

**EXPLORING THE CAPITAL INVESTMENT PRACTICE
OF MINING CORPORATIONS IN NAMIBIA**

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by

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Declaration

I, Hilma Naleshemunyenga Iyambo, do hereby declare that this research report is the result of my investigation and research and that this has not been submitted in part or full for any degree or for any other degree to any other University.

Signed by candidate

Hilma Naleshemunyenga Iyambo

21 August 2018

Date

Dedication

This project is dedicated to my work and the mining companies. It is a special dedication to the mining organisations for the overwhelming support which the companies rendered.

Acknowledgements

I, Hilma Naleshemunyenga Iyambo do hereby take this opportunity to acknowledge those who assisted me in this project especially my work colleagues and friends who contributed towards this project. I am grateful to my supervisor Dr Badri Zolfaghari for her valuable guidance, advice and words of encouragement. I feel so proud to have interacted with her as my supervisor.

Abstract

Namibia is a country rich in minerals, and this has attracted both national and international investors to the mining industry in the country. The mining sector is a capital-intensive industry that calls for long-term investment. Capital investment is a long-term economic venture that requires and consumes a lot of resources, for example, the purchase of fixed assets, such as land, machinery, and buildings (Ward, 2013). Capital investment in the mining sector is risky because of various uncertainties that include among others, political risks, environmental risks (geological), fluctuations of mineral prices on the world market, changes in fiscal policies, and the depletion and exhaustion of mineral resources. Generally, risks associated with technical and commercial aspects have always been high in the mining sector (Bhupu, 2005). Because of the risky nature of the mining sector, companies venturing into a mining project need to adopt comprehensive capital investment practices that realise the return on capital, taking into cognisance all risks that could jeopardise and frustrate the ambitions of the promoters, shareholders and various stakeholders, which include the government, downstream industries and the local community.

The aim of this study was to explore capital investment practices of mining corporations in Namibia focusing on the five large mining companies. The purpose was to identify gaps between investment practice and investment theory that might have a long-term impact on mineral dependent national economies, development finance for local community sustainable development and the return on capital to investors. Since large-scale mining demands large capital investment that requires proper long-term planning for the realisation of return on capital, it has been found necessary to purposively select five largest mining corporations for the study. The mining organisations involved were De Beers Marine, Rosh Pinah, Rössing, Tsumeb Corporation and Navachab.

The study employed an exploratory qualitative research approach to explore the capital investment practices of five major mining operations in Namibia that generate more than 95% of the mining income. The study employed the qualitative research in order to obtain a deep understanding of capital appraisal methods used and get

reasons why they are used. Purposive sampling was used to select five participants for the survey. The collected data was assessed and analysed using thematic analysis. The analysed data was converted into tables and bar charts. The tables and bar charts of analysed data are presented as findings in chapter four of this study.

The results show that five of the mining organisations use Net Present Value to conduct capital investment appraisal and a similar number uses the Payback Back Period. Two of the mining organisations use IRR and one uses ARR for capital investment appraisal. It was further found that mining organisations surveyed factor in development finance in their capital budgeting process but experience unforeseen incidences when it came to implementation. Finally, it is recommended that the Government of Namibia together with various stakeholders consider and incorporate development finance in their capital investment appraisal and capital budgeting for sustainable development.

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Definitions of Terms

Term	Definition
Capital Investment	Effort made by the business to acquire long term possessions which may include buildings, machinery and land (Ward, 2013).
Discounted payback	The process when a business recovers money invested through discounting cash inflows (Arnold, 2005).
Economic Value Added (EVA)	A profit obtained a fur tax accounting charge on the account of using equity (Pike and Neal, 2003).
Internal rate of return (IRR)	A measure of Net Present Value which shows the level of zero profit, (Pike & Neal, 2003).
Investment	Funds expected to grow and create value/return through interest or value increases of an asset (Bhatti, 2012).
Investment appraisal	It is the process decision making of selecting a programme or approach of investment. Both short and long term investments are considered (IFAC, 2013).
Modified Internal Rate of Return (MIRR)	Focuses on analysing capital investment programmes with the assumption that the reinvestment rate is the same as the business cost of capital (Arnold, 2005).
Net present value (NPV)	A technique used to establish the profitability of an investment over time which considers the difference between present value of cash inflows and present value of cash outflows (Boehlje & Ehmke, 2005).
Payback period	Analysing the investment and deciding the time taken to get back the investment put into the project. (Ross, Westerfield and Jaffe, 2001).

List of Abbreviations

ABS	-	Australian Bureau of Statistics
ARR	-	Average rate of return
CER	-	Capital Efficiency Ratio
CIP	-	Carbon-in-pulp
DCF	-	Discounted cash flow
EVA	-	Economic Value Added
IRR	-	Internal rate of return
MIRR	-	Modified Internal Rate of Return
NIED	-	National Institute for Educational Development
NPV	-	Net present value
PBP	-	Payback Period

CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1 Introduction

Capital investment concerns a long-term investment which involves business management during all stages of the business life cycle. Investment involves an outlay of funds from which the business looks forward to obtain a reward. When the investment exceeds the cost, it creates value for the shareholders, thus the reason of investing money. The profit becomes the motive of investment (Bhatti, 2012). Thus, money is invested in anticipation of a return in terms of profit.

Namibia is a country rich in minerals, and this has attracted both national and international investors to the mining industry in the country. Long term investment decisions are often difficult because inaccuracy may creep in when there is no adequate information. The vitality of the business environment may present unforeseen risks which need to be planned for. Accurate forecasting may also be affected because of lack of accurate future information. Ward (2013) notes that mining investment is even more complex considering the uncertainties which may be caused by resource limitations and goal trade-offs. This complexity requires well informed strategic decisions which present high probability of profitable investment. The decisions are based on robust informed intelligent planning.

The Internal Federation of Accountants (2013, p.7) defines investment appraisal as a process of decision making whereby a business entity selects an investment of magnitude size which has high probability of bring in investment rewards. A key consideration in investment appraisal is the risk factor. Investment appraisal considers the time value of the dollar hence it uses discounted cash flows. The widely used investment appraisal techniques include Net Present Value (NPV), Internal Rate of Return (IRR), and Discounted Payback Period (Pike & Neal, 2003). The purpose of this study was to explore capital investment practices existing the Namibian mining industry and relate it to the investment theory.

1.2 Background of the Study

Namibia is rich in minerals and mining has been the main economic activity of the country. According to the National Institute for Education Development (NIED) (2007), the first white settlers in Namibia came across the northern inhabitants of Namibia smelting copper at a place near Otavi in 1851. Mining in Namibia started in 1855 in the surroundings of Walvis Bay. Mining has been the main economic activity of Namibia and currently mining accounts for 11% of Namibia's Gross Domestic Product (GDP) (Sikhakhane, 2012). Namibia is ranked a key producer of diamonds and uranium. In addition Namibia produces lead, copper, zinc and gold. The major mining companies include Navachab, DeBeers Marine, Rosh Pinah, Rössing and Tsumeb. The mining organisations contribute 95% income (NIED, 2007). However the mining industry is a very important economic sector considering that Namibia does not have much on heavy industry.

1.3 Statement of the Problem

The mining companies in Namibia have made a great deal of commitment on capital investment in anticipation of return on capital, for example, Anglo Ashanti Gold invested a significant capital investment of over N\$100 million at Navachab mine on its transition from contractor-mining to owner-mining operations during 2004 (Anglo Gold Ashanti, 2004), and Anglo American invested N\$454 million at the Scorpion zinc mine which was opened in 2003 (NIED, 2007). Capital investment in the mining sector is characterised by sizeable up-front expenditures, extended periods over which expenditures increase before revenues can be generated, with elevated technical, economic and financial risks (e.g., geological, mining, processing, future prices and revenues, and capital and operating costs) (Natural Resources Canada, 2012). According to the Australian Bureau of Statistics (ABS, 2012), mining projects tend to be complex in structure and comprise a number of different investment activities including exploration, engineering construction, plant and equipment and buildings. Despite playing a vital role in Namibia's economy, the mining sector has experienced a decline in growth over the past few years and this has mainly been

because of several mining ventures closing down due to diminishing mineral ore reserves and low commodity prices (Mbendi, 2013).

Capital investment in the mining sector is risky because of various uncertainties that include among others, political risks, environmental risks (geological), fluctuations of mineral prices on the world market, changes in fiscal policies, and the depletion and exhaustion of mineral resources. Generally, risks associated with technical and commercial aspects have always been high in the mining sector (Bhapu, 2005).

The depletion and exhaustion of mineral resources is not a new phenomenon in Namibia. Mining towns such as Elizabeth Bay, Kolmanskop, Pomona, and Bogenfels, turned into “ghost towns” after mining closures resulting from depletion of the resource base (Chamber of Mines of Namibia, 2011). The dynamic economics of the mining cycle is believed to bring both life and death to mining towns, but it is usually hard to predict the timing and impact of potential problems. Furthermore, market fluctuations, economic and public institutions, and resource revenues can present challenges in converting natural resource wealth into sustainable economic growth and development (Fraser Institute, 2012). Closure of mines is inevitable due to the exhaustion of the mineral base, but where and when, is not easily envisaged with accuracy (Neil, Tykkyläinen and Brandbury, 2002). Factors such as mineral exhaustion, high production costs, mineral price fluctuations, which in turn are influenced by volatile market changes, often lead to mine closures.

In light of the above, companies venturing into a mining projects need to adopt comprehensive capital investment practices that realise the return on capital and meaningful contribution to the national economic development, taking into cognisance of all risks that could jeopardise and frustrate the ambitions of the promoters, shareholders and various stakeholders, which include the government, downstream industries and the local community.

