

School of Mining Engineering



UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

**DUE DILIGENCE AND VALUATION OF
MINERAL ASSETS FOR DEBT FINANCING:
PRACTITIONER'S PERSPECTIVES**

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A research report was submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, Johannesburg, in partial fulfillment of the requirements for the degree of Master of Science in Engineering.

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DECLARATION

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ABSTRACT

The metal and mining industry has remained one of the major sectors in need of finance from credit institutions in Zimbabwe. The performance of Zimbabwe mining loan books however is very poor as the non-performing loans are averaging 20% against an industry target of 5%.

The high number of non-performance mining loans has caused most banks and creditors to withdraw due to poor return on investment. Minimal participation by banks and other credit institutions has resulted in the mining sector being under-capitalised for years. The Chamber of Mines of Zimbabwe has estimated that the mining industry requires over US\$5 billion in the next five years for various reasons namely: exploration, developing new mines, opening closed mines, and increasing installed capacities. The presence of high non-performing mining loans prompted the researcher to conduct a study to come up with a due diligence and valuation framework that practitioners can use when dealing with the metals and mining sector. The researcher also aims at establishing whether the banking sector acknowledges the importance of mine due diligence and valuations and the skills required to undertake this exercise. To undertake the exercise, thirty-five closed-ended questionnaires were distributed to the target population, five structured interviews were conducted with executives, and focus group discussions were done with personnel with mining finance experience.

All participants pointed out that mine due diligence and valuation is an important step in investment finance. The participants also pointed out that

the due diligence should consist of mining experts, metallurgists, geologists, legal experts, environmental experts as well as competent mineral asset valuers. Although the participants pointed out these issues, executives indicated that banks do not have the skills required to undertake due diligence and valuation of mineral assets which results in deal structuring risk which is one of the main reasons why mining loan books have high non-performing loans. Based on these findings, the researcher strongly recommends mining schools in Zimbabwe start offering courses in mine due diligence and valuation. Banks should also outsource the required skills from the region and should also consider legal experts and human resources experts as key members of the mine due diligence team.

DEDICATION

I dedicate this mining investment research project to the Almighty God, family, and friends. A special feeling of gratitude to my ever-loving wife Tatenda Matimati, my mother, and Dakarai Tapomwa whose words of encouragement kept me on track. My family members Rumbidzai, Mavis, Africa, Fungai, Simbarashe, Vhenekai, and Shupikai have never left my side and are very special. I also dedicate this dissertation to my in-laws and other family members who have supported me throughout the process. I dedicate this work and give special thanks to Macdonald Tozvireva and my wonderful sons and daughters for being there for me throughout the entire program. All of you have been my best cheerleaders.

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LIST OF FIGURES

Figure 1. Mine Investment Process	7
Figure 2. Investment Management Process	8
Figure 3. Mineral Resource and Reserve Classification System	16
Figure 4. Deloitte's Approach to Mineral Asset Valuation	33
Figure 5. Mine Value Curve	34
Figure 6. Banking and Mining Finance Experience	57
Figure 7. Participants Job Role	58
Figure 8. Agreement Level on Importance of Due Diligence	60
Figure 9. Agreement Level on Geological Experts	61
Figure 10. Agreement Level on Mining Experts	62
Figure 11. Agreement Level on Metallurgical Experts	63
Figure 12. Agreement Level on Human Resources Experts	65
Figure 13. Agreement Level on Legal Experts	66
Figure 14. Agreement Level on Financial Experts	67
Figure 15. Agreement Level Commercial Due Diligence.....	68
Figure 16. Agreement Level on Environmental Experts	69
Figure 17. Agreement Level on Competent Valuers	70
Figure 18. Agreement level on skills availability	71

LIST OF TABLES

Table 1: Mining Financing Options	3
Table 2: Contents of Income Statement	20
Table 3: USMinval Valuation Methodologies	36
Table 4: Participants Mining and Banking Experience	56
Table 5: Participants Job Role	58
Table 6: Agreement Level on Importance of Due Diligence	60
Table 7: Agreement Level on Geological Experts	61
Table 8: Agreement Level on Mining Experts	62
Table 9: Agreement Level on Metallurgical Experts	63
Table 10: Agreement Level on Human Resources Experts	64
Table 11: Agreement Level on Legal Experts	66
Table 12: Agreement Level on Financial Experts	67
Table 13: Agreement Level on Commercial Experts	68
Table 14: Agreement Level on Environmental experts	69
Table 15: Agreement Level on Competent Valuators.....	70
Table 16: Agreement Level on Skills Availability.....	71
Table 17: Focus Group Responses	72

APPENDIX LIST OF TABLES

Table A- 1: Research Questionnaire	86
Table A- 2: Interview Questions	86
Table A- 3: Participants Level of Agreement	87
Table A- 4: Skills Availability	87

TABLE OF CONTENTS

DECLARATION	i
ABSTRACT	ii
DEDICATION	iv
ACKNOWLEDGMENTS	v
LIST OF FIGURES	vi
LIST OF TABLES	vii
APPENDIX LIST OF TABLES	viii
1 INTRODUCTION	1
1.1 Overview of Chapter 1	1
1.2 Problem Statement	1
1.3 Justification for Research	2
1.4 Previous Work	10
1.5 Research Methods	10
1.6 Sources of Data	11
1.7 Structure of the Research Report	11
1.8 Summary of Chapter 1	11
2 LITERATURE REVIEW	12
2.1 Overview of Chapter 2	12
2.2 Technical Due Diligence	12
2.2.1 Geology and reserves	13
2.2.2 Mining due diligence	17
2.2.3 Processing due diligence	18
2.2.4 Financial due diligence	20
2.2.5 Commercial due diligence	26
2.2.6 Legal and environmental due diligence	26

2.2.7	Human resources due diligence	27
2.3	Valuation of Mineral Assets	29
2.3.1	Capacity of mineral asset	30
2.3.2	Collateral	32
2.4	Mineral Asset Valuation Model	32
2.5	Summary of Chapter 2	38
3	RESEARCH DESIGN	39
3.1	Overview of Chapter 3	39
3.2	Research Methodology Chosen	39
3.2.1	Exploratory research	39
3.2.2	Descriptive research	40
3.3	Research Design	40
3.3.1	Cross-sectional design	41
3.3.2	Experimental research design	41
3.3.3	Longitudinal research design	42
3.3.4	Survey research design	43
3.4	Justification of the Survey Method	44
3.4.1	Focus group survey	44
3.4.2	Questionnaires	45
3.4.3	Interviews	47
3.4.4	Research participants	49
3.4.4	Credibility of research	49
3.4.5	Research ethics and clearance letter	51
3.5	Summary of Chapter 3	53
4	DATA ANALYSIS	54
4.1	Overview of Chapter 4	54

4.2 Banking and Mining Finance Experience	54
4.2.1 Job role	57
4.3 Level of Agreement on Due diligence and Skills Availability.....	59
4.3.1 Importance of mine due diligence	59
4.3.2 Geological expertise in due diligence team.....	61
4.3.3 Mining expertise in due diligence team	62
4.3.4 Metallurgical expertise in due diligence team.....	63
4.3.5 Human resources experts in due diligence team	64
4.3.6 Legal experts in due diligence team.....	65
4.3.7 Financial expertise in due diligence team	66
4.3.8 Commercial expertise in due diligence team.....	68
4.3.9 Environmental expertise in due diligence team.....	69
4.3.10 Competent valuers in mine due diligence	70
4.3.11 Competencies in financial institutions in Zimbabwe	71
4.4 Interviews and Focus Group.....	72
4.5 Summary of Chapter 4	73
5 CONCLUSION AND RECOMMENDATIONS.....	74
5.1 Overview of Chapter 5.....	74
5.2 Importance of Mine Due Diligence in Debt Financing.....	74
5.3 Set of Skills to Constitute a Mine Due Diligence Team.....	74
5.4 Importance of Competent Mineral Asset Valuers	76
5.5 Skills Availability in Financial Institutions in Zimbabwe.....	76
5.6 Recommendations.....	77
5.7 Research for Future Work	78
REFERENCE LIST	79
APPENDIX A	86

APPENDIX B	88
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1 INTRODUCTION

1.1 Overview of Chapter 1

Chapter 1 discusses the problem statement, justification of the study, previous work done, research methods adopted, sources of data, and the structure of the report.

