM results applied.

4.2.5. Vector Error Correction Model

The VECM was employed to deviate the relationship from long-run equilibrium and short-run parameters for the studied variable after at least three cointegrating vectors among the variables in the system. Table 12 presents the normalized cointegration vectors that are returned beta elements, and Table 13 presents the estimated VECM of cointegration rank results of the three cointegrating vectors.

4.2.5.1. Long-run causal relationship

Table 12 presents the estimated coefficients for the VECM model of five variables studied in the long run. The VECMs gives the correction terms that reflect influences of deviation of the relationship between the investigate variables from long-run equilibrium and short-run parameters.

Table 12. Cointegrating vector (estimated by ML)

	GDP	MEP	IRT	CBLM	XR
r1	1.000	0.000	0.000	-138.700	7.231
r2	-0.000	1.000E+00	0.000	-2316.000	93.120
r3	-0.000	0.000	1.000	8.086	-1.054

Note: GDP=Gross Domestic Product; MEP=Mining Employees; IRT=Interest Rate; CBLM= Commercial Bank Lending and XR= Exchange Rate

Source: Author's Compilation with R Output

The cointegrating vector r1 = GDP has a positive relationship with MEP and XR but negatively with CBLM. No relationship is noted between GDP and IRT. Integrating vector r2 = MEP has a negative relationship with GDP and CBLM and a positive relationship with XR, but no relationship with IRT. Finally, the cointegrating vector r3 = IRT showed a negative

relationship with GDP and XR, but a positive relationship with MEP and CBLM was also observed.

The Vector Error Correction Model Estimation was employed with three cointegrating vectors (estimated by Johansen Maximum Likelihood Estimation [MLE]) to analyse a long-run relationship between variables. Table 13 presents the adjustment coefficients for the variables used with the long-run dynamics from the VECM model. The error correction term (ECT1) in ΔGDP is statistically significant with the anticipated negative sign. The adjustment coefficient associated with the GDP volatility is -0.533 and statistically significant at a 10 per cent significance level. That validates the presence of a stable long-run bi-directional causal relationship from GDP to GDP (i.e., GDP↔ GDP). That result is sufficient to reject any "no cointegration" hypothesis and claim a stable long-run relationship between GDP and other macroeconomic variables. The other coefficients of the ECT1 were found insignificant, but adverse is IRT to GDP it has a stable relationship but not statistically significant. However, there is no long-run relationship between the MEP, IRT, and XR to GDP, as the coefficient are positive and statistically insignificant.

Secondly, analysis of the error correction term (ECT2) in MEP confirms the presence of a stable long-run unidirectional causal relationship between MEP and XR (i.e., XR→ MEP) as it is statistically significant at a 10 per cent significance level and has a negative adjustment coefficient of 0.003.

Finally, the error correction term (ECT3) analysis in IRT is statistically significant, with the anticipated negative sign suggesting the causal stable long-run unidirectional causal relationship with GDP (i.e., GDP → IRT). The adjustment coefficient associated with the IRT volatility is -8.053 and statistically significant at a 5 per cent significance level. All the other variables have been demonstrated to have a stable relationship with IRT shown by the negative coefficient but are statistically insignificant at both 5% and 10%.

4.2.5.2. Short-run causal relationship

According to the GDP VECM model, R^2 = 97.750 percent of the variation in the GDP equation is explained by the MEP explanatory variable that has a negative impact on GDP, statistical significance at 10% levels. Therefore, on average, a 1-unit increase in MEP has a

negative effect on decreasing GDP by 0.0084 units with statistical significance at 10% level, holding constant with other variables. Hence, it can be concluded that MEP directly impacts GDP in the short run. On the other hand, the GDP is influenced positively by 76.090 units from other factors that cannot be explained by the variables studied.

Based on the MEP VECM model, R^2 = 70.03 percent of the variation in the MEP equation is well explained by explanatory variables. However, the estimation reveals that no important variable as non-have a statistically significant result lower than the 10% level. The MEP is influenced positively by about 6775.491 units by the factors not included in the variables studied but insignificant. It can then argue that the data has shown at least three stable and statistically significant long-run relationships between the studied variable based on a maximum 10% statistically significant level.

Based on the IRT VECM model, R^2 = 81.42 percent of the variation in the IRT equation is well explained by explanatory variables. However, similar to the MEP VECM equation the estimation reveals that no important variable as non-have a statistically significant level of significance low than 10% level. The IRT is influenced positively by about 9.996 units by the factors not included in the variables studied but insignificant.

Based on the CBLM VECM model, R^2 = 93.850 percent of the variation in the CBLM equation is explained by the explanatory variables such as lagged CBLM variables. Estimation reveals that the most important variable is only the lagged of CBLM statistically significant at 1% level. Therefore, on average, a 1-unit increase in the lagged of CBLM negatively affects CBLM by 0.784 units at 1% level significance, holding constant with other variables. Hence, it can be concluded that lagged CBLM impacts CBLM in the short run. The CBLM is influenced positively by about 1.994 units by the factors not included in the variables studied but insignificant.

Based on the XR VECM model, R^2 = 87.740 percent of the variation in the XR equation is explained by the explanatory variables such as lagged IRT variables. The XR VECM model shows a short-term relationship between XR and lagged IRT and GDP with statistical significance at a 10% and 5% level, respectively. The results point that, on average, a 1-unit increase in the lagged of GDP negatively affects the XR by 0.247 units at 10% level significance, holding constant with other variables. At the same time, the 1-unit increase in

the lagged of IRT positively affects the XR by 2.202 units. About 16.79 units positively explain the XR by the factors included in the variables studied at the 5% significant level.