1.4 Aim of the Study

The aim of this study was to explore capital investment practices of mining corporations in Namibia focusing on the five large mining companies. The purpose

was to identify gaps between investment practices and investment theory that might have a long-term impact on mineral dependent national economies, development finance for local community sustainable development and the return on capital to investors (promoters and shareholders).

1.5 Objectives of the Study

The objectives of the study were:

- To identify capital investment appraisal techniques widely used in the mining industry in Namibia;
- To determine the criteria used by the companies in the Namibian mining industry to choose the capital investment appraisal technique;
- To identify benefits of using capital investment appraisal when investing in capital projects; and
- To recommend capital investment practices when investing in mining projects.

1.6 Research Questions

The study addressed the following questions:

- What capital investment appraisal techniques are widely used by the mining companies in Namibia?
- What criteria do companies in the Namibian mining industry use to choose a capital investment appraisal technique?
- What are the benefits of using capital investment appraisal when investing in capital projects?
- What capital investment practices should be conducted when investing in mining projects?

1.7 Significance of the Study

Mining provides essential revenue for the Namibian economy today, and between 1990 and 1997 mining contributed almost 25% to the country's national economy (NIED, 2007), whilst mining products produced up to 50% of Namibia's annual export

earnings (Mbendi, 2013). Furthermore, Namibia expects investment in the region of US\$3.5 billion in its mining sector over the next five years, with the sector accounting for 15% of the country's total economic output (Khobetsi, 2012). Despite the importance of mining and its contribution to the Namibian economy, no studies have attempted to look at capital investment practises in mining in Namibia.

Assessment of capital investment in mining is important, as mining activities are a source of sustainable economic development, but with large and risky capital investments. It is essential to recognise that good practice in capital investment appraisal is a global phenomenon that requires the application of techniques for informed mining investment decision making. The results of this study will inform and help local and international investors to identify capital investment appraisal practices that will realise good return on investment for the investors, and benefit the various stakeholders.

1.8 Scope of the Study

Namibia has 55 mining companies that range from small-scale mining to large scale mining (Chamber of Mines of Namibia, 2011). The study looked into existing capital investment appraisal practices in the mining sector in Namibia focusing on the five main mining operations. We assume that small mining companies have little capital investments, hence they are not included in the survey. The focus is on large long-term investment, hence the choice of the five large mining corporations. Because of time constraints, it was not possible to study all 55 mining companies, hence assume that the outcomes from the five major mining companies are representative of capital investment practices of mining companies in Namibia.

1.9 Research Assumptions

The research assumed that:

- Mining is a major contributor to the national economic development.
- Earnings from mining activities can be crafted into development finance for social and infrastructural development of local communities.

- Well-developed capital investment practices that incorporate development finance for local community leads to sustainable development.

It is in light of the above assumptions that the study assessed the capital investment practices of the five major mining corporations in Namibia for identifying the inclusion of development finance for local community sustainable development.

1.10 Outline of the Dissertation

This thesis is organised as follows: Chapter 1 outlines the introduction. Chapter 2 reviews literature pertinent to the assessment of capital investment practices in the Namibian Mining Industry. Chapter 3, which describes and explains the research approach and methodology that was used to collect and analyse the data for the study follow this. The results of findings from the research are presented in Chapter 4. Finally, and Chapter 5 summarises the findings of the study, draw conclusions and outline recommendations aimed at the improvement of practices of capital investment for economic viability and sustainability of mining projects.

1.11 Conclusion

This chapter focused on the introduction of the study. The chapter presented the background and the research problem which both explained why the research was conducted. The same chapter also presented the topic breakdown in the form of research objectives and questions. The significance of the study was described and the scope defined in terms of organisations involved in the study. The scope also justified why the research focused on capital investment appraisal. The last part of the chapter presented the contents of each of the five chapters that make the research.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Chapter two presents and discusses related literature relevant to assessing the capital investment practices in the Namibian mining industry, with particular reference to the five major mining operators in Namibia: De Beers Marine, Rosh Pinah, Rössing, Tsumeb Corporation and Navachab. We define and create an understanding of capital investment, and look critically at factors affecting capital investment practices in the mining industry. We also briefly compare and contrast the practices of capital investment by different mining companies in Africa and the world.

2.2 Influence of Mining Investment on Economic Activity and Development

The following section looks at the mining industry and analyses the influence of the mining activity on investment in Sub-Saharan Africa.

2.2.1 The influence of mining activity and investment in Sub-Saharan Africa

Mining is an economic activity that has direct and indirect impact on developing nations. Mining creates employment, boosts government economic development and creates employment (Fraser Institute, 2012). Developing countries, including Sub-Saharan Africa, have benefited from financial inflows, as investors from the developed world have been attracted to mineral resources and reserves. The effort by government to promote investment in mining has been expanded at a fast rate. This has been necessitated by the increase in prices of commodity and the depletion of economic activities (Commonwealth of Australia, 2012). Global investment in the mining sector has contributed immensely to the development of third world countries. (Fraser Institute, 2012). Mining economics are sources of development, creation of employment and reduction of poverty but the challenges is that it may have a number of risks (Commonwealth of Australia, 2012). As Mutemeri, Callaghan and Hermanus (2010, p.1) pointed out:

“Although mining depletes non-renewable natural capital, the process of mining can provide, with careful stewardship of mining revenues and the prioritisation of infrastructure development, the basis for developing other types of capital”.

The situation demands that countries from Africa take effort to exploit their rich minerals to benefit the majority and boost development of their economies (Baillie & Dickinson, 2012). In Mozambique for example, the coal based industry is contributing to development with transportation energy generating sectors achieving most of the growth in the future (Greve, 2013).

2.2.2 The influence of Mining Activity and Mining Investment in Namibia

Namibia, with its mineral resource base, can benefit a lot through development finance arising from mining investment and from mineral wealth if good practice in mining investment geared towards sustainable development is practiced. According to NIED (2007), the mining industry is a source of economic development for Namibia and contributes to 25% of the national economy.

For this research, we identify developmental activities to include infrastructural, economic and social development. The concept of the need for mining to support infrastructural, economic and social development on a local and national level is highlighted by the Uranium Institute (2010) as they stated that the Uranium contributes to export earnings, generation of national revenues, enhancing achievement of 2030 goals of developing Namibia into an industrialised nation. The country also looks forward to improvement of quality of education and health and road and communication network. This means that revenues or earnings from mining should contribute towards local and national infrastructural, economic and social development. It is therefore, imperative that both local and foreign investors in the mining sector take due diligence when making investment decisions to take into cognisance the concept of ploughing back into the community through considering local development programmes. Proper capital investment appraisal that

incorporates development finance for infrastructural and local community development is necessary for sustainable mining activities.

With respect to local and national development, Rössing Uranium, one of the Namibian mining giants, has made significant efforts towards social development through investing in education. According to Rössing Uranium (2007), Problems in the provision of education in Namibia are absence of qualified educators and weak work engagement. In an effort to reduce the impact of these challenges, Rössing Uranium supports with qualified and experienced educators in Arandis, Swakopmund and Ondangwa (Rössing Uranium, 2007). According to Rössing Uranium (2007), the Rössing Foundation, is a community development department developed four education-oriented social development principal objectives that include:

- To develop the Namibian education system for the purpose of boosting productivity and promoting lifelong learning.
- To develop the mind set of appreciating the benefits of education
- To improve the level of the living standards of the Namibian people
- To create programmes and projects which improve the general life of the Namibian people

The community and social developmental objectives by the Rössing Uranium are a form of social responsibility where development finance is structured to benefit the local communities in the form of life-long intellectual development.

Another mining giant in Namibia is Namdeb which has a 50% a piece strategic alliance with De Beers Marine and the government of Namibia. Namdeb Foundation became into effect in 2010. The Foundation was split into ten schemes which funded economic activities focusing on development projects. Since the schemes were put in place, they contributed to development project across the breadth of Namibia. The development projects focused more on poor and marginalised communities. The scheme contributed funds and donations in kind. These have contributed significantly to poverty alleviation and improving the livelihoods of the communities and especial children who are vulnerable to disease and nutrition. The programmes have also been extended to the assistance of the aged citizens.

2.3 Review of Capital Investment Appraisal Techniques

The term investment appraisal is associated with an evaluation of the attractiveness of an investment proposal, using methods such as average rate of return (ARR), internal rate of return (IRR), net present value (NPV), or payback period. IFAC (2013) defined Investment appraisal focuses on determining what is derived from an undertaking and whether such an investment justifies the funding committed to the project.

Owners of a business or management, expect a return when the capital invested is meant to create value for its owners in the form of expected returns from the investment. This is the same with owners of mining companies who invest large sums of money on mining projects. Investment decisions have to be made based on the outcomes of various investment appraisal techniques. Investment appraisal attempts to determine whether the benefits from undertaking an investment are sufficient to warrant the initial expenditure.

Since the benefits from an investment are futuristic and forecasting may not be perfect, alternative investment opportunities should be analysed closely (Boehme and Ehanke, 2005). Boehlje and Ehmke (2005) further stated that choosing investments that contribute to improve financial status of organisation concern two important functions: analysis of profit and financial feasibility analysis.

The profitability of a selected investment will show the viability of the selected option (Boehlje & Ehmke, 2005). The current capital intensive techniques of a modern production require close consideration in the choice of ways and processes used for analysing appraisal. Finding the most or best technique of investment appraisal is challenging to both organisation management and stockholders. However in real practice organisations may adopt more than one investment method or may mix aspects of the different methods.