1.2 Problem Statement

The Zimbabwean mining industry has remained one of the key economic pillars for economic growth. The sector contributes 13% towards Gross Domestic Product and 65% foreign earnings. The sector however has experienced limited financial support from the financial services sector due to poor returns from the mining loan books. The non-performing loans for the mining sector are averaging 20% against an industry target of 5%.

According to the Business Herald dated 25 February 2021, non-performing loans (NPLs) including mining loans ballooned to unsustainable levels that threatened the viability of several banks.

NPLs in Zimbabwe reached a peak of 20.45 % with some banks such as ZB Bank and NMB among the worst performers with NPLs above the sector average. Kaiser (2010) argues that investment institutions must be well resourced with mining finance skills to invest in opportunities that generate superior returns. These skills are critical in the selection of investable mineral assets which should be done in line with the investment charter to assist in the decision-making including adherence to selection criteria. Due to the shortage of mining finance professionals, the research seeks to make meaningful contributions to the board of knowledge by presenting an investment philosophy meant to enhance sound mining investment banking business practice in Zimbabwe.

The high non-performing mining loans experienced by most banks in Zimbabwe signal the presence of a poorly crafted investment philosophy for the mining sector. Against this background, the researcher aims to come up with a due diligence and valuations framework which banks can use in Zimbabwe.

1.3 Justification for Research

The need for a suitable mine due diligence and valuation framework in Zimbabwe cannot be over emphasised. The sector has remained a key economic pillar that needs financial support. Debt financiers with an investment appetite for mining projects generally need specialized skills at every stage of the deal including deal origination, structuring up to closure. The presence of such skills promotes sound asset selection and good portfolio performance.

Central to the teams involved in granting debt facilities to the mining companies are the competent valuers. The International Association of Mineral Appraisers (2017) points out the severe shortage of competent valuers globally. The country does not have its own legislative framework for the valuation of mineral assets however legislation from other jurisdictions such as South Africa is being used. The prevailing situation is unhealthy and therefore calls for the problem to be investigated through the engagement of practitioners in the mining finance sector. These are the people who deal with transactions involving huge sums of capital.

Millions of dollars are spent at each stage of the project. Benning (2000) points out that a mineral project's ability to attract a particular type of finance is dependent on the

stage of mine development. Seeger (2019) argues that there are various funding options available for mineral projects as shown in table 1.

Table 1: Mining Financing Options (Seeger, 2019)

Financing option	Remarks
Shareholder's equity	Composed of share capital, share premium, and retained earnings. Equity can be injected into any stage of mine development.
Listing	Involves floating the company shares to the public to raise funds required for the project. This applies to projects at all stages of mine development
Reverse listing	This entails a mining company vending in shareholding in its mining project to a floated company in exchange for shares in the listed public company. This financing option applies to all stages of mine development.
Private equity and venture capital	This entails selling an equity stake to a private equity investor who will develop the project and exit after an agreed investment period. The success of venture capital and private equity financed deal depends on strategy, capital and talent. This financing option applies to high-growth mining operations and projects.

Corporate bank loans	These are on-balance sheet financing schemes whereby a bank loan is secured by the balance sheet items. Applies to producing mines.
Project finance	These are off-balance sheet funding schemes in which the project has limited recourse. Usually, the project assets are used as security. This applies to projects that have passed the feasibility study stage and are ready for construction or production.
Debentures / Corporate bond	These are fixed-income debt securities that a mining company issues and sells to investors. The bond has a payment structure composed of coupon payments, face value, and maturity. This option applies to mining projects that are in production.
Streaming finance	This is a type of finance whereby a mining investor, avails capital required by the project in return for a re-payment done in metal streams. This option applies to projects that are under construction or in production.
Royalty financing	This is whereby a mining investor, provides mining capital in return for a share of project proceeds to be realized for the entire life of the mine.

Farm-in financing	This is one whereby the financing of a mining project is done in a staged manner. The investor acquires an equity stake in the mining project by providing capital in tranches. This applies to projects under exploration.
Off-take financing	This is a type of financing whereby the investor, provides capital to a mining company, and the company is expected to deliver an agreed quantity and quality of a commodity as specified in the off-take agreement. This option applies to projects that are in production.
Equipment financing	This is one whereby the investor, equipment manufacturer, or vendor enters into a contract with a mining company in which the cash flows generated from the mining operations are used to repay the equipment loan.
Crowdfunding	A method of raising capital for a project through pooling together contributions from a large number of individuals. The option applies to projects at all stages of mine development.

Insurance wrapped financing	A financing arrangement that involves a creditor and an insurance guarantee. The option applies to projects that are in production.
Development finance	This is a type of financing provided by Development Finance Institutions (DFIs). It applies to projects that are at the feasibility study stage or beyond. Commercial banks do not usually fund projects at this stage as they are considered high risk but DFIs have an investment appetite for such opportunities. Applies to projects that require time to get into production.
Contractor financing	Contractor vendor financing entails the contractor (mining and or processing) availing project capital to the mining business in exchange for a long-term contract from the mining company. This involves the Build + Own + Operate Contract. This applies to projects that are under construction.

The author goes on to point out that in the presence of the above financing options, bank loans remain one of the preferred choices by mining companies because they are one of the traditional financing schemes available. Benning (2000) argues that the focus of attention by any banker to a mining project is undoubtedly the bankability of

the mineral project which is reflected in a feasibility study. In essence, the project must exhibit strong fundamentals and appropriate valuations.

The Southern African Code for Reporting of Exploration Results, Mineral Resource, and Reserves (SAMREC Code) defines a feasibility study as a comprehensive study that involves undertaking technical and financial evaluations to assess if profitable mining is possible at the time of reporting.