Table 13. Vector Error Correction Model results with r = 3 and VECM Cointegrating vector (estimated by Johansen MLE)

Dynamic	ΔGDP			ΔMEP			ΔIRT			ΔCBLM			ΔXR		
	Coeff	Std. Error	Pr(>|t|)	Coeff	Std. Error	Pr(>|t|)	Coeff	Std. Error	Pr(>|t|)	Coeff	Std. Error	Pr(>|t|)	Coeff	Std. Error	Pr(>|t|)
Long-run															
ECT1	-0.533	0.203	0.059 *	17.930	40.304	0.679	-0.091	0.062	0.217	0.023	0.012	0.127	0.034	0.059	0.597
ECT2	0.007	0.004	0.147	-1.005	0.823	0.289	0.001	0.001	0.600	0.000	0.000	0.176	-0.003	0.001	0.058 *
ECT3	-8.053	2.004	0.016 **	-151.330	397.685	0.723	-1.285	0.611	0.103	-0.032	0.116	0.797	-0.501	0.582	0.438
Constant															
Intercept	50.555	27.808	0.143	6775.491	5517.341	0.287	9.996	8.471	0.303	1.994	1.604	0.282	25.913	8.068	0.033 **
Short-run															
GDP-1	0.126	0.388	0.762	-11.226	77.041	0.891	-0.018	0.118	0.884	-0.008	0.022	0.733	-0.247	0.113	0.094 *
MEP-1	-0.008	0.003	0.051*	0.285	0.610	0.665	-0.001	0.001	0.500	0.000	0.000	0.343	0.001	0.001	0.597
IRT-1	2.351	2.319	0.368	90.342	460.120	0.854	1.030	0.706	0.218	0.203	0.134	0.204	2.203	0.673	0.031**
CBLM-1	4.047	6.298	0.556	900.125	1249.482	0.511	0.783	1.918	0.704	0.784	0.363	0.097 *	2.393	1.827	0.260
XR-1	-1.779	1.491	0.299	23.798	295.759	0.940	-0.712	0.454	0.192	-0.073	0.086	0.443	-0.675	0.432	0.194
Statistic: Cointegrating vector															
R^2		0.978			0.730			0.814			0.939			0.877	
Adj.R^2		0.927			0.124			0.396			0.800			0.602	
RSE		2.851			565.600			0.867			0.165			0.827	
F-statistic		19.270			1.204			1.948			6.786			3.182	
P-Value		0.006**			0.462			0.272			0.040*			0.139	
Schwarz's information criterion (SIC)								1279823							

Note: GDP=Gross Domestic Product; MEP=Mining Employee's; IRT=Interest Rate; CBLM= Commercial Bank Lending and XR= Exchange Rate; *p<0.1; **p<0.05; ***p<0.01. Source: Researcher's design from research data

Source: Author's Compilation with R Output

4.2.6. Diagnostic of the Econometric model

Consider that Model 2 considered from the above analysis before applying the model estimates for economic analysis it was subject to several econometric tests. While several tests are suggested in the literature, the tests employed here include normality, serial correlation, heteroscedasticity, and stability mean the structural breaks in the residuals. The econometric tools applied here are the Jarque Bera Test, Durbin-Watson Test & Portmanteau Test, Studentized Breusch-Pagan test and CUSUM test.

Table 14 shows diagnostic indicators results: Jarque Bera test that test the normal distribution of the residuals Chi-squared equal to 9.007 with a p-value equal to 0.531. The results suggest no adequate evidence reject the null hypothesis since the statistically significant p-value (0.531) is more than the critical value alpha (0.05). The researcher can say that the data are normally distributed, evidenced on the residual Figure 3.

Table 14. Diagnostic of the Model Outputs

Diagnostic	Test	Chi-squared	P-value
Normality	Jarque-Berra Test	9.007	0.531
	Skewness	6.735	0.241
	Kurtosis	2.272	0.810
Serial correlation	Portmanteau Test (asymptotic)	196.34	0.999
	Durbin-Watson test	2.039	0.426
Heteroscedasticity	Studentized Breusch-Pagan test	1.698	0.791

Source: Researcher's design from research data

The Durbin-Watson and Portmanteau (asymptotic) test for autocorrelation in the model's residuals. The Durbin-Watson statistic equal to 2.039 with a p-value equal to 0.426 (not significant at $p > 0.05$) was computed. Portmanteau Test with the Chi-squared statistic value of 196.34 is not statistically significant, indicating the residuals are not serially correlated, and the alternative hypothesis is that residuals are correlated. Consider the results in Table 15 that there is insufficient evidence against the null hypothesis. That means there are no residual autocorrelations up to lag 4, and then the test is valid. The results present that there is no root lies outside the unit circle. The null hypothesis is accepted, and the Model satisfies the stability condition with that above.

Table 15. Vector Autoregressive Residual Portmanteau Tests for Autocorrelations

Lags	Chi-Square	Degree of Freedom	P-value
1	25.602	0	<2.2e-16
2	48.352	25	0.0033
3	77.237	50	0.0080
4	104.05	75	0.0149
5	123.57	100	0.0551
6	142.20	125	0.1393
7	156.12	150	0.3494
8	167.47	175	0.6452
9	180.14	200	0.8399
10	186.03	225	0.9728
11	191.31	250	0.9977
12	196.34	275	0.9999
13	196.34	275	0.9999

Source: Researcher's design from research data

In terms of the heteroscedasticity, the Studentized Breusch-Pagan statistic equals 1.698 with a p-value equal to 0.791 (not significant at $p > 0.05$). The three statistic test results infer that in Model 2, the residual is normally distributed. There is no evidence for autocorrelation, no indication of heteroscedasticity danger, and this also supports the results. Table 5 shows no severe issues dedicated to multicollinearity, with the highest VIF of 5.680 among the explanatory variables.

The CUSUM plots investigate the stability of the long-run movement with the VAR Model's short-run movements as converted from VECM given in Figure 4. Evidence shows that CUSUM statistics are well within the 5% critical bounds, implying that short-run and long-run coefficients in the VAR model are stable. That demonstrates that the estimate is stable over the period studied. As all the essential characteristics of Ordinary Least Squares [OLS] are met from the test, the model can be reliable for the econometric analysis. Indicated that the model does not suffer any serial correlation and normality satisfaction confirm that the VECM model is the best linear unbiased estimator and valid.