Akalu (2001) stated that during some years investors and business owners have been considering various ways of establishing the feasibility of projects. A variety of business appraisal techniques were established. A key weakness of some business

investment methods is failure to acknowledge that money invested today will not be the same in some time to come. In addition some investment project ignores non-financial information. The challenges have compelled the investors to continuously search for alternative business investment appraisal methods.

Akalu (2001) established that the discounted cash flow method is an often used capital investment approach. The most popular investment appraisal techniques are Net Present Value (NPV) and Internal Return of Return (IRR). The challenge remains the investment is able to capture non-financial information. Non-financial information is important in showing the viability of an investment projects.

Mott (2009) stated that it is normal that managers view profit as the most used variable of profit. The uncertainty in SMEs has resulted in squandering states that business finance is shrinking and other operations are affected. A number of studies have been conducted to establish the relationship between theory and practice. While not much has been obtained among various research, research needs to be pursued to establish the gap between theory and practice (Mott, 2009). Practice shows people's commitment and the commitment needs to be weighed against the achievement scored.

Gilbert (2005) stated that when making decisions on investment, managers do not follow theory. Instead management use a multi stage elimination process to reduce projects and align with the organisation's strategic goals. Gilbert (2005) further indicates that discounted Cash Flows investment analysis method is implemented to determine if the chosen methods are viable. The business seems to be experiencing quite a number of challenges. However they would be cognisance of other intervening factors and these should be taken care of.

Maloyi and van der Pol (2012) note that a critical challenge in today's business environment is that resources are limited. The situation makes it challenging to share resources between running businesses and new ventures. The situation leads to the use of capital budgeting techniques to establish viable projects. It is necessary that the most suitable method be used to assess investment appraisal. Establishing the right cash flows to be part of the appraisal process is complex. A way forward is to

consider cash flows which are relevant and these can only be determined by considering cash inflows which are relevant and these can only be determined by considering cash inflows which are a result of choosing the investment preferred.

2.4 Capital Budgeting and Mining Investment Appraisal

Capital budgeting is the process of evaluating and selecting long-term investments that are consistent with the firm's goal of maximising owner wealth (Gitman, 2009). Mining activity involves long-term investment for the predicted life cycle of the mining project. According to Mill (2000), the capital budgeting process is a complex, lengthy process that takes place in stages through time, in which the earlier activities and choices are crucial. Mill (2000) indicated that the process has linked activities which are determined by how they are structured. Pike and Neale (2003) explain the purpose of capital budgeting and indicate that it is meant to analyse alternative methods and choose the one which shows long term viability. The economic thinking is that choosing the ideal method of investment contributes business growth significantly. The assumption is that the application of a correct theoretical method leads to optimal investment selection and, hence, maximises shareholders' wealth (Gitman, 2009).

Capital budgeting provides the analysis and evaluation of investments in terms of their impact on the firm's value. It is important that a correct capital budgeting technique and a reliable investment appraisal be used in carrying out investment decisions. Finding appropriate cash flows to include in a project appraisal often involve difficulty in data collection and require some thoughtfulness in applying the concepts of incremental cash flows. The key point on determining the relevant cash flows is that only cash flows, which are consequences of the investment decision, should be considered (Gitman, 2009).

The common practice is investment appraisal approaches is to use multiple techniques (Groppelli & Mikbakht, 2000). Reporting a study on mineral investment, decision making practices by mining companies in USA Bhapu and Guzman (1995) found smaller and newly established businesses use simpler capital investment appraisal methods as compared to bigger organisations. Boehlje and Ehmke (2005)

found that some techniques have distinct advantages; supplementing methods are used to link and promote project visibility. A study on investment projects of some big firms in Nigeria showed that the most preferred and used investment appraisal techniques were simple, effective and easy to understand and implement (Katundu, 2007). However business environments are not the same. An investment appraisal may work in one business environment and fail in another.

2.4.1 Capital Budgeting Techniques

i) Payback Period (PBP)

Payback is the period taken by an investment to recover the capital invested in the project (Ross, Westerfield & Jaffe, 2001; Hill, 2008). Decision on accepting an investment project using the pay back periods is against a set standard or benchmark. The investment that pays back in the shortest period is given priority. The reason behind that is that the returns are paid within the shortest period and this limits risk (Pike & Neale, 2003).

The weaknesses levelled against the pay back technique is that it does not consider that a dollar in the future (Arnold, 2005). Furthermore, Hill (2008) stated that PBP puts more emphasis on liquidity and ignores profitability. The fact that PBP does not consider the value of money over a period presents challenges up to the end of the investment cut-off date and puts more emphasis on liquidity and does not consider profitability hence falls short when it comes to large complex investments where both liquidity and profitability are necessary (Hill, 2008).

ii) Discounted Payback Period

Discount pay back is the time taken to recover cash outflows against the inflows discounted at the capital opportunity costs. This approach builds on the simple payback method but considers that the value of the dollar changes over time. However though the discounted cash flows is a better method in terms of

consideration the changes in the value of money overtime it does not consider cash flows beyond the cut off data.(Hill, 2008).

2.4.2 Accounting Rate of Return (ARR)

Hill (2008) defined the ARR as the ratio of the profit achieved over a year compared to the value of the investment. The ARR is frequently combined with the PBD to assess investment profitability (Hill, 2008). The ARR establishes profit accounting ratio obtained from an investment in relation to an outlay of capital. The investment is also called return on investment. Similarly it is regarded as return on capital employed. The ARR considers the projects performance of the total life cycle of the asset. Under ARR project is accepted if the index is greater or equal to the rate of hurdle.

The ARR technique is easily calculated since accounting data is used (ratio of annual profit to capital) and the input required are the projected profits. Managers also often favour it because it is an evaluation measure that is broadly consistent with return on capital employed and a ratio on which their own performance is measured. However, it ignores the time value of money and the cash flow from investment, and does not consider terminal value of the project (Keshav, 2009). For example, there is no allowance for the fact that cash received in year one is more valuable than an identical amount received in year three. More importantly, it is flawed, because it uses profits rather than cash (Hill, 2008). It can be summed up that ARR falls short for long-term complex investments. This is supported by Jan (2011) who stated that ARR it is not suitable for projects, which have high maintenance costs because their viability also depends upon timely cash inflows.

2.4.3 Net Present Value (NPV)

According to Pike and Neale (2003) Net Present Value (NPV) is the return generated by cash flows which consider the changes in the value of the dollar over the investment period. NPV is the total current value of the total cash flows less the amount invested. When calculating NPV, the current values are determined by discounting cash flows using value reduction from the cost of capital. A project

evaluated using NPV is accepted if the current value of the investment is the same or more than the initial investment. NPV is focused on continuously improving the wealth of the shareholders (IFAC, 2013).

NPV is calculated using cash flows and considers that a dollar invested today is not the same in some years to come, NPV is calculated by discounting cash flows and summing these to compare with initial investment and establish whether the investment is positive or negative.

2.4.5 Internal Rate of Return (IRR)

Internal Rate of Return is defined by Pike and Neale (2003) as investment appraisal techniques which establish the zero point of NPV. IRR establishes when an investment makes zero returns. When using IRR for appraising investment, the investment makes zero returns. When using IRR for appraising investment, the investment is accepted when the IRR index surpasses the cost of capital. The strength of IRR as noted by Keshav (2009) is that it takes note of the change of the value of money over a period. IRR has strength of establishing the actual rate of return the project achieves

Despite these benefits, that IRR does not show the size of the project when looking at various investment projects, the method is popular with some enterprises. The approach also assumes that the funds generated can be invested at the same rate of return as the IRR. IRR compares cash flows to the funds which are used to generate the outflows, which can be challenging if the investment requires outlay which is not the same (Lancto, 2012).

2.4.6 Modified Internal Rate of Return (MIRR)

Arnold (2005) describes MIRR as an investment return where the start investment is the same with the investment at the end of the investment is the same with the investment at the end of the investment period. The future value of the investment is calculated as compound rate of the investment. It is established by working out the rate those results in the current rate of the end value of an investment's inflow to be

the same with current value of investment outflows. This is through the use of weighed cost of capital (WACC) where negative cash flows are discounted at the commencement of the project. Profitability ...as it links with information on re-investment and acknowledges negative and positive cash flows with more accuracy (Gitman, 2009).

Although the requirements of an estimation of the possible cost of capital for the purpose of making decision which may not offer a decision which maximizes the value to be implemented for comparing different investments and used for selecting investments when capital is being rationed.

2.4.7 Real Options

Boer (2000) stated that the real option theory presents a clear picture about investments by drawing similarity to options of finances. Katundu (2007) notes that currently literature on real options use complicated methods to explain how option theory can be implemented in capital investment projects.

There is observation that businesses are changing the approaches they use to assess investment programmes. The use of contingent claim analysis on capital investment appraisal show new trends which facilitate better decision making (Moel & Tufano, 2002). This is different to the challenges of project investment which estimates costs which change with production when fixed costs which cost which do not change are budgeted for at the start of the project.

2.4.8 Economic Value-added (EVA)

EVA is defined by Pike and Neale (2003) as an after tax accounting profit created by a business which is charged for using equity and multiplied by the equity and multiplied by the equity book value. Adler (2000) indicates that EVA is an index related to measurement of performance and it connects with the internal value of the organisation. EVA is calculated by removing the cost of capital from net operating profits after tax obtained by the business.