Desktop review and technical analysis is the first stage that every debt investor or lender does before making investment decisions. The review is done in stages as shown by the investment process depicted in figure 1 below:

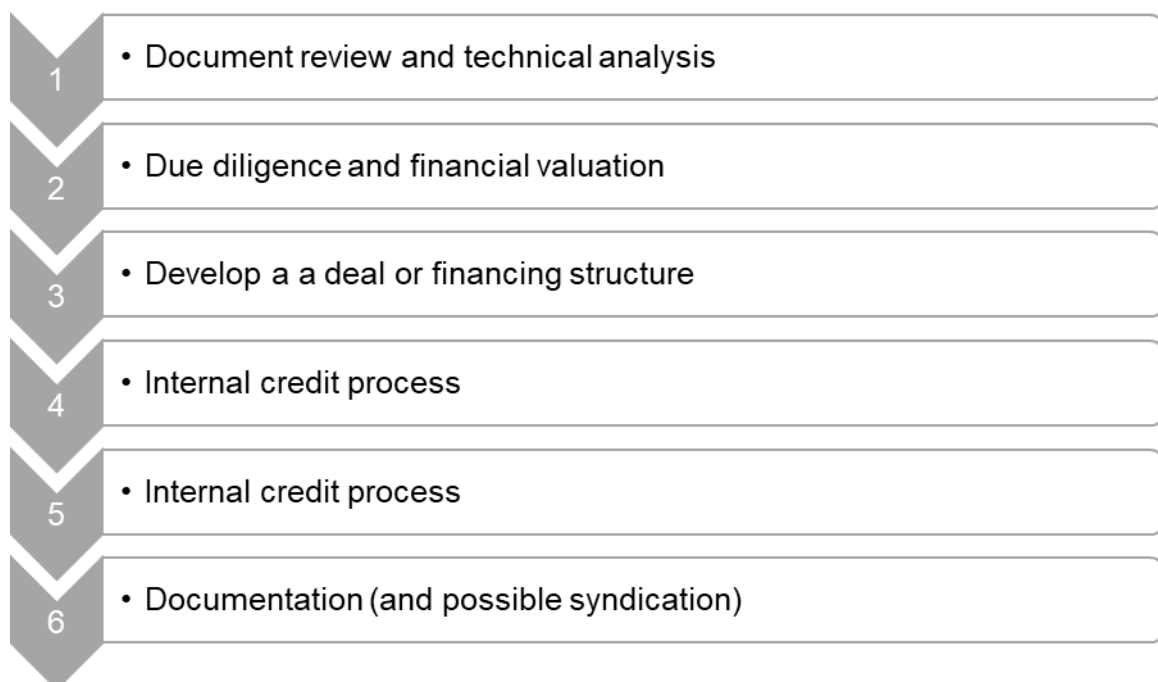


Figure 1. Mine Investment Process (Butler, 1994)

Debt investors generally are concerned about the capacity of the project to repay the loan and as such a thorough investigative exercise is required to establish whether the mineral project has a good credit rating.

Kaiser (2010) points out that financiers require a complete set of human resources skills to originate and structure deals successfully including the generation of anticipated returns. To obtain the set returns, a robust investment management process must be

put in place. Venter and Raphel (2003) argue that to run investments funds successfully, a suitable investment management process should encompass the key issues shown in figure 2:



Figure 2. Investment Management Process (Venter and Raphel, 2003)

Achievement of set objectives is only possible if asset selection is following stages highlighted in figure 1. Mineral asset selection is one of the most important but complex exercises that require the right approach and talent.

The exercise is quite challenging as it involves several issues namely: technical, financial, social, environmental, political, governance and investment issues.

Best mining investment banking practice requires that appropriate and complete due diligence and valuations be done before approval of financing mining projects. Due diligence generally is a comprehensive appraisal of a business to establish its commercial potential while valuation is a quantitative process of determining the worthiness of a business.

The Polish Association of Mineral Asset Valuers for Development, POVAL Code (2008), argues that the exercise requires experts with the ability to develop project-

specific financial solutions however such skills are in short supply. Most financial institutions make use of one-size-fits-all investment philosophy which has failed to correctly address the mining business.

In particular, more weight is given to financial statements which do not reflect technical issues associated with the mineral deposits. Mining investment portfolios have failed to perform which has resulted in debt financiers withdrawing from this investment space.

Ideally, mine due diligence and financial valuations should address all the pertinent issues surrounding mineral deposits namely technical, financial, commercial, social, legal, environmental, and cultural factors. These parameters need to be integrated for purposes of deriving debt financing ratios and the exercise is very specialized.

The South African Mineral Asset Valuation Committee, SAMVAL Code (2016), requires that the valuation of mineral assets be done by competent mineral asset valuers. The Polish Association of Mineral Asset Valuers for Development, POVAL Code (2008), points out that the valuation of mineral assets is a highly specialized exercise done in multiple stages. Valuation of mineral assets can be done at any stage of mine development and it requires experience and knowledge in areas such as geology, mining, mineral processing, accounting, and economics.

The International Mineral Property Valuation Standards, IMVAL (2018) points out that mineral asset valuers must follow three fundamental principles namely competence, materiality, and transparency. The absence of mineral project investment skills can result in serious mining investment blunders including rejection of bankable projects, for example, the Pickstone gold project could access debt financing of USD3 million from lenders in Zimbabwe because it had no historical income statements even though the project was backed by a bankable feasibility study report.

This study aims at developing a due diligence and valuation framework that can be used by debt financiers when assessing the viability of extending credit facilities in a Zimbabwe mining environment.

The findings from the study will be useful in the following ways:

- i. They will assist Zimbabwe's banking sector with an investment philosophy suitable for the mining sector; and
- ii. Expand knowledge base in the context of portfolio management

1.4 Previous Work

No previous work has been done in Zimbabwe on due diligence and valuation of mining projects however there is general literature published by several authors who make up part of the literature review namely Venmyn Deloitte, Alistair Macfarlane among others.

The researcher embarked on this study to achieve the following objectives:

- i. Establish the importance of mine due diligence in debt financing
- ii. Identify the skills that should constitute a mine due diligence team
- iii. Establish the importance of competent valuers in debt financing of mineral projects
- iv. Develop a due diligence and valuation framework for assessing the viability of mineral assets for financing opportunities.

1.5 Research Methods

In this study, the researcher adopted the qualitative and quantitative research methodologies. The pros and cons of each research method were considered to enable a choice to be made. Research instruments in the form of questionnaires and interviews were used and data collected was analysed using SPSS and displayed in the form of frequency tables and histograms.

1.6 Sources of Data

The researcher made use of various sources of data. The literature review was done based on journals accessed through websites, textbooks, and the internet as well. Conclusions of this research were done based on data obtained from respondents.

1.7 Structure of the Research Report

The report has been structured into five chapters namely

- i. Chapter 1 is the introductory chapter which discusses several issues including problem statement, justification of the study, previous work done, research methods chosen, and sources of data.
- ii. Chapter 2 discusses the literature review on the research topic
- iii. Chapter 3 discusses on research methodology chosen, research instruments, use of software to capture responses, and ethical issues considered.
- iv. Chapter 4 discusses the presentation and analysis of data.
- v. Chapter 5 discusses the researcher's conclusions and recommendations.

1.8 Summary of Chapter 1

Chapter 1 discussed the background to the problem, justification of the study, previous work done, highlights on research methods, sources of data, and the structure of the report

2 LITERATURE REVIEW

2.1 Overview of Chapter 2

The chapter discusses various forms of mine due diligence and how the valuation of mineral assets is done. Mangi (2016) points out that parties involved in investment transactions should be equipped with adequate information to avoid making investment blunders. Toovey (2011) points out that even for high-value target companies in the mining space, there is a need to do a robust investigation to assess the impact of mining on the community and this can only be done through the mine due diligence process. Chisholm and Dunlop (1997) argue that the mine due diligence program helps to provide the lenders with the level of assurance they require when considering the reliability of the technical bases of the feasibility study. Ghany *et.al* (2016) illustrate that mine due diligence assists in providing a rational view on which the banker can decide to proceed or abandon the transaction.

Stoker (2010) also points out that the primary purpose of due diligence is to assess the most likely business case and that involves the identification of risks and opportunities inherent to the business.

Mangi (2016) suggested that independent due diligence must be done as part of the verification process and must be conducted by independent parties with no material interest in the deal. If done properly, due diligence helps financiers and investors to verify supplied information and identify risks inherent to a target business. Due diligences generally fall into various categories namely: technical financial commercial, legal, environmental, and human resources.