Mean	6.67E-08
Std. Error	2.175
Median	-3.890
Std.Dev	8.425
Kurtosis	-1.450
Skewness	0.100
Minimum	-12.840
Maximum	13.394
Range	26.233
Sum	1.00E-06
Count	15

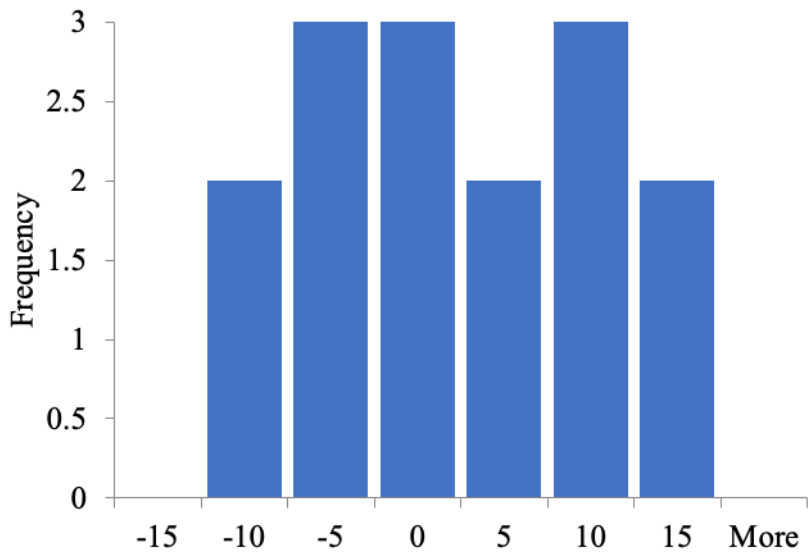

Figure 3. Mode1 2 results of the test for the skewness of the residuals

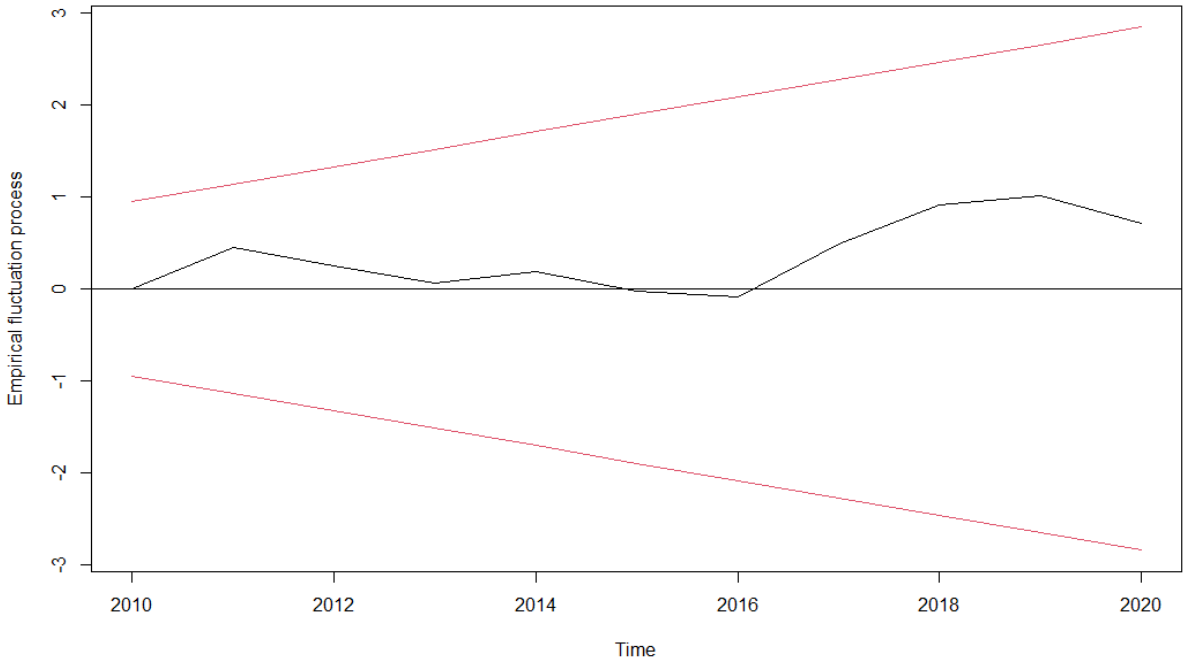

Figure 4. Testing for structural breaks in the residuals

4.2.7. Granger Causality Test

While the previous section examines the cointegration between two variables if it could be identified, it does not indicate the direction of a causal relation. If any relation is identified, a causal relationship between the variables should be tested with the Granger Causality test.

Table 16. Results from Granger Causality Estimation

Null Hypothesis	F – Statistic	Probability
MEP does not granger cause GDP	0.7318	0.5100
IRT does not granger cause GDP	1.9391	0.2058
CBLM does not granger cause GDP	0.8486	0.4632
XR does not granger cause GDP	0.2113	0.8139
GDP does not granger cause MEP	5.4026	0.0328 **
IRT does not granger cause MEP	2.9375	0.1105
CBLM does not granger cause MEP	2.2161	0.1715
XR does not granger cause MEP	4.3199	0.0534*
GDP does not granger cause IRT	0.9489	0.4268
MEP does not granger cause IRT	0.4233	0.6688
CBLM does not granger cause IRT	1.105	0.3769
XR does not granger cause IRT	0.6447	0.5501
GDP does not granger cause CBLM	11.705	0.0042 ***
MEP does not granger cause CBLM	1.5942	0.2614
IRT does not granger cause CBLM	0.9066	0.4417
XR does not granger cause CBLM	1.3233	0.3188
GDP does not granger cause XR	5.5037	0.0314 **
MEP does not granger cause XR	0.3904	0.689
IRT does not granger cause XR	2.1712	0.1765
CBLM does not granger cause XR	2.0301	0.1936

Note: GDP=Gross Domestic Product; MEP= Mining Employees; XR=Exchange Rate; IRT=Interest rate, CBLM=Commercial Bank Lending. *p<0.1; **p<0.05; ***p<0.01.
Source: Researcher's design from research data.

Table 16 presents the Granger Causality test results. The test results indicate no bivariate causal relationship among any variables. However, there are one-way causal relationships between GDP and MEP, GDP and CBLM, and GDP and XR. The interest of this study to exploit the Granger Causality relationship between GDP and CBLM demonstrate that GDP does granger cause CBLM as shown by the statistically significant F-statistic of 11.705 with a probability value of 4.2%, which is below 5% significate level. That means GDP has a long-run causal impact on CBLM. GDP can, therefore, be used to predict CBLM in the long run. But CBLM does not granger cause GDP that is also reflected by the results, which is not statistically significant. As such, CBLM has a long-run causal impact on GDP.