The value for the shareholder is increased of the business is engaged in business decisions that results in positive Net Present Value (Pike and Neale, 2003). When working out Net Present Values, there is need to discount the increasing cash flows of a decision and there is possibility that such cash flows are not the same with those that are part of the investment project.

2.5 Capital Appraisal in the Mining Sector

Well performing mining companies do not implement uniform investment appraisal methods (Da Silva, Gillespie & Buckeridge, 2012). The mining industries are complex and are made up of diversified activities such as excavation, engineering, plant, equipment, exploration and buildings (Australian Bureau of Statistics (ABS) 2012).

Capital investment in the mining sector is risky because of various uncertainties that include among others, political risks, environmental risks (geological), fluctuations of mineral prices on the world market, changes in fiscal policies, and depletion and exhaustion of the mineral resources. Therefore mining capital projects require investing huge funding, with prospects of reaping huge returns. However capital investment projects have risks which need proper proactive planning (Kantudu, 2007). Generally uncertainties linked to technical and business returns are prominent in the mining sector (Bhapu, 2005).

In light of the complexity of mining projects, mining companies venturing into a mining project need to adopt comprehensive capital investment practices that realise the return on capital taking into cognisance of all risks associated that would jeopardise and frustrate the ambitions of the promoters, shareholders and various stakeholders including the government, related industries and the local community. According to Katundu (2007), for difficult decisions, there is requirement to consider critical objective assessment of investment projects and making judgements intelligently. The use of quantitative techniques and mathematical programming should be used as opposed to qualitative decisions. However techniques for appraising investments are diversified. Some are simple while others are complex and technology operations to facilitate accurate decision making (Katundu, 2007).

The investment appraisal techniques are categorised into complex models and simple models (Adeleke, 2002, Pendey, 2002, Kurfi, 2003). Considering the advantages of technology, current investment appraisal is conducted using complex computer programmes.

The traditional according to Adeleke (2003), are payback period and accounting rate of return as the methods do not consider that the value of many changes with time.

.The discounted models are net present value, internal rate of return, and profitability index or benefit-cost ratio that takes into cognisance both the overall profitability of projects and the timing of returns (Brealey & Myers, 2002).

Da Silva et al. (2012) supported the use of discounted models as they stated that, “for mining projects, a portfolio approach at a minimum should rank projects on such metrics as NPV, IRR and Capital Efficiency Ratio (CER).” A survey by Bhapu and Guzman (2005) on the evaluation of foreign mining projects by North American Mining companies showed that they utilised capital budgeting practices, adjusting their evaluations using methods that include increasing discount rates, increasing required rates of return and/or reducing the payback period (Bhapu & Guzman, 1995).

In light of the size and complexity and mining projects, Da Silva et al. (2012) stated that that mining industry should have well established techniques which they should use to evaluate capital investments objectively. Such strategies should lead to decision in pursuing sound economic investments the investments should enhance economic, social and environment sustainability.

2.6 Benefits of using Capital Investment Appraisal in Capital Projects

Despite being time consuming and sometimes draining some financial resources through outsourcing financial management experts, capital appraisal investment appraisal has both short-term and long-term benefits to the investors and to the organisation. Daniel (2011) identified four benefits of capital appraisal investment appraisal that include:

- Consistency and flexibility - anticipated business opportunities and possible constraints are easily developed that are consistent with the objectives of the company. Flexibility is enhanced based on the strategic assessment of financing and capital budgeting.
- Better, financial decisions - it becomes easy to analyze several investment options and business executives can use different tools to come up with different recommendations.
- Access risk and uncertainty - Capital budgeting is the only sure way to access the risk involved when allocating more resources in long-term investments based on informed decision whether or not to invest in long-term projects.
- Analyze long-term repercussions - Capital budgeting has a long-term effect on the business and unavoidable affects the organization's future growth and cost structure.

From the above, it can be summed that capital investment appraisal enables maintenance of consistency with long-term plans, facilitates financial risk assessment and brings about informed decisions on resource allocation. With regard to local community and national development, mining companies can influence economic and social development of local and national communities through inclusion of development finance in their budgets. A variety of capital budgeting techniques can be applied but with caution as each technique or method has its merits and drawbacks. The suitability of the capital budgeting technique for investment decision may depend on the information available, size of the project, the extent of the project (long-term or short-term) and the interests of the various stakeholders. In the case of mining projects, they are long-term and complex investment projects that may require application and use of more than one technique for informed decisions that may yield desired outcomes. Therefore management needs to weigh available options and choose the most appropriate investment project that grows the wealth of shareholders but at the same time having low risk.

2.7 Summary

This chapter reviewed literature relevant to the assessment of capital investment practices in the Namibian Mining Industry. It explored various concepts of capital

investment, capital investment appraisal techniques and the benefits of capital investment appraisal. From the literature reviewed, it can be seen that development finance can arise from mining investment and from mineral wealth if good practice in mining investment is geared towards sustainable infrastructural and local community development. The literature reviewed show that large mining corporations in Namibia are making use of their revenues for development finance through corporate social responsibility, investment in education and entrepreneurial development. However, minerals are not infinity and other unfavourable factors may lead to the decline if not the end of revenue from mining as with the case of some mining operations that have closed in Namibia resulting in ghost towns.

In realisation of the risk associated with investment in mining projects that might have a negative impact on national economic development projects, mining corporations can make use of various capital budgeting and capital investment appraisal techniques in mining projects. A variety of capital investment appraisal techniques have been explored and they include payback period, discounted payback period, ARR, NPV, IRR, MIRR, real option theory and EVA. However, discounted cash flow techniques (NPV and IRR) are the often mostly used capital investment appraisal techniques as they incorporate the modern concept of time value of money as opposed to traditional techniques (payback period and ARR).

Lastly, it has been found that capital investment appraisal enables maintenance of consistency with long-term plans, facilitates financial risk assessment and brings about informed decisions on resource allocation that incorporate development finance for local community leading to sustainable development. . The next chapter focuses on the research design and methodology used to collect data for this study.

CHAPTER 3:

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

Chapter 3 presents the research design and methodology used for this study. The research paradigm, the research design, population and sampling techniques are presented and justified. The chapter presents the instruments used to gather data, how these instruments were administered and collected. This chapter also explains how the pilot study was conducted, how trustworthiness of the results was addressed and how the ethical issues were observed.

3.2 Research Paradigm

The purpose of the research was to explore the capital investment practice of mining corporations in Namibia. Although mining corporations apply quantitative analysis for capital investment appraisals, the research data collected was mostly qualitative based on opinions of the finance managers of mining companies on why they use certain or specific capital investment appraisals that incorporate development finance for local and national economic and social development. While quantitative research is the systematic empirical investigation of social phenomena via statistical, mathematical or computational techniques (Given, 2008), qualitative research gain insights through discovering and interpreting meanings by exploring richness, depth, and complexity of the phenomena (Neill, 2007).

The research was predominantly inductive, utilising “a bottom up” approach (Burney, 2008), where a specific idea of capital investment appraisal for capital projects was used to indicate case specific practices for mining corporations as per the research topic which is linked to the interpretivism paradigm (Crowther & Lancaster, 2009). The study was predominantly qualitative using an explorative strategy.

The problem for the study is capital investment practices by mining corporations and how the development finance can be incorporated into local community development. The study sought to explore capital investment practices by mining corporations and to interpret the significant infrastructural development in the local communities by mining corporations.

3.3 Research Design

De Vos et al. (2009, p.132) views a research design as plan which guides the researcher together data to answer the research questions. The research design provides a framework that embraces how the research process is going to be conducted. The research design thus enables the researcher to plan for data collection, analysis and reporting.

For the purpose of this qualitative research, an exploratory study explored the capital investment practices of five major mining operations in Namibia that generate more than 95% of the mining income. The researcher focused on the current and future interests of the shareholders and stakeholders of the five major mining operations. This helps to learn more about a little known or poorly understood situation (Leedy & Ormrod, 2010) on the capital investment practice in the mining sector in Namibia.

3.4 Research Population

Best and Kahn (2006) describe population in the context of research as the total universe of units or people who are involved in a research. The study considers the mining corporations as the population for the study. The mining corporations share a common practice of capital investment and appraisal, an issue being investigated in this study. The common shared practice enables comparison of capital investment projects among the different mining organisations.

3.5 Sampling Procedures

Purpose sampling technique was adopted to select five large mining corporations in Namibia for the survey. Purposive sampling is based on the judgement of the

researcher. The researcher selects units which best suits the study with regard to provision of rich data. The five big mining towns were considered to be rich sources of data.. Furthermore, purposive sampling technique involves the use of the researcher's experience and knowledge of the group under study (Gay, Mills & Airasian, 2009). Five large mining corporations of Namibia namely, De Beers Marine, Rosh Pinah, Rössing, Tsumeb Corporation and Navachab were purposively chosen for study,

The five companies were selected because they are the major anchors of the Namibian economy contributing about 50% of the economy and the largest employer. The sustainability of these companies is critical to the survival of the Namibian economy and source of employment. Purposive sampling technique was used to select information-rich participants (financial managers) who participated in the study (Gay, Mills & Airasian, 2009).

3.6 Research Instrument

A semi-structured interview schedule was used as a research instrument to gather primary data. The semi-structured interview schedule had both closed-ended questions and open-ended questions that helped to get more information from participants. Closed-ended questions made it easier to analyse data that can presented graphically for comparison while and open-ended questions allowed in-depth information to be collected.