2.2 Technical Due Diligence

Keogh *et. al* (2015) point out that technical due diligence provides a process to identify key geological, mining, geotechnical, metallurgical, environmental, and social risks,

and opportunities and determine the most likely business case and valuation of assets. Technical due diligence is commonly carried out in parallel with legal, commercial and financial due diligence, often involving the acquirer, to maximize the understanding of the investment. Baker *et.al* (1998) points out that technical due diligence examines the underlying robustness of the company as 'a going concern' and the viability of any expansion plans.

There are significant benefits investors derive from conducting comprehensive technical due diligence. The outcomes provide the opportunity for the investor to make early, informed decisions and to understand and manage risks.

Technical due diligence may be carried out at several stages: when considering and weighing up several investment options, before and during a transaction, or immediately post-transaction. In the first stage, the outcomes inform the choice of investment and, more particularly, whether there are any fundamental flaws in the projects being considered. In the second stage, due diligence outcomes inform the level of investment and approach to risk management and planning. In the third stage, risks and opportunities can be investigated in more detail, allowing the investor to consider the best options to reduce risk and maximise the return on investment. Technical due diligence in mining manifest in several ways namely:

2.2.1 Geology and reserves

Also called resource and reserve audit is a type of technical due diligence that investigates whether the mineral resource status is in the form presented by a client especially quantity and quality. This involves the use of competent personnel in the area of geostatistics and geotechnical engineering as well. The resource and reserve audit provides feedback to the lender on the status of the orebody and with emphasis on whether the reported tonnage and grade are reasonable approximates.

Mineral Resource

The South African Code for the Reporting of Exploration Results, Mineral Resource and Mineral Reserves, the SAMREC Code (2016, p18) defines the mineral resource as *“concentration or occurrence of solid material of economic interest in or on the Earth’s crust in such form, grade or quality, and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade, continuity, and other geological characteristics of a mineral resource are known, estimated, or interpreted from specific geological evidence and knowledge, including sampling”*.

Mineral resources are classified according to the geological confidence associated with them. There are three categories of mineral resources namely inferred, indicated, and measured, and only resource sections with reasonable prospects for eventual economic extraction should be viewed as part of the mineral resource matrix. The three categories of mineral resources are defined as follows:

- i. **Inferred resource** – The South African Code for the Reporting of Exploration Results, Mineral Resource and Mineral Reserves, SAMREC Code (2016, p20) defines an inferred mineral resource as *“one with a lower level of geological confidence and estimations on grade and tonnage are done based on limited geological investigations including sampling. An inferred resource can be upgraded to an indicated mineral resource with ongoing exploration”*.
- ii. **Indicated resource** - The South African Code for the Reporting of Exploration Results, Mineral Resource and Mineral Reserves, SAMREC Code (2016, p21) defines an indicated mineral resource as *“one in which geological work has advanced to a reasonable stage to allow estimation of resource in both quantity and quality. Geological confidence for an indicated*

resource is greater than one for an inferred resource and modifying factors can be applied to generate a probable reserve”.

- iii. **Measured resource** – The South African Code for the Reporting of Exploration Results, Mineral Resource and Mineral Reserves, SAMREC Code (2016, p22) defines a measured mineral resource as *“one with higher geological confidence and modifying factors can be applied to support viability studies. The geological confidence for a measured mineral resource is higher than that for an Indicated mineral resource or an inferred mineral resource”*. Due to higher geological confidence, the measured resource can be converted to a proved mineral reserve or a probable mineral reserve.

Mineral reserves

The South African Code for the Reporting of Exploration Results, Mineral Resource and Mineral Reserves, SAMREC Code (2016, p25) defines a mineral reserve as *“that portion of a measured and/or indicated mineral resource that can be economically extracted”*. Economic viability encompasses modifying factors. The mineral reserves are classified into probable reserves and proven reserves and classification depends on the level of confidence associated with both the mineral resource and modifying factors. Mineral reserves fall into two categories:

- i. **Probable reserves** - The South African Code for the Reporting of Exploration Results, Mineral Resource and Mineral Reserves, SAMREC Code (2016, p26) defines a probable mineral reserve as *“that part of a measured mineral resource that can be mined economically after applying **modifying** factors whose confidence is however lower than ones applied to a proved mineral reserve”*.
- ii. **Proven reserves** - The South African Code for the Reporting of Exploration Results, Mineral Resource and Mineral Reserves, SAMREC Code (2016,

p26) defines a proven reserve as “*that part of a measured mineral resource that can be mined economically and the level of confidence in the modifying factors is high*”.

Mineral resources can be converted to mineral reserves through technical studies that encompass assessments of mining techniques, processing methods, market conditions, environmental issues, infrastructure status social, and sector policies as shown in figure 3:

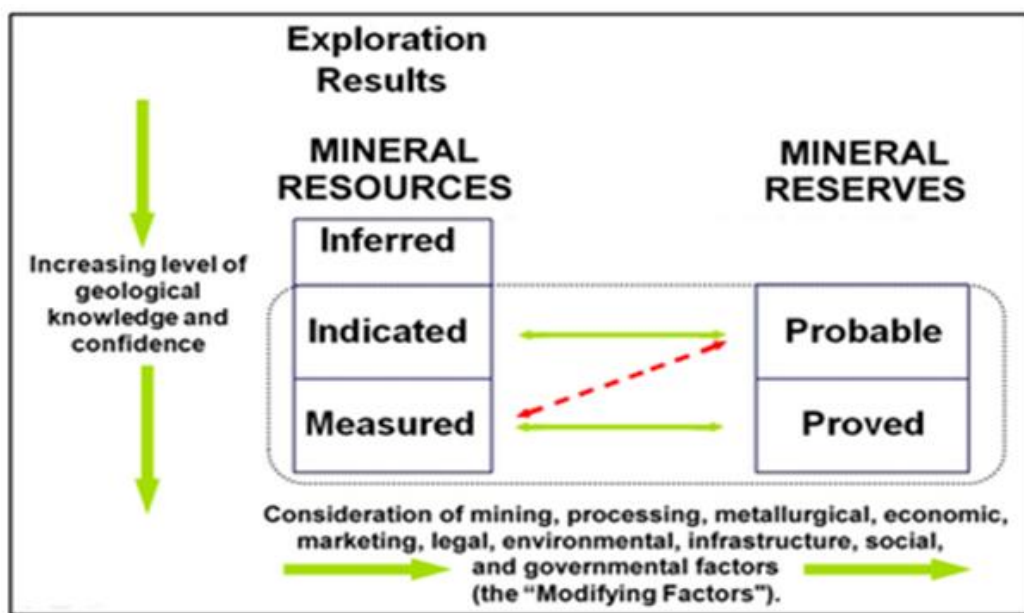


Figure 3. Mineral Resource and Reserve Classification System (SAMREC Code,2016)

The geology and reserve due diligence requires a competent person whose investigation will entail field inspections, the examination of drill core, review of sampling procedures, quality assurances and quality controls, analytical data, review of geological reports, and reserve studies.

International standards recognised a competent person as someone with at least five years of relevant experience in the style of mineralization and activity which that person

is undertaking. The standards demand that the competent person be registered with a Recognized Professional Organization (RPO).

The competent person is one responsible for resource and reserve re-estimations which are done on portions of the orebody including reserve expansion potential.