4.2.8. Quantitative Summary

Section 4.2 presents the results obtained from the analysis with interest in the relationship between the CBLM and other variables. The Johansen cointegration and VECM mainly examine the short-run and long-run relationship between the Namibian commercial banks' financing in mineral resources and the mining sector's contribution to economic growth and development. The analysis found statistically insignificant long-run relationship between the GDP and CBLM. However, the Granger analysis presents evidence that GDP does granger cause the CBLM. But there is not enough evidence that the CBLM does not granger cause GDP or any other variable studied. GDP was found to have a long-run relationship with GDP and IRT, but there is not enough evidence that the GDP does not granger cause GDP or IRT v verse versa.

On the other hand, CBLM was statistically insignificant with GDP, MEP, CBLM and XR in both the short-run and long-run, but statistically significant with the IRT in the short-run. That means that there is evidence that Namibian commercial banks financing in the mineral sector contributed to economic development in the short-run. However, Granger Causality results' evidence did not show CBLM and IRT. Nevertheless, the evidence found through Granger is that the growth and development of the country economy in terms of GDP does granger cause the CBLM, as mentioned already. Another notable statistically significant result demonstrating both short-run and long-run relationships was the negative coefficient of interest rate and economic growth. This relationship is as expected that an increase in the lending interest rate would discourage the mining sector from borrowing capital for new or existing projects while also abandoning the existing project due to high capital costs. There is, however, not enough evidence that the IRT does not granger cause GDP verse versa. The XR was found to have a significant short-run relationship with economic growth and IRT, in which the evidence was found that GDP does granger cause the XR. But there is not enough evidence that the XR does not granger cause GDP or IRT verse versa.

In conclusion, there is no long-run and short-run relationship between the GDP and CBLM. As specifically to this study, the null hypothesis that “there is a strong relationship between the financial institutions’ financing in mineral resources and the mining sector contribution to economic growth and development “can be rejected. However, the causality examination

shows that GDP does granger cause CBLM, which has a causal impact on CBLM. That is a unidirectional causal relationship between GDP and CBLM running from GDP and CBLM, but there is not enough evidence that the CBLM does not granger cause GDP.

4.3. Qualitative Research Findings and Analysis

4.3.1. Demographics of characteristic and profile of the commercial bank

Understanding the participant demographics of characteristics and profile has been highlighted in the literature as significant as it aids in determining whether the sample is representative enough for the target population. It also helps the researcher determine if the participants have a credible and relevant understanding of the research problem and context. The researcher must include demographics of characteristic and profile questions in the research interview. For this study, the profile questions were to find details on the bank's name, the role of the representative, number of years of experience in banking and their level of education.

Table 17. Demographic Details of the Participants

	Category	Frequency
Commercial Bank	First National Bank Namibia Limited	1
	Bank Windhoek Namibia Limited	1
	Standard Bank Namibia Limited	1
	Nedbank Namibia Limited	0
	Banco Atlántico	0
	Bank BIC Namibia Limited	0
	Trustco Bank Namibia Limited	0
	Letshego Bank Namibia Limited	0
Section	Head: Corporate Credit	1
	Corporate and Business Banking	1
	Head: Mining & Natural Resources	1
Role in Banking	Senior Manager	2
	Junior Manager	1
No. of years of experience in banking	2-3 years	2
	4-5 years	1
Educational qualification	Master’s degree	3

Source: Researcher's design from research data

The semi-structured questionnaire through an online interview process was employed. The target population were representative of eight commercial banks in Namibia as registered by the Bank of Namibia, the regulator. However, those successful interviews were only four out of eight (50%). In those four participants, Nedbank's data have not been covered in this analysis as at the time of writing, and the bank legal department did not authorise the information to be used yet. In case four other banks: Bank BIC Namibia Limited and Banco Atlántico, did not respond to the email sent or pick up telephone calls attempt made. At the same time, it was not possible to connect to the credible person responsible for the corporate and investment department that deals with the minerals sectors at Trustco Bank Namibia Limited and Letshego Bank Namibia Limited. The researcher has made several attempts to get credible participants, but all led to unsuccessful results.

Nevertheless, the participation of the three banks, namely First National Bank Namibia Limited, Bank Windhoek Namibia Limited, and Standard Bank Namibia Limited, was considered credible as those banks are currently the most significant bank Namibia with an assets market share 82.18% and advance loan concentrate to mining about 95.61% for annual financial year 2020 (Bank BIC Namibia Limited, 2021; Bank Windhoek Namibia, 2021; First National Bank Namibia Limited, 2021; Letshego Bank Namibia Limited, 2021; Nedbank Namibia Limited, 2021; Standard Bank Namibia Limited, 2021; Trustco Bank Namibia Limited, 2021). The market share results for 2019 and 2020 for the banks based on financial data on their annual reports are presented in Table 18. The summary details about the demographic of the participants are present in Table 17 with a short discussion.

Table 18. Namibia commercial bank

		Total (in N$ billion)	Market shares information (%)						
			BWN	BIC	FNB	LSB	NBN	TBN	SBN
2020	Lending Mining	1.66	54.82	0.00	5.33	0.00	4.39	0.00	35.46
	Asset	148.58	28.87	0.26	30.89	2.95	14.54	0.07	22.41
	Interest Income	12.12	31.07	0.21	31.84	5.16	13.27	0.05	18.39

2019	Lending Mining	1.60	59.15	0.00	17.46	0.00	4.90	0.00	18.49
	Asset	139.88	28.24	0.37	31.60	2.45	14.58	0.10	22.66
	Interest Income	13.08	28.84	0.17	29.54	4.78	14.62	0.06	21.99

Sources: (Bank Windhoek Namibia, 2021 #854;Bank BIC Namibia Limited, 2021 #857;Standard Bank Namibia Limited, 2021 #858;First National Bank Namibia Limited, 2021 #856;Trustco Bank Namibia Limited, 2021 #859;Nedbank Namibia Limited, 2021 #855;Letshego Bank Namibia Limited, 2021 #860)

The data gathered have demonstrated that the participants were credible and fully understood the mining and natural resources sector and the issues of mining financing under the financial department for this study. Specifically, 66 per cent of the participants lead the Mining and Resources and Corporate and Investment Banking departments of their banks. In comparison, 34 per cent of the participants lead the Corporate Credit section in their financial institutions that handle issues of mining financing other sectors. All the participants are reported to have the master's degree/post-graduate as their highest qualification, which is linked to either mineral or financing issues. Regarding experience within their related field at their current positions, the study assured that the number of years' ranges from 2 - 5 years. Even though the participants had less than five years of experience, considering that they are in a senior position and understand the field of study, the researcher assumes that the data provided are reliable.