3.7 Administration of semi-structured interview schedule

Five managers each representing each mining institution were involved in the study. Participants were contacted by telephone and informed about the survey. Semi-structured interview schedules were electronically emailed to each of the research participants. This made it easy to deliver the research instruments immediately to all the participants at once using the modern method of communication. The respondents were asked to indicate and justify capital investment appraisal technique, which it uses in their organisation. The second question requested the respondents to select the best capital investment appraisal technique and explain

why it is the most preferred one. The third question asked respondents to state whether their organisations factored in their budgets to social responsibilities initiatives and the last question requested the respondents to indicate the form of social responsibility, which the organisation performs, and explain why the organisation pursues the type of development initiative.

Follow-ups by telephone calls were done to ascertain reception of the research instrument, and participants were requested to complete the research instruments and then to email or fax them back to the researcher.

3.8 Data Analysis

Data was analysed using thematic qualitative data analysis approach. Explaining the suitability of thematic data analysis approach Ruggunan (2013,p.2) and Jugder (2016, p.1) indicate that it allows qualitative data to be put into themes and categories and coded for analysis. The following example shows how the data was coded:

CODING FRAME

Question 1: Investment Methods

INVESTMENT METHODS	CODE
Accounting Rate of Return (ARR)/Return on Capital Employed (ROCE)	1¹
Economic Value Added (EVA)	1²
Internal Rate of Return (IRR)	1³
Net Present Value (NPV)	1⁴
Payback Period (PBP)	1⁵
Real options theory (ROT)	1⁶
Modified Internal Rate of Return (MIRR)	1⁷
Other (just tick and specify below table)	1⁸

QUESTION 2: Reason for using the investment method

RESPONSE	CODE
Direct measure of dollar contribution	2 ¹
Measure of business risk	2 ²
Factors time value of money	2 ³
Indicator of efficiency	2 ⁴

First data was read through to establish the quality of data and whether all questions were adequately answered. Themes were identified, codes allocated, and it enabled to identify similar responses. The themes were then categorised and data was reduced into fewer groups. The categories of data were linked to the research objectives to ensure that all the research objectives were answered. Interpretation was done describing and linking the findings to the research objectives. The findings were further linked to related literature and empirical studies.

3.9 Trustworthiness and credibility

Bless et al. (2013, p.236) and Maree (2016, p.123) indicate that instead of addressing validity and reliability like what is done in quantitative research in qualitative research the focus is establishing the trustworthiness of the data. The following precautions suggested by Maree (2016, p.238) were taken to address research trustworthiness. Detailed description of the researcher, the participants and the context in which the study was undertaken was made. Purposive sampling used enabled the study to select mining companies that contribute about 50% of Namibia's economy. Since the selected mines contribute about 50% of Namibia's economy, inclusion in the sample presented data on how they determine the sustainability of the minerals. Concurrent data collection and analysis enabled addition of more questions to fill gaps from the initial data collection process. Methodological verification was used where two research tutors from Namibia University of Science and Technology were requested to verify the logic and implementation of each step of the methodology. Respondent validation was used to ensure that the findings of the study were a true reflection of the experiences of

participants, in this case what the participants gave with regard to appraisal methods for business sustainability.

3.10 Elimination of bias

Bryman and Bell (2014, p.171) views bias any factor that may affect the authenticity of the study. Bias can be introduced through poor construction of research instruments or how the sampling is done. Bias can affect the validity of the research hence De Vos et al. (2009) point out that any factor known to affect the bias of the study should be addressed. In this study research instrument bias was addressed through conducting a pilot study. Research instrument were further analysed to ensure that the language used was not biased and any leading questions were eliminated. During the interviews no comments were made to the responses

3.11 Ethical Issues

De Vos et al. (2009, p.114) define ethics as human rights considerations which the researcher addresses and observes during all the stages of research. The following ethics considerations were observed:

- **Avoidance of harm**

De Vos et al. (2015:116) notes that during research, there is possibility of causing physical or psychological harm to the respondents. Sensitive questions were avoided and respondents were not pressurized to give answers to the questionnaire. The interview schedule was made of reasonable length not taking more than 30 minutes to avoid overstretching the respondents

- **Informed consent**

Saunders et al. (2012, p.230) regard informed consent as evidence that the respondent has taken part in the study voluntarily. A debriefing meeting explaining the purpose of the study, the role of participants and the expected outcomes were explained. After the debriefing participants were requested to sign consent forms to show that they had taken part in the research voluntarily. According to De Vos et al.

(2015, p.117), written informed consent becomes a necessary condition rather than a luxury or impediment.

- **Privacy confidentiality, anonymity**

Privacy is about keeping the research activities to the participants involved and confidentiality is not disclosing research to any other person (De Vos et al., 2009, p.119). Every person has a right to privacy, confidentiality and anonymity. In this study, no names were written on questionnaires. The same in reporting no names or any form of identification was used. The results of the study were not published unless the respondents were informed and agreed. Respondents were assured of privacy, confidentiality and anonymity.

- **Permission Obtained**

Saunders et al. (2012, p.194) state the importance of getting permission before entering into an organisation. In this study, permission to conduct was sought from the Ministry of Mines and granted. In addition, a letters were written to the mining companies requesting permission and indicating ethical issues and permission was granted. The letters of permission are attached in the appendix section.

3.12 Conclusion

This chapter presented and justified the methodology adopted for this study. A qualitative research design was indicated and justified. The chapter presented sampling technique used to select the sample, justified the use of closed and open ended questionnaire. Data collection procedures were justified and precautions taken to reduce bias explained. The last part of the chapter explained how the trustworthiness of the results was assured and steps taken to observe ethical issues.

CHAPTER 4

DISCUSSIONS OF FINDINGS

4.1 Introduction

This chapter presents the analysed primary data obtained through the research instrument. The study was meant to assess the capital investment practice of mining corporations in Namibia focusing on the five main mining operations namely: De Beers Marine, Rosh Pinah, Rössing, Tsumeb Corporation and Navachab. .

The findings are presented according to research objectives. The findings are presented using frequency tables and bar graphs. Each frequency table and bar graph is followed by a brief description of the findings. The findings are also discussed and interpreted making reference to the research objectives.

4.2 Presentation of Findings

The findings of this study are presented according to the structure of the research instrument. The results are from the five main mining corporations that responded and these include De Beers Marine, Rosh Pinah, Tsumeb Corporation, Navachab and Rössing Uranium.

Research objective one: To identify capital investment appraisal techniques widely used in the mining industry in Namibia.

4.2.1 Type of capital investment appraisal technique(s) used by organisations

Table 4.1: Capital investment appraisal techniques used

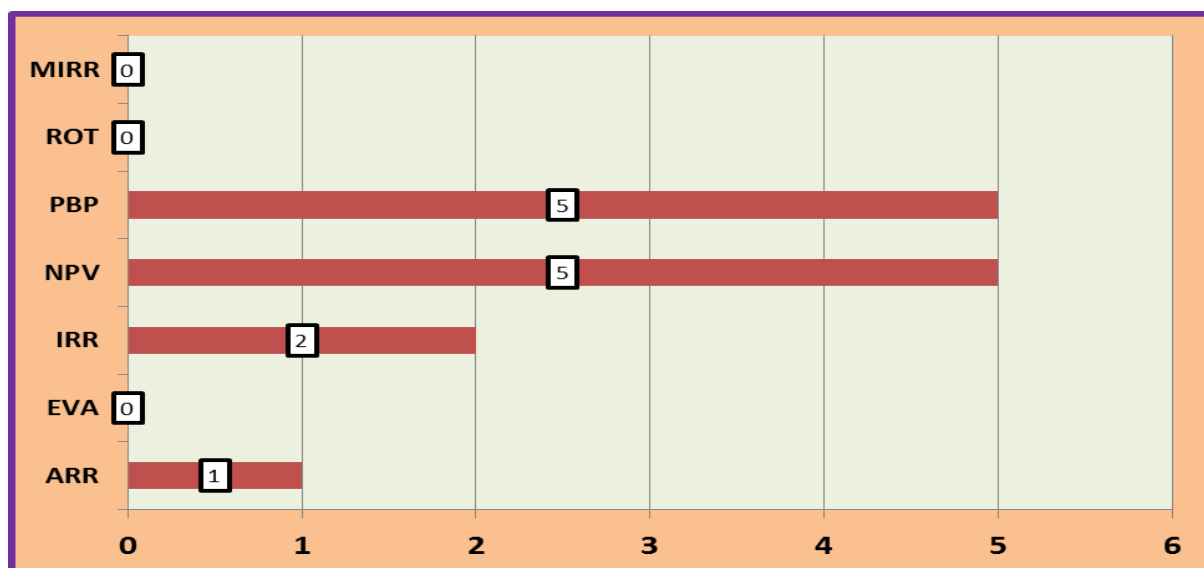
Organisation	Capital investment appraisal technique(s) used
De Beers Marine	<ul style="list-style-type: none">• Accounting Rate of Return (ARR)• Internal Rate of Return (IRR)• Net Present Value (NPV)• Payback Period (PBP)

Rosh Pinah	<ul style="list-style-type: none"> • Internal Rate of Return (IRR) • Net Present Value (NPV) • Payback Period (PBP)
Rössing Uranium Limited	<ul style="list-style-type: none"> • Net Present Value (NPV) • Payback Period (PBP)
Tsumeb Cooperation	<ul style="list-style-type: none"> • Net Present Value (NPV) • Payback Period (PBP)
Navachab	<ul style="list-style-type: none"> • Net Present Value (NPV) • Payback Period (PBP)

Source: Candidate's design from research data

Table 4.1 shows that all organisations surveyed use NPV and PBP with Rössing Uranium Limited, Tsumeb Cooperation and Navachab using only the two while other two organisations use IRR (De Beers Marine and Rosh Pinah) and ARR (De Beers Marine only). The same data was shown on Figure 4.1 below.