Santini et al (2000) argue that if the reserve audit is at 90% it must be accepted and deemed appropriate. The author further points out that reserves that pass the audit should be ones to be used for cashflow preparations and estimations of credit ratios.

2.2.2 Mining due diligence

Scriven (1999) points out that mining due diligence should be done by a mining engineer who possesses knowledge of the mineral deposit in question. The mining engineer's task entails assessments on mining methods, geotechnical studies among other things. The author further argues that the mining due diligence can be categorised under two main areas which are mining data and mining costs:

Mining data

Scriven (1999) points out that due diligence on mining data involves assessment of several issues which includes feasibility studies;

- i. Mineable reserves include tonnages, grades, recoveries, and dilution factors.
- ii. Life of mine plans (short-medium, and long term) including production targets, production equipment.
- iii. Geotechnical issues (rock mechanics, slope stability, and subsidence).
- iv. Production schedules (ore production, production drilling, stripping ratios, waste management).

- v. Ore and waste haulages (capacity of loaders, trucks, drills, haul distances, cycle times, equipment maintenance schedules).
- vi. Manning schedule (crew size, shift schedule, workforce demographics)
- vii. Utility plan (power, water, roads).
- viii. Ventilation plans (fan sizes, ventilation shafts, ventilation ducts).
- ix. Safety and training – routine training schedule, safety meetings, awareness programs

Mining costs

Review of mining costs is critical, and this due diligence covers the following:

- i. Fixed costs
- ii. Variable costs (equipment, fuel, lubricants, power).
- iii. General and administrative costs.
- iv. Capital costs (expansion capital, replacement capital).

2.2.3 Processing due diligence

Bentzen (1999) described processing due diligence as one that examines plant flowsheet, bottlenecks, plant, and equipment status, and processing costs. The review helps in assessing the capacity of the plant and how it compares with similar plants.

The review can be categorized into the following classes:

Processing plant

The focus of the review will be on the following:

- i. Flowsheet – comparison will be made between original and actual, compare plant expansion potential and changes to be made.
- ii. Production capacity.
- iii. Utilization; production schedule – production, feed grade, plant recovery.
- iv. Consumption of reagents and consumables.
- v. Research work that has been done.
- vi. Manning schedules –shift size and age of the workforce.
- vii. Maintenance schedule, procedures, and policies.
- viii. Utility plans; safety and training.

Processing costs

The review will look at the following fixed and variable plant costs:

- i. Labor or employment costs incurred when running the plant.
- ii. Equipment costs associated with the plant.
- iii. Fuel consumption costs.
- iv. Oils and lubricants costs associated with the plant.
- v. Power and water costs incurred when running the plant.
- vi. Office and administration costs associated with the plant.
- vii. Capital costs entail expansions, replacement costs.

2.2.4 Financial due diligence

This is a type of review that looks at all financial aspects of the business. Meason (1999) argues that financial due diligence reviews should focus on the following:

Accounting due diligence

The review entails computing financial ratios which measure the performance of the mining entity and analysis of financial statements namely income statement, balance sheet, cash flow statement, and statement of changes in equity.

i. The income statement

An income statement measures the revenues a company generates minus the expenses a company incurs over some time. Publicly listed entities are required to publish their financial statements quarterly and annually. The following are the income statement items:

Table 2: Contents of the Income Statement (Seeger, 2019)

Item	Remarks
Revenues	These are aggregate proceeds from the sale of goods and services;
Cost of Revenue or Cost of Goods Sold ("COGS")	Includes expenses directly related to the goods and services sold –Direct labor, parts & supplies, depreciation of P, P&E associated with production (i.e., machinery, building, etc)
Gross Profit	Is the outcome obtained when Costs of Goods Sold are deducted from Revenues;

Sales, General & Administrative (SG&A)	Includes expenses associated with sales, marketing, and management functions of the business; May also include research & development (if not broken out) and depreciation expense not related to COGS
Income from operations ("EBIT")	EBIT represents income from the normal course of operations and it does not include any debt costs; $EBIT = \text{Gross Profit} - S, G \ \& \ A$
Earnings Before Interest, Tax, Depreciation, and Amortisation (EBITDA)	Is a measure of a company's profitability of the operating business only, thus before any effects of indebtedness, state-mandated payments, and costs required to maintain its asset base. $EBITDA = EBIT + \text{Depreciation} \ \& \ \text{Amortization}$
Interest Expense / Interest Income	The expense associated with borrowing debt / Income from investments
Earnings Before Taxes ("EBT")	$EBT = EBIT - \text{net interest expense (income)} - \text{other expenses (income)}$;
Net Income	$\text{Net Income} = EBT - \text{Taxes}$; and

ii. **Balance sheet**

A balance sheet measures the financial position of the business at a particular moment in time. It shows the company's assets, liabilities, and owner's equity. The balance sheet is best summarised by the equation:

assets = liabilities + owner's equity.

Assets are divided into two main parts -current assets and non-current assets

Current assets: are ones that can be converted into cash within one financial year and this includes:

- Cash (most liquid), stocks, bonds, and notes.
- Accounts receivable (credit given to a customer, will be received later).
- Inventories (represents products that will be sold to customers).
- Prepaid expenses (cash paid in advance for services –insurance); and
- Deferred income taxes (difference between internal revenue service's tax and generally accepted accounting practice tax; the company will receive taxes within one financial year).

Non-current assets are those assets that are not expected to turn into cash within one financial year and are stated at book value and not at market value these include:

- Property, Plant & Equipment (owned buildings, factories, cars, trucks, machinery, etc.). These assets are depreciated except land;
- Goodwill –derived from acquisitions (Goodwill = Price of Target –Book Value of Target); and

- Intangible asset –includes customer lists, brand value among other things.

Liabilities are divided into two main parts -current liabilities and non-current liabilities.

Current liabilities - are those financial obligations that must be paid within one financial year and include:

- Revolving credit (loan from a bank).
- Accounts payable (money owed to suppliers).
- Current portion of long-term debt (debt to be paid within one year).
- Accrued expenses (wages, utility, rent); and
- Deferred income taxes (Difference between internal revenue service tax and generally accepted accounting practice tax; the company will pay taxes later)

Non-current liabilities - are financial obligations to be paid after one financial year and includes the following:

- Long-term debt (sum of the bank, bonds, capitalized leases – any interest-bearing debt);

Owner's equity - represents capital deployed into the business by shareholders in the form of share capital, share premium, reserves, and retained earnings.

iii. **Cashflow statement**

The cash flow statement measures actual cash movements in and out of the business in each period. The cash flow statement bridges the income statement and the balance sheet by providing the profile of a company's liquidity and cash generation ability.

Cashflows for a mining operation are measured from three types of activities:

- Cash flows from operating activities – it involves adjustment of accrual basis income statement to a cash basis.
- Cash flow from investing activities –accounts for the cash effects of capital expenditures, investments, and acquisitions
- Cash flows from financing activities –accounts for the cash effects of debt amortization, changes in capital structure, and dividend payments for common and preferred stock.

iv. Financial ratios

The National Association of Certified Valuers and Analysts, NACVA (2015) points out that for investors to get an understanding of how well the business is performing, it is of paramount importance to conduct a financial analysis.

The financial analysis gives insight into the historical and current performances performance, and potential cash flow generating capacity of the business. The analysis of financial performance helps in assessing how well management is utilising and looking after the organisational resources to generate cashflows.