4.3.2. Results Presentation, Analysis and Discussion

The responses from the semi-structured questionnaire are to be used to understand the role of Namibian commercial banks in financing mineral resources projects and their contribution to economic development. The study employed content and thematic approach to analyse the data before interpreting the findings. To accomplish the objectives as well as to answer the research questions of this study, this section directly presents the three questions as formulated from Chapter 1 as follows:

1. How do the financial institutions finance the mineral resources projects to uplift the Namibian economy's development?
2. What strategies and financial products are available in Namibian financial institutions for natural resources (mineral resources)?
3. Which mineral resources project stages and commodities benefit from Namibian financial institutions, and why?

The banks' names are not used directly for privacy in the following section.

4.3.2.1. Drivers of bank lending in the Mineral Resources Sector

To determine if commercial banks are financing the mineral sector to uplift Namibia economic development or not, the main question was structure as what has been driving their banks to invest in the mineral sector for the past 15 years? In response, the participants mentioned four critical drives not necessarily in common: shareholders value creation, stakeholders' value creation, commodity price, and sustainable finance solutions. On an individual basis, Bank_A indicates that they followed more the stakeholder value creation than shareholders' value creation business. The reason has been that although the decisions are based on investment profitability, they consider that the investment must be social and environmentally feasible. The direct quote from Bank_A when they responded goes as follows:

"*We focus on the mining finance to be a market provider, responsible for socially, environmentally, shareholders, stakeholders responsible for the market maker. The bank facilitates the funding of specific funding requirements, economics, and positive incentives by being a market maker between the people who require funds and people who can provide funds and seeking returns.*"

While Bank_B acknowledges that their role is to act as intermediary financial institutions between the owner of capitals and those in need, including the mineral sector, what drives them to provide financial service to the industry is to create shareholders' wealth. Their business strategy activities are shareholder-driven because they are private entries for profit-making purposes. Apart from providing financial service to the mining sector, they play a role

in policy formulation and advise the government to create a favourable business environment for mining investors.

In Bank_C response, they do not have a specific drive. Still, they aim to provide sustainable finance solutions to mineral projects that demonstrate a solid financial forecast with a cash flow and well-defined risks. Sustainable finance solutions are achieved by understanding the mineral project financial position and projection, the project's financial need or purpose, and the overall risk implication. Interestingly, they highlight that they strongly consider providing finance projects with commodities in the booming stage and strategic commodities that have a solid relationship with the Namibian economy, such as diamonds and uranium. The reason is to add value to the economy; that is also the logic behind financing projects linked to the mining sector, such as renewable energy power. For economic reasons, the sense to finance the infrastructure projects related to mining, specifically renewable energy and green hydrogen, has also supported Bank_B. The evidence is that at least three recent solar power plants built in Namibia are owned by the mining companies or supply energy to the mining projects within a 50 km radius to support the government strategic vision, such as Vision 2030 and Harambe Plan.

"*We also keen to partner up with the mining company by looking at things currently taking place in the country and things that the government is trying to drive*." Bank_B.

Overall, all the banks' investigated has their purpose, but it is also clear that they are all somehow driven to provide financial services to the mineral sector for economic reasons. The key drivers to them, not necessarily to all, can be summarised as shareholder’s value creation, stakeholders value creation, commodity price, and sustainable finance solutions.

4.3.2.2. Strategies and Financial Products Available

In response to the question, what strategies and financial services/products do their banks offer to the mining and natural resources sector? And how? All the participants have indicated that there are many products their banks contribute to the mineral sector. Some information is published in the public domain, like the bank's annual reports and website. However, the clear message was that they do not provide equity finance, but they provide various types of financing in the short-term and long-term in terms of debts. That aligns with the business

licence conditions that the Bank of Namibia issues. As represented by Bank_A and Bank_B, the banking license only provides debt financing. They are not private equity investors, but they give only loans solutions to the mining sector.

Nevertheless, they offer mining advisory services related to acquisition finance, structured & working capital finance, export credit finance, and commodity price hedging. The representative of Bank_A and Bank_C confirmed this when they emphasised that they provide working capital requirements, capital expenditure requirements, purchases of lost assets or machinery, equipment, debtor financing, overdraft, instalments sales agreement, commercial bods, account management, and cash management solutions. Bank_B and Bank_C further indicate that they have business principles of considering each client different to provide them with a sustainable optimal solution based on their needs, which means that the strategies they use to fund their client are based on the customers' needs and what the situation dictates. In their own words, Bank_B and Bank_C have responded as follow:

Bank_B: "*In Namibia, we do not play in the equity space in the mining sector. The funding solutions are more in the form of debts where they can do preference shares, vanilla loans, etc*."

Bank_C: "*The bank has advisory services, equity capital market, debt primary market, project and export financing, and securitisation in the investment banking space. We also have what they call a crowdfunding sort of structure. For the equity capital market, they can assist a client in raising equity, a platform for an investor that would like specifically to invest in mines, structure trade and commodity financing, sustainability finance solutions, and global market solutions. This is for forex solution, currency exchange services*."

While the researcher was keen to investigate the quantitative data from the banks to provide insight into the study problem. Issues like growth in their products, the number of clients they offer service to, the bank's loan distribution over the years, and their allocation budget, such data was not made available. The reason is confidentiality and the challenge of organising them better to share with external users. However, one bank has provided the insights information articulated in detail, but the study could not compare and contrast with single data. Therefore, that has limited the analysis to be covered in that detail. On the other hand,

the representative informed the researcher that such data are available at banks but not just accessible by external individuals.