Figure 4.1: Commonly used capital investment appraisal techniques



Source: Candidate's design from research data

Figure 4.1 shows that commonly used capital investment appraisal techniques are NPV (5) and PBP (5) The least used are IRR (2) and ARR (1) ARR. EVA, ROT and MIRR are not used at all by the organisations surveyed. The results agree with Akalu (2001) who established that discounted cash flow techniques that are most

commonly known and most often used are net present value (NPV) and Payback Period (PBP).

4.2.2 Reasons why the organisations prefer the investment appraisal methods they use.

Table 4.2: Why the organisation favour the methods

Technique	Reasons
NPV	<ul style="list-style-type: none"> • Simple and easily understood. • Provide a good balance in assessment between cash flow and profitability assessment for projects. • Direct measure of the dollar contribution to the stakeholders. • Takes into account time value of money
IRR	<ul style="list-style-type: none"> • Simple and easily understood. • Provides a good balance in assessment between cash flow and profitability assessment for projects. • Shows return on the original money invested
PBP	<ul style="list-style-type: none"> • Simple and easily understood. • Provides a good balance in assessment between cash flow and profitability assessment for projects. • Effective in measuring investment risk especially when cash flow is important for evaluating a project.
ARR	<ul style="list-style-type: none"> • Simple and easily understood. • Provides a good balance in assessment between cash flow and profitability assessment for projects.

Source: Candidate's design from research data

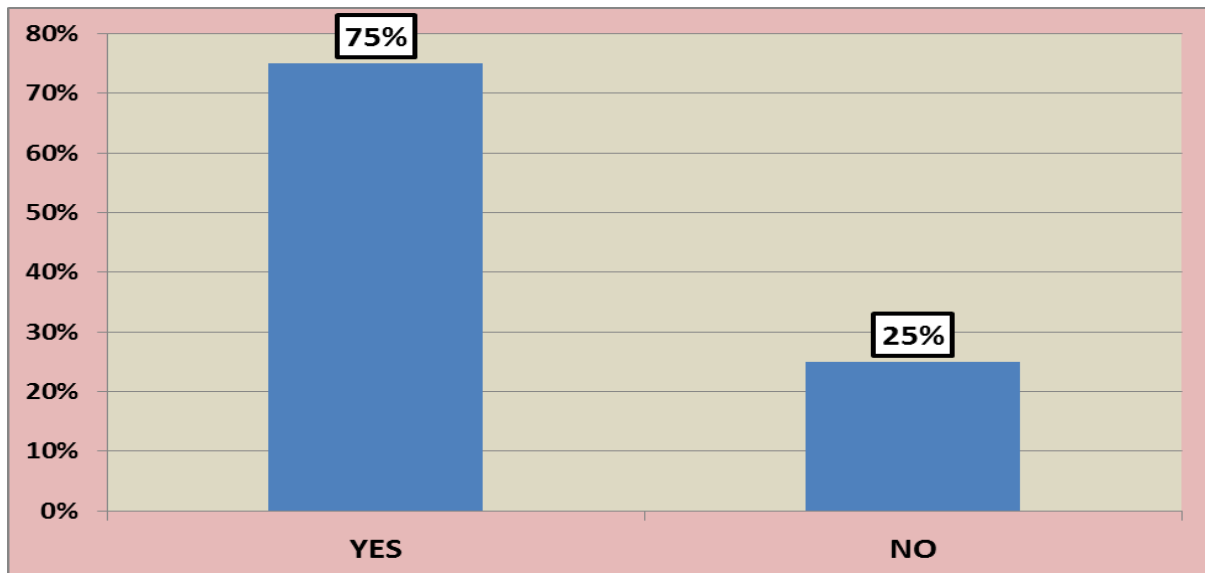
Table 4.2 shows that organisations surveyed favour the methods in Table 4.1 and Figure 4.1 mainly because the methods are simple (NPV, IRR, PBP and ARR), Provide a good balance in assessment between cash flow and profitability (NPV, IRR, PBP and ARR), take into account for the time value of money (NPV), shows

return on the original money invested (IRR) and effective in measuring investment risk (PBP). The fact that all organisations use not only one technique indicates a combination provides favourable balanced advantages. This agrees with the fact that the tendency for decision makers is to use more than one technique (Groppelli & Nikbakht, 2000; Johnson, 1994; Thakor, 1993; Winicur, 1993).

4.2.3 Capital investment appraisal/budgeting and the factoring of development finance for infrastructural, economic and social development of local and national communities.

Representatives of organisations surveyed were asked to find out if they factor in development finance for infrastructural, economic and social development of local and national communities. The results of their responses are shown in Figure 4.2 below.

Figure 4.2 Capital investment appraisal/budgeting and development finance



Source: Candidate's design from research data

Results show that two (75%) of the organisations surveyed factor in development finance in their capital budgeting process while only one (25%) do not. This shows

that to a certain extent development finance is considered by some mining companies in their capital budgeting.

4.2.4 The form of local and national development initiative activities financed

Table 4.3: Local and national development initiatives financed

Organisation	Activities financed
De Beers Marine	<ul style="list-style-type: none"> • Social responsibility initiatives • Infrastructural development
Rosh Pinah	<ul style="list-style-type: none"> • Social responsibility initiatives • Infrastructural development
Rössing Uranium Limited	<ul style="list-style-type: none"> • Social responsibility initiatives
Tsumeb Cooperation	<ul style="list-style-type: none"> • Social responsibility initiatives • Infrastructural development
Navachab	<ul style="list-style-type: none"> • Social responsibility initiatives • Infrastructural development

Source: Candidate's design from research data

4.2.5 Details of development activities financed

The details of activities financed by organisations surveyed include development housing, road networks, schools and health clinics where mines are operating. Furthermore, development finance is incorporated in the development of employees and making donations to the needy local communities.

4.3 Summary of findings

- All mining organisations surveyed use NPV and PBP. Some mining organisations surveyed also use IRR and ARR.
- ARR, EVA, ROT and MIRR are not used at all by the organisations surveyed.

- The main reasons for the methods used by mining organisations surveyed include simplicity, provision of a good balance in assessment between cash flow and profitability taking into account for the time value of money effective in measuring investment risk as for PBP.
- Mining organisations surveyed factor in development finance in their capital budgeting process but to a certain extent.
- Activities financed by organisations surveyed include development housing, road networks, schools and health clinics where mines are operating.

4.4 Conclusion

This chapter presented findings of the study. The findings were presented according to the research objectives. The results indicated that NPV and PBP are the most commonly use investment appraisal methods. IRR and ARR were used by few mining organisations with the rest of the appraisal methods not in use. These indicated appraisal methods were described as easy to compute and understand. The next chapter presents summary of findings and makes recommendations.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The main purpose of this study was to assess the capital investment practice of mining corporations in Namibia. The study was carried out on five main mining corporations in Namibia through primary research. Related literature provides secondary data for the study. The secondary data is linked to the research findings. Based on the findings of the study, recommendations were made. Finally the chapter ends with a conclusion.

5.2 Conclusions on Findings

Findings were summarised according to the research objectives

Research objective one: To identify capital investment appraisal techniques widely used in the mining industry in Namibia.

The study found that the Net Present Value and the Pay Back appraisal techniques were the most used capital investment appraisal techniques used by the mining companies in Namibia. Reasons for the popularity of NPV were simple and easy to understand, direct measure of the dollar contribution to the stakeholder value creation and that NPV considers time value of money. From these three reasons given on why NPV is the most popular capital investment technique, the consideration of time value of money is the most significant reason. Considering the volatility of the market, changes in mineral prices and exchange regimes, time value of money factors in these changes. By discounting the present dollar NPV takes into account the basic idea that a future dollar is worth less than a dollar today. The second highest method used for capital investment appraisal was IRR. It was indicated that the method was preferred because it is easy to understand, and that it shows return on the original money invested. The investment appraisal method is

easy to understand because it clearly shows the timing of cash flows in future years. Each cash flow is given equal weight by using the time value of money. Also the IRR could be a favoured investment technique because it provides a quick snapshot of what capital projects would provide the greatest potential cash flow. The least used capital investment appraisal technique used was ARR. The method was supported showing company profitability over a period. However the fact that the method does not consider the time value of money makes it unpopular considering the volatility of the market and global competition.

These results clearly show that the investment appraisal techniques are sensitive to what is happening in the global market. The investment appraisal techniques also reflect the expectations of the stockholders and shareholders. An investment today should not yield the same value after five years, an issue which is considered by both NPV and IRR.

Research objective two: To identify the benefits of using capital investment appraisal when investing in capital projects.

The findings indicated that the methods mainly used (NPV, IRR, PBP and ARR), were because they are simple provide a good balance in assessment between cash flow and profitability take into account for the time value of money (NPV), shows return on the original money invested (IRR) and effective in measuring investment risk (PBP). The fact that all organisations use not only one technique indicates a combination provides favourable balanced advantages, thus the limitations of one approach is covered by the other. The hybrid approach introduces flexibility which enables the organisation to adopt the most suitable investment appraisal approach.

Research objective three: To find whether the mining companies factor in development finance for infrastructural, economic and social development.

The study found the majority 75% of the organisations factoring in development finance and 25% not factoring in development finance. The organisations, which consider development initiatives, focus on developing initiatives focus on developing social amenities and infrastructure. The results show that the mining organisations

are aware of sustainable development. Sustainable development requires organisations to focus on the triple bottom line, that is the economic, social and environment aspects. In addition to fulfilling their obligations of sustainable development, the organisations create good reputation. Good name in the community earns the organisation support and respect. Being an ethical business attracts positive recognition and best preferred organisation.