Common-size financial statements are used to give insights into the financial performance of the business. NACVA (2015), points out that there are three common-size analysis techniques used in the industry namely:

- i. Vertical analysis – where each item is divided by total assets.
- ii. Trend analysis – an analysis that is done on a time-series basis.
- iii. Cross-sectional analysis – a technique that compares company performance with its peers.

Financial ratios are grouped into five classes namely:

- i. Profitability ratios – measure the profitability of the company.
- ii. Liquidity ratios – assess the ability of a firm to pay its short-term obligations.
- iii. Activity ratios – measure how efficient the firm is in performing day-to-day activities.
- iv. Solvency ratios – assess the ability of the firm to pay its long-term obligations.
- v. Valuation ratios – they measure the quantity of asset or flow associated with ownership of a specific claim.

Although these ratios are useful in making investment decisions, they don't fully address the principal reason why businesses exist. Tholana and Neingo (2018) point out that every business exists to create optimum shareholder value. Macfarlane (2019) argues that value is measured in two dimensions namely:

- i. Economic Value Added (EVA) in the short term, and
- ii. Market Value in the long term.

Companies can make profits and destroy shareholder value at the same time. With the current challenges faced by the industry, mining companies pursue short-term survival strategies that conflict with the long-term objective of organisations. Companies, therefore, prefer to mine high-grade zones, suspending exploration and deferring maintenance of machinery and installation of mine infrastructure which results in the creation of marginal mining assets.

v. Economic Value Added (EVA)

Tholana and Neigo (2018) point out that Economic Value Added (EVA) is a short-term measure of shareholder value. The metric considers costs of all forms of capital used

in the business usually debt and equity. Economic value-added measures the return generated more than the investors' required rate of return. EVA can be expressed as shown in the Equation:

$$\text{EVA} = \text{NOPAT} - (\text{WACC} * \text{capital invested})$$

Where:

NOPAT = Net operating profits after tax

WACC = Weighted average cost of capital

2.2.5 Commercial due diligence

Commercial due diligence is a review that looks at how well the company is positioned relative to its competitors in the market. Generally, a company must operate in a manner that causes it to stand out from the rest.

Various tools such as Porter's five force model namely rivalry, threats of new entrants, bargaining power of buyers, bargaining power of suppliers are used. Other issues that are reviewed include commodity demand and supply dynamics; capability profile; generic strategies – cost leadership, differentiation, focus; growth strategies – mergers, acquisitions, new businesses; distribution channels; product width and breath; marketing strategies; product pricing and supply contracts

2.2.6 Legal and environmental due diligence

Hayes (1999) says laws affect every area of a business hence the need to conduct legal due diligence reviews. The focus will be on the following:

- i. legal ownership.
- ii. compliance to environmental laws.

- iii. compliance to permits.
- iv. tariffs and quotas.
- v. tax holidays.
- vi. repatriation of profits; litigation cases.
- vii. statutory regulations and business contracts

The legal and environmental due diligence enables a mining entity to conduct its operation in a manner that is environmentally acceptable to gain the unwritten contract, the social license to operate.

2.2.7 Human resources due diligence

Human resources are one of the most important assets any organisation should possess. For an organization to achieve its intended objectives, the need for a skilled and experienced labor force cannot be overemphasized.

Humphries (1999) argues that human resources are one of the critical areas to be paid attention to for the long-term success of an organization. The key areas to focus on when conducting a human resource due diligence are namely, general human resources, general compensation, health, and welfare which are discussed in the subsequent sections:

General human resources

General human resources mainly look at several issues namely:

- i. Human resources strategy and structure – the assessment looks at whether the structure supports the strategy.

- ii. Effectiveness of human resource planning – the assessment looks at how well the human resources plans fit well into the plans of the organisation.
- iii. Workforce strength and payroll tax issues – this looks at the number of employees and compliance of the company to applicable employment taxes.
- iv. Cultural and social issues – looks at the extent to which a company observes the cultural issues of the community.
- v. Collective bargaining and unions.
- vi. Labor relations – look at morale and motivation. Great labor relations will have a positive impact on the growth and revenue of a company.
- vii. Working environment, compensation, and benefits

General compensation

General compensation looks at reward systems in place and it covers the following aspects:

- i. Bonus schemes.
- ii. Employee stock ownership schemes.
- iii. Competitiveness of employee benefits and packages.
- iv. Pensions schemes and actuarial matters.

Health and welfare

The health and welfare programs are designed to help maintain or improve employees' behavior to achieve better health. The review under health and welfare: medical aid cover; wellness campaigns; counseling; protective clothing; working conditions

2.3 Valuation of Mineral Assets

The South African Code for Reporting of Mineral Asset Valuation, SAMVAL Code (2016) defines valuation as *“the estimation of the value of a mineral asset in money or monetary equivalent”*.

The Polish Code for Valuation of Mineral Assets, the Poval Code (2008) points out that mineral deposit valuation is a specialized area that requires knowledge and experience in geology, mining engineering, mineral processing, and corporate finance. To avoid misleading valuation of mineral assets, a final draft of the IMVAL Template was developed in 2016 to achieve harmonization of mineral asset valuation standards in use namely SAMVAL Code, VALMIN Code, CIMVAL Code. The IMVAL template is aligned with International Valuation Standards (IVS). The National Association of Certified Valuers and Analysts, NACVA (2015) defines Valuation as the process of estimating the worthiness of a business. The Revenue Ruling 59 – 60 defines fair market value as follows:

“The amount at which property would change hands between a willing buyer and a willing seller when the former is not under any compulsion to buy and the latter is not under any compulsion to sell, both parties having reasonable knowledge of relevant facts. Court decisions frequently state in addition that the hypothetical buyer and seller are assumed to be able, as well as willing, to trade and to be well informed about the property and concerning the market for such property”. To estimate the fair market values, valuation models are developed as described in the subsequent section.

In essence, no due diligence is complete without undertaking financial valuation. Lenders require mineral asset valuation for two main reasons namely: capacity of the mineral asset (the ability of the project to repay the loan) and collateral cover which is the forced sell value of the mineral asset pledged as collateral

Credit decisions are however based on five Cs of credit and the other three Cs of credit include capital (equity capital committed into the business), character (willingness to repay liabilities), and compliance (compliance with the relevant laws and regulations)

2.3.1 Capacity of mineral asset

Butler (1994) points out that in assessing the ability of the mineral project to service the loan, robust cash flows are required. The cash flows should reflect the mineral resource, mining plan, processing plan, tax regimes, commodity prices, capital costs, operating costs, and capital costs. The cash flows enable key financing ratios to be computed namely:

Interest cover ratio

Butler (1994) defines the interest cover ratio as “*the ratio that reflects the ability of the mineral project cash flow to cover interest obligations and is given by cash flow divided by interest charge*”.

Principal cover ratio

Butler (1994) argues that the principal cover ratio informs a lender about the ability of the mineral project to cover the principal loan amount and is given by mine cash flow divided by principal balance. It allows lenders to estimate the time that a mineral project will be able to repay the principal amount.

Debt service cover ratio

Butler (1994) points out that the debt service cover ratio is the most important ratio used by lenders to assess the ability of the project to repay the loan amount in full as scheduled and is given by mine cash flow divided by the sum of interest and principal.

Mineral reserve cover ratio

Butler (1994) argues that the mineral reserve cover ratio is a ratio that reflects the ability of the mineral reserves to repay the loan during its tenure and is given by mineral reserves divided by reserves to be mined during the tenure of the loan.

Loan life ratio

The National Association of Certified Valuers and Analysts (2015) points out that the loan life ratio assesses the robustness of the project fundamentals and is given by the sum of discounted cash flow during loan tenure divided by loan amount. Cash flows are discounted at the cost of borrowing and using loan tenure as the discount period.