4.3.2.3. Mineral Resources Project Stages and Commodities Type

Regarding the mineral resources project's stages and commodities type preferable, the study found that the banks are cautious to which commodity project they finance and at what life stage the project is, which means they prefer certain stages of the project and certain commodities type in doing business. The direct quotes for the banks are as follow:

Bank_A: "*We fund most of the assets on the balance sheet, from property to land, buildings, lost machinery, working capital requirements, debtors, and long-term debt. The applications are provided on a case-to-case basis; therefore, we do not prefer any commodity type unless expressly excluded from the list of specific sectors or products that we do not finance as part of the bank sustainability framework. In terms of mining, the only restriction is on uranium. It is not like we are not allowed to have uranium exposures, but it should not be too high of the percentage of the financial book.*"

Bank_B: "*It depends on the client's needs every year. The current indication is that we bank over 80% of the Natural Resources Clients in Namibia. We were also participating in activities that were not of our Clients. Some of the deals/activities we have funded/provided services to are as follow:*

- We have provided advisory services to Bannerman by introducing the local shareholders to the structure.
- Acted as mandated lead arranger in financing several diamond vessels done in Debmarine
- Exploration Vessel – SS Nuyoma
- Worked on AMV3 – Benguela Gem
- Acted as a lead lender to Ohorongo Cement
- Funded Langer Hienrich Mine and also in many independent Power projects in Namibia.

Bank_C: "*We do not fund projects at the exploration stage, and it already needs to be done because this is mostly for venture capitalists or angel investors. Regarding the commodity type, we do not specify one specific commodity; we are pretty diverse. However, we do not necessarily finance coal, not yet into lithium in Namibia, and not necessarily finance uranium. Because of the strong partnership with China at the moment, the bank has a section that specifically deals with the Chinese client which is in co-operation with Uranium Mine in Erongo Region, and thus we do so*."

They further added that:

"*We provide the finance service to any opportunity that is viable and economically feasible. Hence, we finance any commodity that is currently booming or shows potential for possible mining projects. We are most keen on commodities that are currently booming and existing in Namibia and adding value back into the economy of Namibia. For example, we are currently looking at diamond, gold, tin, copper, etc."*

In analysing the banks' representative responses, it was observed that Bank_A and Bank_B do not necessarily have the preference stage; however, they treat each case-to-case basis as each client has specific needs. In contrast, Bank_C was straight to state that they do not finance exploration projects that include drilling activities. The issue that Bank_C is not interested in providing finance to the exploration stage was expected in the financial banking sector. The reason is that exploration projects are associated with high risk with negative cash flows. Banks tend not to take high-risk investment projects due to shareholder strategic plans or outside factors such as regulation. They all indicate no restriction regarding the types of commodities they tend to finance, but they are cautious when investing in uranium projects or projects with low commodity prices. Their concern is the project's cash flow and the commodities price volatility.

4.3.2.4. Commercial Banks views on the Economic Growth and Development

To conclude the interview, one of the participants was asked whether the commercial banks recognise the financing of Mining and Natural Recourses projects/assets as one of the ways of uplifting the Namibian economic growth and development? The responses were definitely "YES" from all the banks. They agreed that they are keen to see most of their funds

contributing to the economic growth and development of the country. To safeguard, they all have internal sustainable framework/procedures to select the projects that can contribute to the economy economically and those with positive social and environmental benefits. The response for Bank_B has summarised it even better, as quoted below, that commercial banks are always willing to participate in funding/lending in any activities in the mining sector.

Bank_B: "*It is clear that the mining sector is the most crucial sector in Namibia that contributes significantly to GDP and a sort of foreign earning (*this agrees with the study's literature in Chapter 2*). As a result, it only makes sense both from the shareholder's and government's agenda point of view to participate in mining activities fully. In this scenario, the bank is helping the country to sustain economic growth and contribute to the national development goals. Not just the country but the region at large*."

Build on representative response, and the researcher can argue that all the banks provide financial services to the mineral sector for shareholder value creation. Still, they also consider Namibian economic growth and development as one of their goals. That is based on their argument that they are keen to fund whatever projects the bank needs to finance to impact society and a significant aspect of the economy in Namibia. It is also done to analyse essential micro and macro factors such as project profitability, the number of jobs created in the economy, environmental impacts, and government commitments to those projects. For example, the state firmly that banks do not fund mineral projects that involve or intend to sell commodities to companies with issues such as negative human rights and child labour practices prohibited by the Namibia law and international laws.

4.4. Integration of Quantitative and Qualitative findings

The researcher has analysed, summarised, and interpreted the findings independently in a mixed-method approach before integrating the quantitative and qualitative findings. For this kind of research-specific, they have to discuss how the data relate differ, and it may provide a better understanding of the role of commercial banks in financing mineral resources in Namibia and contribute to economic development. Hence, this section presents the summative merged interpretation of the results in the previous section.

It was noted that the Namibian economy has declined since 2015 at an average of 0.7%. The increase in the commercial bank leading to mining was observed, but the significance never grew more than 2% per GDP per year during the study period. The lending has been seen to have a high dispersion factor of 50%, although deemed a low variance since the CV<1. The Pearson correlation coefficient matrix results show evidence that the commercial bank leading to mining has a strong positive significant relationship with GDP, GTM, XR, and MEP, while negatively correlating with interest rates. However, this relationship is meaningless as it did not explain the causal relationship between the CBLM and other variables. That is why further analyses were needed.

It is anticipated that the commercial banks are playing a role in strengthening the mining sector by financing mineral projects/assets to contribute to the economic growth and development of the country. The responses analysed from the banks' participants revealed that commercial banks provide financial service to the mining sector primarily in the form of short and long-term debt solutions and financial advisory to create shareholder value. They target mainly to fund opportunities that present profitable cash flow with low risk but do not necessarily plan to contribute to economic growth and development. That is not a surprise as mining projects are high risk by nature, and the banks do not commonly consider funding them due to their uncertain cash flows. As Bank_A and Bank_B stated that they are profit-making businesses, maximising the shareholder's return plays a significant role in making final investment decisions. They indicate that they do not fund projects with equity as a case of development finance institutions. It only comes by accident that the project they invest in indirectly contributes to the country's economy in employment, government fiscal revenue, knowledge (human) development, and foreign exchange earnings that contribute to the growth of the GDP.

The study also employed to test multicollinearity by using VIF to determine the variables that have to be included in the model. The last model, Model 2, excluding Tax Revenue and Exchange Rate variables, indicates that all the VIFs levels were below 10. This model was suggested for further analysis where the model presents that it can explain about 96% of the variations in the GDP growth. The result of the F-statistic stands at 72.83, and the corresponding p-value at 2.348e-07, which indicates that the comprehensive regression model is significant. Furthermore, all the explanatory variables are statistically significant with

CBLM at the 5% significance level, while MEP, IRT and XR are statistically significant at a 1% significance level. In a case where the data series' stationarity is tested with ADF, the study found that the null hypothesis can be rejected at 1%, 5%, and 10% significance levels.