Research objective four: To recommend capital investment practices when investing in mining projects.

5.3 Recommendations

Considering the findings and conclusions of this study, the Government of Namibia together with various stakeholders in the mining sector are recommended to consider and incorporate development finance in their capital investment appraisal and capital budgeting for sustainable development. The Government of Namibia through its legislators and the ministry of mines and energy can develop policies that enforce mining companies to factor in and incorporate development finance in their capital investment appraisal and capital budgeting to bring about meaningful local and national community and infrastructural development.

5.4.1 Areas for Further Research

A detailed further research or follow-up studies are highly recommended on other mining corporations that were not included in this study. This can be done as in-depth case studies for each mining corporation in Namibia to identify its impact through development finance in the local communities

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APPENDICES

Appendix I: Application Letter for Approval and Clearance

Hilma N. Iiyambo
P. O. Box 8395
Bachbrecht
Windhoek
Namibia



MCom

Cell: +264812458945

10 April 2013

Attention: The Public Relations Manager/Director
.....

Dear Sir/Madam

RE: INTRODUCTION AND APPROVAL LETTER

My name is Hilma N. Iiyambo, a Namibian student studying towards an MCom degree in Development Finance through the University of Cape Town (UCT).

I am carrying out research to assess capital investment practices in the Namibian mining industry. This is in partial fulfilment for the award of the Mcom degree in Development Finance. The information to be obtained is only for academic purposes and will be treated confidentially.

I am therefore asking permission and approval to conduct a research in your organisation in order for me to get information related to my studies where applicable?

I am waiting for a positive response from you soon. Your assistance in this regard is greatly appreciated. Thank you in advance.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Hilma N. Iiyambo'.

Hilma N. Iiyambo
(Researcher)

Appendix II: Approval Letters

Approval letter from Rosh Pinah

Rosh Pinah Zinc Corporation (Pty) Ltd
part of Trevali Mining Corporation
Reg No 380
Private Bag 2001 | Rosh Pinah | Namibia
Tel +264 63 274 200 Fax +264 63 274 209

12 December 2017

Dear Hilma Iiyambo

APPROVAL LETTER FOR RESEARCH DONE IN OUR ORGANISATION (CONDUCTED IN 2013)

As the matter refers, it was a pleasure granting you approval to conduct an academic research in our organisation "*To assess capital investment practices in the Namibian mining industry*".

You were advised to make an appointment with our financial department to make the necessary arrangements for data collection as well as to use the information collected for academic purposes only.

We wish you the best in your academic research.

Yours truly


Kondja Kaulinge
HR & Engagement Manager



Directors: *M Cruise, *A Ladd, *M Hoffman, **CJ Horn, CJ Witum, JA Penderis

*Canada **South African

Approval letter from Rössing Foundation

08 February 2018

Dear Ms Hilma Iyambo

RE: APPROVAL LETTER TO CONDUCT A RESEARCH

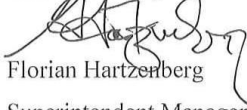
With reference to your request to conduct, an academic research for “Assessing the capital investment practices of mining corporations in Namibia” dated 29th November 2013; I hereby confirm that you have been granted permission to conduct research on the capital investment practises of Rössing Uranium Ltd from a general perspective and confirmation of the application theory in practise.

None of the information provide and question answered are of a confidential or sensitive nature with most information publicly available on the Rössing and Rössing foundation websites.

For any further information, please do not hesitate to contact the Superintendent Management Accounting in this regard.

All the best in your academic research.

Yours Sincerely



Florian Hartzberg

Superintendent Management (ACMA, MSc Strategic Business Management)

+264811243188/+264811290015

Appendix III: Introduction to Questionnaire



The purpose of the questionnaire is to assess capital investment practices in the Namibian mining industry.

You are kindly requested to fill in the questionnaire to assist with the information that will help the researcher to “assess capital investment practices in the Namibian mining industry”. The questionnaire will take approximately 10 minutes to complete.

The information to be obtained is only for academic purposes, will be treated confidentially and will be used for academic purpose of this research only. You will not be requested to supply any identifiable information, ensuring anonymity of your responses. Your participation in this research is voluntary. You can choose to withdraw from the research at any time.

Should you have any questions regarding the research, please feel free to contact the research on +264811400663. Your cooperation is greatly appreciated. Thank you in advance.

Yours sincerely

Hilma N. Iiyambo
(Researcher)

Appendix IV Interview Schedule

1. State the organisation that you represent.

.....

2. What type of capital investment appraisal technique(s) do you use in your organisation? (Please tick the appropriate box(es) to indicate your choice).

Capital investment appraisal technique	
Accounting Rate of Return (ARR)/Return on Capital Employed (ROCE)	
Economic Value Added (EVA)	
Internal Rate of Return (IRR)	
Net Present Value (NPV)	
Payback Period (PBP)	
Real options theory (ROT)	
Modified Internal Rate of Return (MIRR)	
Other (tick and specify below table)	

Please specify other

.....

3. Kindly comment on why your organisation favours the method(s) you identified in Question 1 above.

.....

4. According to your personal opinion and experience, which type of capital investment appraisal technique(s) do you consider to be the best for mining projects? (Please tick the appropriate box or boxes to indicate your choice).

Capital investment appraisal technique	
Accounting Rate of Return (ARR)/Return on Capital Employed (ROCE)	
Economic Value Added (EVA)	
Internal Rate of Return (IRR)	
Net Present Value (NPV)	
Payback Period (PBP)	
Real Options theory	
Modified Internal Rate of Return (MIRR)	
Other (tick and specify below table)	

5. Kindly comment on why you favour selected technique(s) over others?

.....

.....

.....

.....

6. Does capital investment appraisal/budgeting exercise in the organisation factor in development finance for infrastructural, economic and social development of local and national communities.

Yes	
No	

7. The form of local and national development investment activities your organisation is doing or has done if any are:

Social, e.g. social responsibility initiatives	
Infrastructural development	
Other (please specify other below)	

Please specify other

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.....
.....

8. Briefly describe the form of local and national development investment activities you have mentioned in Question 7 above.

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Thank you for your participation

Appendix V: Interview response from De Beers Marine Namibia

1. State the organisation that you represent.

DE BEERS MARINE NAMIBIA

2. What type of capital investment appraisal technique(s) do you use in your organisation? (Please tick the appropriate box(es) to indicate your choice).

Capital investment appraisal technique	
Accounting Rate of Return (ARR)/Return on Capital Employed (ROCE)	X
Economic Value Added (EVA)	
Internal Rate of Return (IRR)	X
Net Present Value (NPV)	X
Payback Period (PBP)	X
Real options theory (ROT)	
Modified Internal Rate of Return (MIRR)	
Other (just tick and specify below table)	

Please specify other

.....

3. Kindly comment on why your organisation favours the method(s) you identified in Question 2 above.

These methods are very simple and easily understood. These also provide a good balance in assessment between cash flow and profitability assessment for projects. Management which is not all that financial illiterate can be explained and understand these appraisal techniques. Management takes part in informed decision making

4. According to your personal opinion and experience, which type of capital investment appraisal technique(s) do you consider to be the best for mining projects? (Please tick the appropriate box(es) to indicate your choice).

Capital investment appraisal technique	
Accounting Rate of Return (ARR)/Return on Capital Employed (ROCE)	X
Economic Value Added (EVA)	
Internal Rate of Return (IRR)	X
Net Present Value (NPV)	X
Payback Period (PBP)	X
Real Options theory	
Modified Internal Rate of Return (MIRR)	
Other (just tick and specify below table)	

5. Kindly comment on why you favour selected technique(s) over others?

I like the simplicity and effectiveness of these techniques.

6. **Does** capital investment appraisal/budgeting exercise in the organisation factor in, development finance for infrastructural, economic and social development of local and national communities.

Yes	
No	X

Not directly although it has some impact on all the areas mentioned above.

7. The form of local and national development investment activities your organisation is doing or has done if any are:

Not applicable. Our social responsibility initiatives are indirect and limited to donations provided for the purpose of helping the community.

Social, e.g. social responsibility initiatives	
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Infrastructural development	
Other (please specify other below)	

Please specify other

.....

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8. Briefly describe the form of local and national development investment activities you have mentioned in Question 7 above.

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Thank you for your participation

Appendix VI: Interview response from Rosh Pinah Zinc Corporation

1. State the organisation that you represent.

Rosh Pinah Zinc Corporation

2. What type of capital investment appraisal technique(s) do you use in your organisation? (Please tick the appropriate box(es) to indicate your choice).

Capital investment appraisal technique	
Accounting Rate of Return (ARR)/Return on Capital Employed (ROCE)	
Economic Value Added (EVA)	
Internal Rate of Return (IRR)	X
Net Present Value (NPV)	X
Payback Period (PBP)	X
Real options theory (ROT)	
Modified Internal Rate of Return (MIRR)	
Other (just tick and specify below table)	

*Note that not all capital spend can be justified via financial performance indicators and issues such as safety, environment, social projects some business improvement incentives etc. cannot be justified using these parameters and only using the above parameters is an over simplification

Please specify other

.....

3. Kindly comment on why your organisation favours the method(s) you identified in Question 1 above.

NPV- direct measure of the dollar contribution to the stake holders.

IRR – shows return on the original money invested and it shows the point when the organisation profit reaches a zero point

PBP – effective in measuring investment risk especially when cash flow is important for evaluating a project, easy to calculate it does not require an expert the organisation can use local staff to determine pay back.