Project life ratio

Butler (1994) points out that the project life ratio is one used to assess the robustness of the project throughout its entire life and is given by the sum of discounted cash flows for the entire project divided by loan amount.

Residual cash flows

Is the difference between project life ratio and loan life ratio which is a reflection of residual cash flows associated with the project to justify additional funding that might be required. The above ratios only address the capacity of the project to repay the loan. Sensitivity analysis is also key to lenders as it helps in assessing the ability of the project to repay the loan if key variables change. Butler (1994) points out that lenders generally work three types of sensitivities namely:

- i. Single variable sensitivity - this type of sensitivity assesses the capacity of the project to repay the loan if one variable changes keeping other variables constant and usually a 10% variance is used in the mining industry. These changes may occur in mining grade, mineral price, costs, and tax.

- ii. Break-even sensitivity – assesses the extent to which a variable must change for the mineral project to achieve a break-even point.
- iii. Compound disaster sensitivity –assesses the ability of the project to repay the loan if all the variables experience a downside movement.

2.3.2 Collateral

Sofala Partners Limited (2019) points out that bank decision processes are typically predicated on hard, non-moveable/non-transferable collateral, such as land or buildings. Collateral security entails assets the project owners pledge as security in the event of default. These include property, plant, and equipment including mineral reserves. Every lending process requires pledging collateral security as a fallback plan. The perfection of security registration requires fair market valuations to be done and this is done by specialists such as registered valuers for real estate and plant and machinery. In mining investments, however, mineral deposits can be pledged as collateral, and this will require the valuation of the mineral assets to be done to determine the fair market value of the mineral project which can be adjusted to arrive at a forced sale value. Lenders require a valuation of mineral assets for hypothecation purposes.

2.4 Mineral Asset Valuation Model

The mineral asset valuation model is one used to estimate the fair market value of an asset. The valuation model should address all the technical, financial, cultural, social, and investment factors surrounding the mineral deposit. Venmyn Deloitte (2015) points out that for mining companies to ascertain the value of their assets, they need to work with a model that addresses six key issues shown in the model below:

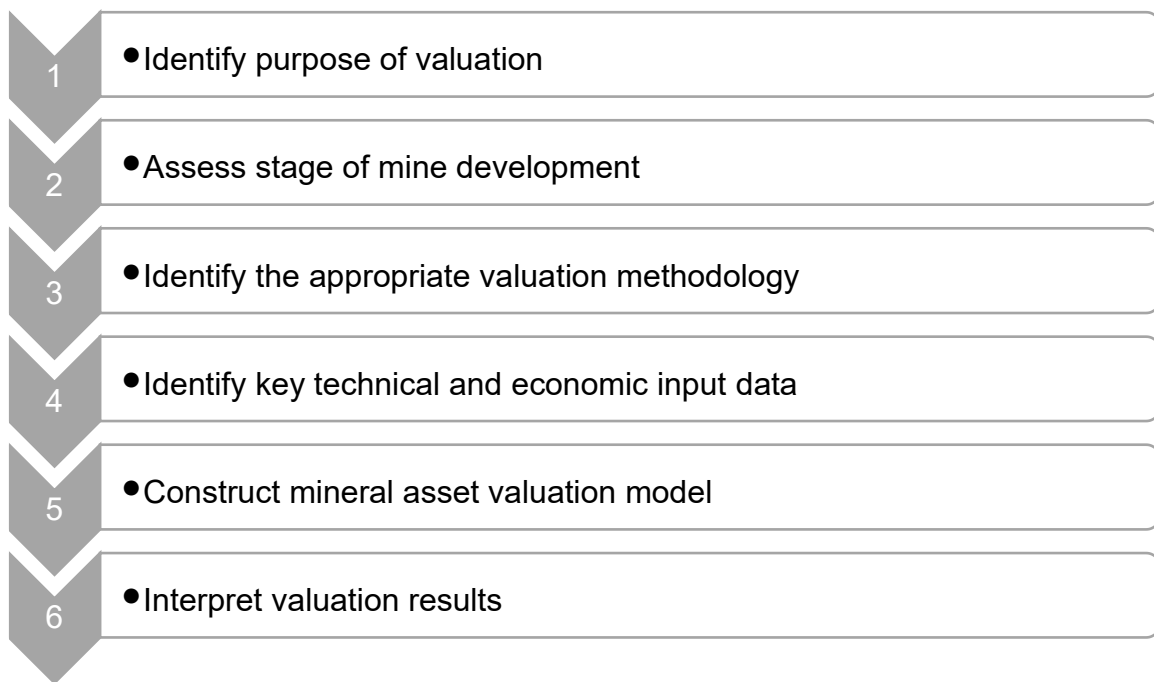


Figure 4. Deloitte's Approach to Mineral Asset Valuation (Deloitte:2015)

Stage 1: Purpose of valuation

The purpose of a valuation is one of the most important issues to be pointed out in any valuation exercise. The purpose of valuation has a bearing on the choice of valuation methodology. Lenders mainly conduct the valuation of mineral assets to ascertain the capacity to repay and justify the adequacy of collateral. The Poval Code (2008) points out that the value of mineral deposits can be determined for various reasons namely: acquisitions and sales transactions; mergers; initial public offerings; listing support; support financial statements; litigation; income tax; insurance claims; deal structuring; expropriations compensation; vendor selection; loan security; mining annuity; determination of royalty payments; investment decisions and state reserves

Stage 2: Stage of mine development

The stage of development is also one of the key considerations that every valuation analyst must pay attention to. The stage of mine development gives a mineral asset an identity along the mine value curve shown in figure 5 and that has a bearing on the choice of valuation methodology.

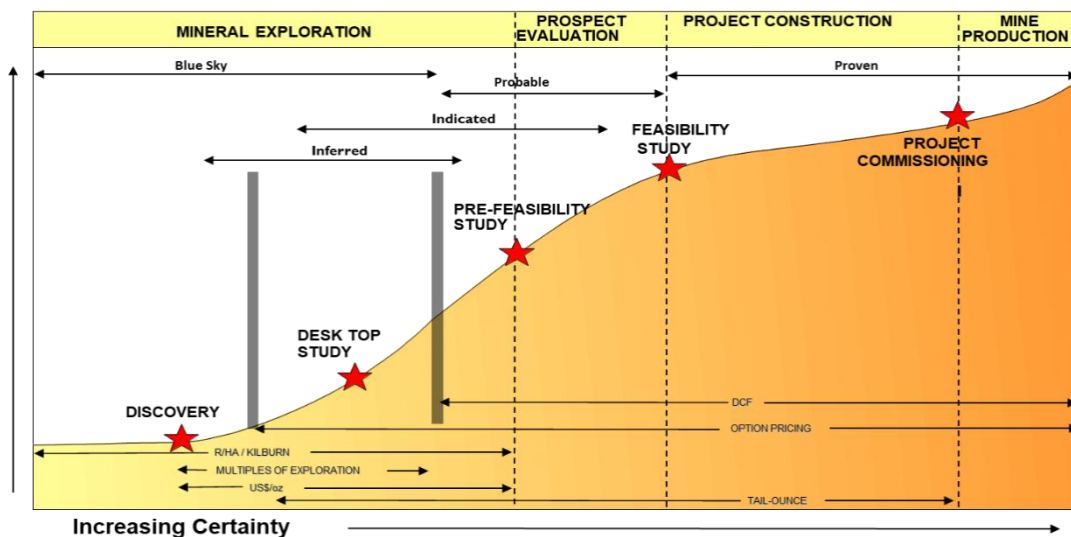


Figure 5. Mine Value Curve (Vemny Deloitte: 2010)

Cawood (2004) argues that mineral properties can be classified into six categories with emphasis given to the stage of mine development. The six categories are as follows:

- i. Pre-exploration properties: These are mineral rights with no exploration history. It includes properties from which encouraging exploration results were obtained from early exploration work done.
- ii. Exploration properties: These are ones in which exploration work is being done based on encouraging results from previous work, but the discovery has not yet happened.
- iii. Advanced exploration: These are properties with detailed geological work done and a preliminary feasibility study has yielded positive results.
- iv. Development properties: These are properties on which a bankable feasibility study has been done and finance being sought or secured for mine development.
- v. Operating mines: These are properties that are currently in production.
- vi. Decommissioned mines and properties: These are properties that have either exhausted the mineral resource or have been temporarily closed in anticipation of improvement in technology or economic environment.