Then again, the study found that all variables used in this study are stationary at 10% significance levels at first difference level 1(1); this led the researcher to examine the long-run and short-run relationships between the remaining variables using the co-integration and VECM. The Johansen Cointegration maximum eigenvalue test a long-run relationship amongst the study variables that mark by r < = 4, that there is a long-run equilibrium relationship between the explanatory variables and economic growth in the term of Gross Domestic Product in Namibia. Oppositely, the current GDP is statistically significantly influenced by the lag GDP in the long-run relationship. That means that the previous year GDP determines the level of the current GDP to predict/estimate future GDP. Another compelling evidence was the long-run relationship observed between interest rate and GDP. The above feedback concurs with the result from Bhat and Laskar (2016), Kinyondo (2018), Semuel and Nurina (2014). Therefore, the study shows that the national GDP increases in Namibia when the interest rate increases.

Even though the mining sector employs many people in the country, the number of employees in the mining sector shows a statistically insignificant relationship with GDP. There is also a statistically insignificant relationship between the exchange rate and GDP in the long -run.

In terms of short-run relationships, the estimation reveals that the GDP in the short-run negatively is statistical significance impact by the number of employees in the mining sector at 10% levels. CBLM is a negative short-term relationship with the lagged value of GDP with statistical significance at a 1% level. Then XR is a positive short-term relationship with IRT with statistical significance at a 10% level.

Furthermore, the Granger analysis has proven a long-run and short-run relationship between the CBLM and GDP in this study. However, the causality examination shows insufficient evidence that the CBLM does not granger cause GDP, but GDP does granger cause CBLM statistically significantly. The latter statement also corresponds to the analyses done from the participants' responses. When Bank_B and Bank_C responded that they consider some factors before lending their funds to a specific mineral project: commodity type and market

price conditions before lending funds to a specific project in mining. They also prepare an analysis to see whether the country's economy is booming or not to provide funds. That means that they look at the economic growth as Namibia; in other words, they provide funds based on both short-term and long-term economic growth. It was also found out that banks have no restrictions on funding or advising the mining project at any stage, as long as they meet all their requirements, but they tend to be cautious about investing in specific projects with commodities such as uranium, lithium and coal. The reasons why they tend to be cautions range from commodity price volatility to environmental reasons. The financial institutions are aligned with the sustainability framework and build their funds to mitigate risk. Another insightful finding was that banks are involved in funding projects linked to the mining sector, such as renewable solar power.

As indicated by the responses, the commercial bank has no restrictions on funding or advising the mining project at any stage, as long as one meets all their requirements. But funding in uranium, lithium or coal projects is limited due to the historical economic nature of those commodities and ESG reasons. They are treated differently or even denied. Interestingly, banks have indicated their willingness to invest in more new mineral associate projects in Namibia, such as renewable energy projects. They align their decision with the sustainability framework and build their funds to mitigate risk.

CHAPTER 5: DISCUSSION, RECOMMENDATIONS AND FUTURE RESEARCH

5.1. Introduction

This chapter discusses and summarises the study's overview and findings presented in the previous chapters when assessing financial institutions' role in financing natural resources in Namibia. It covers the summary and conclusion of the study, the policy recommendations of the findings and concludes with the avenues for future research.

5.2. Summary and conclusion of the study

This study aimed to investigate the effect of financing of financial institutions (commercial banks) in mineral resources projects' contribution to economic growth and development in Namibia. This study's four main objectives were explored and achieved, even though the researcher has experienced some limitations during the data collection process.

As demonstrated in Chapter 3, the study employed the convergent parallel mixed research approach, one of the three research approaches found in the literature to suit this research work. With that approach, the researcher followed a quantitative and qualitative process concurrently in the course of the design phase of the research, data collection and data analysis at the same time. In the quantitative approach, a time series analysis method was employed to analyse the macroeconomic data covered from 2006 to 2020. The data were assumed to be from the eight commercial banks operating in Namibia between those periods. The GDP was considered as a dependent variable. At the same time, CBLM, MEP, GTM. XR and ITR were measured as independent variables. The data was drawn from several sources such as public online databases, quarterly reports, and annual reports for various institutions in Namibia such as the Central Bank and Internationally. To examine the short-run and long-run relationship between variables, at least four techniques, namely regression analysis, Johansen cointegration, VECM and Granger causality, were applied to examine the data.

While on a qualitative approach, four in-depth semi-structured questionnaire interviews formulated around the study's objectives were successfully conducted with the representatives (senior staff members) from FNB, BW, SBN and Nedbank. However, Nedbank's data have not been covered in this study, as mentioned in Chapter 4. All

representatives interviewed demonstrate understanding of the study's aspects within their banks on financing and investing in the mineral resources sector in Namibia. The semi-structured interviews were recorded and analysed using thematic qualitative analysis. The thematic analysis was selected as an appreciate method that can aid the researcher in identifying, analysing and interpreting patterns of meaning within a set of texts such as the interview. Therefore, several themes were emerged in representing their understanding and insights of the roles and contributions of Namibian commercial banks' financing and investing in the mineral resources sector.

5.3. Policy Recommendations of the findings

The study shows no long-run and short-run relationship between the GDP and CBLM. However, the causality examination shows that GDP does granger cause CBLM, which mean the GDP has a causal impact on CBLM. That is a unidirectional causal, and there is not enough evidence that the CBLM does not granger cause GDP. At the same time, while bankers claimed to finance mineral projects to contribute to economic growth, the reality is that is not necessarily true as their decision is shareholder-driven as their primary objects are to make profits than create stakeholders value. Their actions evidence that the banks tend to invest in the mineral sector when the commodities price is high then low to maximise their returns. They also select specific projects that are less risky as they avoid those in the exploration stage or commoditise that is becoming controversial in the public domain mainly due to meeting ESG requirements.

The Namibia economy has been declined over the years and requires a robust and concise solution that can drive the economic growth and development of the country. However, there is a lack of evidence to see how institutions such as commercial banks assist in driving the economy by critical funding sectors such as mining. It is believed that Namibian banks don't even have guidelines or policies to finance the mineral sectors. Therefore, it can be recommended that the banks pay particular attention to developing policy that gives them a guideline to fund sectors such as mining to contribute to economic growth. In addition, it is the view that institutions do lack human, technical capacity to assist facilitate projects, and it can be suggested that they should develop internal capacity to improve the participation of banks in financing the mineral sector.