4. According to your personal opinion and experience, which type of capital investment appraisal technique(s) do you consider to be the best for mining projects? (Please tick the appropriate box or boxes to indicate your choice).

Capital investment appraisal technique	
Accounting Rate of Return (ARR)/Return on Capital Employed (ROCE)	
Economic Value Added (EVA)	
Internal Rate of Return (IRR)	X
Net Present Value (NPV)	
Payback Period (PBP)	
Real Options theory	
Modified Internal Rate of Return (MIRR)	
Other (just tick and specify below table)	

5. Kindly comment on why you favour selected technique(s) over others?

The IRR method is very clear and easy to understand. An investment is considered acceptable if the IRR is above an established minimum. It is a rate quantity, an indicator of the efficiency, quality or yield of a project. It uses cash flow and recognizes the true value of money.

6. Capital investment appraisal/budgeting exercise in the organisation factor in development finance for infrastructural, economic and social development of local and national communities.

Yes	X
No	

7. The form of local and national development investment activities your organisation is doing or has done if any are:

Social, e.g. social responsibility initiatives	X
Infrastructural development	X
Other (please specify other below)	

Please specify other.

.....
.....
.....

8. Briefly describe the form of local and national development investment activities you have mentioned in Question 7 above.

Local - Capital contribution to expand and upgrade primary school in RP;

- Housing for employees to ensure that all get decent accommodation to motivate them to work hard

National - Generating work opportunities, PIT financial support;

- Development of employees through training, continuous to ensure that employees have necessary skills to improve productivity and also to retain qualified staff

-Running youth development project in the community and helping the youth start self-employment projects

-Helping women who are organised by supporting their projects in the communities

Thank you for your participation

Appendix VII: Interview response from Rössing Uranium

Appendix (iii) Questionnaire

1. State the organisation that you represent.
Rössing Uranium
2. What type of capital investment appraisal technique(s) do you use in your organisation? (Please tick the appropriate box(es) to indicate your choice).

Capital investment appraisal technique	
Accounting Rate of Return (ARR)/Return on Capital Employed (ROCE)	
Economic Value Added (EVA)	
Internal Rate of Return (IRR)	
Net Present Value (NPV)	x
Payback Period (PBP)	x
Real options theory (ROT)	
Modified Internal Rate of Return (MIRR)	
Other (just tick and specify below table)	

Please specify other

3. Kindly comment on why your organisation favours the method(s) you identified in Question 2 above.
NPV takes into account time value of money. It allows project owners to think about future expected cash flows from the project; this allows for post investment reviews from which learnings can be drawn. The estimated future cash flows can easily be incorporated in the annual operational budgets, thus project owners can be held accountable. Valuation

Page | 3

of the mine and mine optimisation is based on NPV, Impairment testing is based on NPV techniques, thus it is widely used by engineers and non-financial employees and is not considered a strange concept.

Payback period is a good measure of risk, it indicate the estimated length of time a project pays-off itself (based on the estimated cash flows). The longer the payback the higher the risk. Payback is particular useful as a capital rationing technique in current times when there are increased pressure on preservation of cash flow and cutting/postponement of Capex. (its gives an indication which projects to take on that can quickly bring benefits to the organisation)

4. According to your personal opinion and experience, which type of capital investment appraisal technique(s) do you consider to be the best for mining projects? (Please tick the appropriate box(es) to indicate your choice).

Capital investment appraisal technique	
Accounting Rate of Return (ARR)/Return on Capital Employed (ROCE)	
Economic Value Added (EVA)	
Internal Rate of Return (IRR)	
Net Present Value (NPV)	x
Payback Period (PBP)	x
Real Options theory	
Modified Internal Rate of Return (MIRR)	
Other (just tick and specify below table)	

5. Kindly comment on why you favour selected technique(s) over others?
NPV and Payback is the most widely used. Engineers and other non-financial employees are familiar with it. Used as a combination it takes into account risk. The drawback is that cash flows are only estimations and might not be reliable, but this is countered by check and balances in the system (e.g. review by investment committee). And when part of a group of companies, benchmarking serves as a reality check.

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6. Capital investment appraisal/budgeting exercise in the organisation factor in development finance for infrastructural, economic and social development of local and national communities.

Yes	x
No	

7. The form of local and national development investment activities your organisation is doing or has done if any are:

Social, e.g. social responsibility initiatives	x
Infrastructural development	x
Other (please specify other below)	

Please specify other.....

8. Briefly describe the form of local and national development investment activities you have mentioned in Question 7 above.

The Rössing Foundation was established in 1978 by Rössing Uranium Limited through a Deed of Trust to implement and facilitate corporate social responsibility activities within the communities of Namibia.

The Rössing Foundation undertakes a broad range of activities across a wide spectrum of community development areas. The Foundation concentrates its activities mainly within the Erongo Region and to a lesser extent in the Oshana, and Omaheke Regions.

As far as infrastructural development is concerned RUL contributed immensely to Arandis in this regard.

Please read further at the following websites:

<http://rossingfoundation.com/>

<http://www.rossing.com/>

Thank you for your participation

Appendix VI: Interview response from Tsumeb Cooperation

9. State the organisation that you represent.

Tsumeb Cooperation

10. What type of capital investment appraisal technique(s) do you use in your organisation? (Please tick the appropriate box(es) to indicate your choice).

Capital investment appraisal technique	
Accounting Rate of Return (ARR)/Return on Capital Employed (ROCE)	
Economic Value Added (EVA)	
Internal Rate of Return (IRR)	
Net Present Value (NPV)	X
Payback Period (PBP)	X
Real options theory (ROT)	
Modified Internal Rate of Return (MIRR)	
Other (just tick and specify below table)	

Please specify other

.....

11. Kindly comment on why your organisation favours the method(s) you identified in Question 1 above.

NPV- direct measure of the dollar contribution to the stake holders

PBP – effective in measuring investment risk and the time the investment takes to pay off

12. According to your personal opinion and experience, which type of capital investment appraisal technique(s) do you consider to be the best for mining projects? (Please tick the appropriate box or boxes to indicate your choice).

Capital investment appraisal technique	
Accounting Rate of Return (ARR)/Return on Capital Employed (ROCE)	
Economic Value Added (EVA)	

Internal Rate of Return (IRR)	
Net Present Value (NPV)	X
Payback Period (PBP)	
Real Options theory	
Modified Internal Rate of Return (MIRR)	
Other (just tick and specify below table)	

13. Kindly comment on why you favour selected technique(s) over others?

The NVR method is very clear and easy to understand. It considers the time value of money

14. Capital investment appraisal/budgeting exercise in the organisation factor in development finance for infrastructural, economic and social development of local and national communities.

Yes	X
No	

15. The form of local and national development investment activities your organisation is doing or has done if any are:

Social, e.g. social responsibility initiatives	X
Infrastructural development	X
Other (please specify other below)	

Please specify other

.....

16. Briefly describe the form of local and national development investment activities you have mentioned in Question 7 above.

Local - Capital contribution to expand and upgrade primary school in RP;

- Housing for employees; it motivates employees

National - Generating work opportunities, PIT financial support;

- Development of employees through training.

Thank you for your participation

Appendix VI: Interview response from Navachab

17. State the organisation that you represent.

Navachab

18. What type of capital investment appraisal technique(s) do you use in your organisation? (Please tick the appropriate box(es) to indicate your choice).

Capital investment appraisal technique	
Accounting Rate of Return (ARR)/Return on Capital Employed (ROCE)	
Economic Value Added (EVA)	
Internal Rate of Return (IRR)	
Net Present Value (NPV)	X
Payback Period (PBP)	X
Real options theory (ROT)	
Modified Internal Rate of Return (MIRR)	
Other (just tick and specify below table)	

Please specify other

.....

19. Kindly comment on why your organisation favours the method(s) you identified in Question 1 above.

NPV- direct measure of the dollar contribution to the stake holders.

PBP – effective in measuring investment risk especially when cash flow is important for evaluating a project.

20. According to your personal opinion and experience, which type of capital investment appraisal technique(s) do you consider to be the best for mining projects? (Please tick the appropriate box or boxes to indicate your choice).

Capital investment appraisal technique	
Accounting Rate of Return (ARR)/Return on Capital Employed (ROCE)	
Economic Value Added (EVA)	

Internal Rate of Return (IRR)	X
Net Present Value (NPV)	
Payback Period (PBP)	
Real Options theory	
Modified Internal Rate of Return (MIRR)	
Other (just tick and specify below table)	

21. Kindly comment on why you favour selected technique(s) over others?

NPV is the best because it takes note of the time value of money. It can also be used to compare investing in two projects or more

22. Capital investment appraisal/budgeting exercise in the organisation factor in development finance for infrastructural, economic and social development of local and national communities.

Yes	X
No	

23. The form of local and national development investment activities your organisation is doing or has done if any are:

Social, e.g. social responsibility initiatives	X
Infrastructural development	X
Other (please specify other below)	

Please specify other

.....

24. Briefly describe the form of local and national development investment activities you have mentioned in Question 7 above.

Local - Capital contribution to expand and upgrade secondary school;

- Housing for employees; it cushions the employees from low salary

National - Generating work opportunities, it reduces poverty in the community



- Development of employees through training, equip youths with skills so as to reduce poverty and create self employment projects

Thank you for your participation

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Master's candidate full name	Hilma Naleshemunyenga Iiyambo		
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Co-Supervisor's full name	N/A		
Co-Supervisor's email address	N/A		
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