Since there is no government guideline or policy to promote the commercial banks or financial sector to finance the mining sector; it is then recommended that the central bank and policymakers in Namibia focus on developing a robust institutional framework and favourable fiscal and monetary policies that could help commercial banks channel funds to the mining sector. Those policies are essential, especially when the commodities price is low, increase confidence in the local financial system and promote the flow of funds. That can create stakeholders value and contribute to the national economic growth.

5.4. Avenues for Future Research

The limitations encountered by the researcher during this study to access the data from the banks for reasons such as data privacy has an impact on finding more insight about the bank's influence on mining and the economy. One suggestion is that commercial banks in Namibia should strengthen their relationship and data sharing with institutions such as the Bank of Namibia and Namibia Statistic Agency to provide related financing of mining data and archive them for future reference. That may apply to mining data and another sector funded by commercial banks. Such data should be accessible publically without limitations for the researchers to analyse factors accordingly in the future. To understand the causality between the commercial bank and other sectors and their contributions to economic growth and development. That is important as conducting the times series analysis requires at least a trend of more than 30 years. Even though there are some data in the public domain, especially those published by the Central Bank, those data are for the entire economic sector but not specific to commercial banks' mineral resource financing. Another recommendation is that there is room for improvement for the Bank of Namibia to standardise the structure of the annual report of commercial banks. Include the same factors to allow the researchers to compare and contrast. That may also help the bank to be able to do products bench making in their daily operation.

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Appendix

UNIVERSITY OF CAPE TOWN

GSB DEFIC DEVELOPMENT FINANCE CENTRE

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APPENDEX 1: RESEARCH INTERVIEW ON THE COMMERCIAL BANKS IN NAMIBIA

18 August 2021

Dear Participants

My name is Paulina Kandiwapa Nanyemba, and I am currently a student at the University of Cape Town Graduate School of Business in Cape Town enrolled for a Master of Commerce in Development Finance. I am writing this letter as I wish to conduct the research for my Master's dissertation, which comprises '**an Assessment of the Role of Financial Institutions in Mineral Resources Financing in Namibia: A Mixed Methods Study.** Thus, I have a set of questions that I would appreciate if you took your time to participate in the discussion with your permission. The interview should take at most only 20 - 30 minutes of your time.

The study aims to answer four main questions: What is the relationship between financial institutions' financing in mineral resources projects' contribution to Namibia's economic growth and development? How do financial institutions finance the mineral resources projects? What strategies and financial products are available in Namibian financial institutions for natural resources? Which mineral resources project stage and commodities are benefiting from Namibian financial institutions, and why?

The assurity is that there are no known risks or threats to you accompanying this study. However, your identity will remain anonymous in responses to the research questions, and all responses will be confidential and used for the purposes of this research only. Therefore, I am seeking your consent to conduct an online interview with you for research purposes. Should you require further information, please do not hesitate to contact the Researcher on cell phone number 081 304 9705 and/or email address kpoullen@gmail.com. Thank you for your time and consideration in this matter.

Yours sincerely,

Paulina K Nanyemba

Masters Candidate, Development Finance Graduate School of Business

University of Cape Town

APPENDEX 2: INTERVIEW CONSENT FORM

Participant name: ……

I volunteer to participate in a research project conducted by Paulina Kandiwapa Nanyemba as partial fulfilment of the Master of Commerce in Development Finance Degree requirements at the UCT Graduate School of Business. I understand that the research is designed to gather information about the **Assessment of the Role of Financial Institutions in Mineral Resources Financing in Namibia: A Mixed Methods Study**. I will be one of approximately nine people being interviewed for this research.

Objective(s) of the research

- This research seeks to investigate the Namibian financial institutions' role in mineral resources projects financing and their contribution to their economic development.

Ethics approval

The ethical clearance for this study was approved by the UCT GSB Research and Ethics Committee on 29 July 2021

Participation and confidentiality

I understand that my participation in this research is voluntary, that I will not be compensated and that I may withdraw at any time. The interview will take approximately 30 - 45 minutes to complete and will be audio recorded.

I understand that I will not be identified by name in any reports using information obtained from this interview and that my confidentiality as a participant in this study will remain secure. Subsequent uses of records and data will be subject to standard data use policies that protect individuals and institutions' anonymity.

Should you have any questions or concerns, please contact me at +264813049705 or my supervisor latif.alhassan@gsb.uct.ac.za

Consent

I consent to participate in this interview based on the terms outlined above and subject to the following additional condition of my own (if any).

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Signed by interviewee **Date**

…….. ……..

Signed by Student **Date**

APPENDEX 3: INTERVIEW DISCUSSION GUIDE

Section 1: Demographic Information

1. Name of the Financial Institution
2. Nature of Business
3. What is your role at [name of the institution]?
4. How long have you been in this role?
5. What is the current qualification you hold?

Section 2: Semi-structured interview questions for Financial Institutions in Financing Mineral Resources in Namibia.

* Required

1. Does the institution have a department or section that deals with financing Mining and Natural Resources projects/assets? If "Not", why not? If "Yes", why yes?
2. What motivate the Bank to invest in Mining?
3. What is the mandate that the Bank has for this department?
4. Have the Bank-funded any Mining and Natural Resources projects/assets in the last 12 years?
5. How many natural resources' projects/assets (average) do the Bank fund every year between 2009 and 2019? Is it possible to access such information/data?
6. From 2009, what is the total range amount the Bank lends on these projects/assets so far? Is it possible to access such information/data?
7. How do the Bank' fund Mining and Natural Resources projects/assets?
    7.1. Apart from what you have mentioned, is there any other strategic policy and financial products available for Mining and Natural Resources projects/assets? Products like equity and debt?
8. What criteria/characteristics/features that the Bank use to recognise natural resources' projects as potential investments? Why?
9. Which of the project stages do the Bank prefer to fund? Why not other stages?
10. Does the Bank have a preferable mineral to fund? If "Not", why not? If "Yes", why yes?
11. Do the Bank recognise the financing of Mining and Natural Resources projects/assets as one of the ways of uplifting the Namibian economic growth and development? If "Not", why not? If "Yes", why yes?
12. Is the anything that you would like to add to our conversion topic?

Thank you very much for taking the time to participate in the interview.