Stage 3: Mineral asset valuation methodologies

The choice of an appropriate valuation methodology for a mineral asset is based on the judgment of the valuation analyst. SAMVAL Code (2016) points out that the valuation of mineral assets should be done by a Competent Valuator. The choice of valuation methodology depends on several factors namely:

- i. Purpose of valuation - the purpose of the valuation will determine the basis of valuation.
- ii. The premise of value - an assumption regarding the most likely set of transactional circumstances that may apply to the subject valuation, for example going concern, liquidation. The going concern premise of value means the business is being sold as an ongoing business enterprise.
- iii. Basis of value - represents the estimated exchange price without regard to transaction costs
- iv. Stage of mine development - represents the position of the project on the value curve in figure 5.

The Revenue Ruling 50-60 argues that the valuers need to exercise reasonable judgment on factors surrounding the subject in determining a proper value for the business.

Njowa (2017) points out that valuation methodologies to be adopted by the minerals industry should be based upon the principle of determining market-related values for the mineral asset at any given date of valuation. The IMVAL (2016) points out that there are three globally accepted valuation methodologies namely:

- i. The income approach which relies on the value-in-use principle and discounts future cash flows of the mineral asset throughout its entire life.

- ii. The market approach which relies on the “willing buyer”, “willing seller” principle and requires that the monetary value is obtained from the sale of comparable mineral assets.
- iii. The cost approach which relies on how much has been spent in the past and the amount to be spent in the future based on the principle of contribution.

Each valuation approach has various methods that can be applied. The USMinval (2003) points out that there are several commonly used valuation approaches and methods as shown in table 3 below:

Table 3: Valuation Methodologies (USMinval: 2003)

Valuation Approach	Valuation Method	Exploration Properties	Marginal Development Properties	Development Properties
Income	Discounted Cash Flow	No	Maybe	Yes
	Option Pricing	No	Yes	Yes
	Monte Carlo Analysis	Less widely used but acceptance increasing		
	Probabilistic methods	Little used or accepted		
Cost	Appraised Value	Yes	Yes	No
	Multiple of Exploration Expenditure	Similar to Appraised Value method but multiplier includes value; more common in Australia		
	Geoscience Factor	Yes	Maybe	No

Market	Comparable Transactions	Yes	Yes	Yes
	Option Agreement Terms	Yes	Yes	Yes
	Gross “in situ” value	Not acceptable		
	Net Metal Value or value per unit	Widely used rule of thumb, but not a primary valuation		
	of metal	Method		
	Value per unit area	Secondary method for large exploration holdings		
	Market capitalization	The secondary method most junior applicable to companies with only a single valuable property		

The applicability of the valuation methodology depends on the stage of mine development of the mineral asset under review.

Stage 4: Technical and economic input parameters

Mineral project valuation requires a vast amount of data from the technical and economic dimensions namely: resource tonnage, resource grade, mining rate, mining recovery, processing rate, plant feed grade, plant recovery, commodity price, revenue, variable costs, fixed costs, capital costs, taxes regimes, capital structures and cost of capital.

Stage 5: Mineral asset valuation model construction

The construction of a valuation model involves bringing the technical and input data together using excel based financial models. The financial model is constructed in a manner that reflects net cashflows that can be generated by the mineral project at every trading period. Depending on the purpose of valuation, the cash flows are discounted at an appropriate discount rate to give the value to be a net present value associated with the project.

Stage 6: Interpretation of valuation results

The interpretation depends on the purpose of valuation. For collateral purposes, the net present value from stage six gives the fair market value which is then discounted to give the forced sale value. If the purpose is capacity, the net cash flows are used in conjunction with the financing parameters to establish the financing ratio discussed in section 2.7.1 of this report.

2.5 Summary of Chapter 2

Chapter 2 discussed critical issues around mine due diligence were discussed namely: technical, financial, commercial, legal, environmental, and social issues. The chapter also discussed the valuation of mineral assets including methodologies and stages involved in the valuation of mineral projects.

3 RESEARCH DESIGN

3.1 Overview of Chapter 3

This chapter discusses the research design adopted by the researcher to achieve the intended objectives. The chapter mainly focuses on research methodologies chosen, research instruments used, data reliability and validity, participant selection, and ethical issues.

3.2 Research Methodology Chosen

The researcher embarked on both qualitative and quantitative approaches. Tswere (2013) argues that quantitative research deals with numbers and statistics, while qualitative research deals with words and meanings. The two approaches were done in the form of a pure research methodology. Tswere (2013) points out that pure research generates new ideas, principles, and theories that, that can be used immediately. Exploratory research is used to investigate a problem that is not clearly defined. It is conducted to have a better understanding of the existing problem but will not provide conclusive results. Pure research was therefore chosen because it advances fundamental knowledge in the business world. Pure research generally falls into two categories namely:

3.2.1 Exploratory research

This research is what is done when a problem has not been studied more clearly; seeks to identify the nature and the relationships of cause and effect. It seeks to connect ideas to understand the cause and effect of a phenomenon.

Pros and cons of exploratory research

- i. Exploratory research lays the foundation of research, which can lead to further research.

- ii. Exploratory research is its qualitative data and subsequent analysis.

3.2.2 Descriptive research

Descriptive research involves observing and describing the behavior of a subject without influencing the subject in any way. Descriptive research does not answer questions about why a certain phenomenon occurs or what the causes are. Answers to such questions are best obtained from randomised and quasi-experimental studies.

Pros and Cons of descriptive research

- i. The collection of data is quick and easy to conduct, especially when doing surveys.
- ii. It allows you to collect data in a natural environment that gives high-quality and honest data collection.
- iii. It is easier to make decisions and go further for data analysis.

The exploratory research was selected because few financiers have mining desks and very little knowledge is available on the status of mining finance in Zimbabwe. This was done to get insights into the practices by mining debt financiers. Sekaran (2002) argues that an exploratory approach is undertaken where there is limited information regarding the problem being solved. Robson (2002) points out that an exploratory study is very useful as it helps in finding out what is happening and seeking new insights. This type of research was considered ideal as it leads to new information that can be used in mine due diligence and valuations.

3.3 Research Design

Research design entails procedure followed in the selection of research participants, research tools used to generate information that is valid and reliable. Research designs

aim at generating data that represents a population. Tswere (2013) points out that research design mainly focuses on the following questions:

- i. What should be done to generate information that is a true representation of reality as accurately as possible?
- ii. What should be done to conduct the study in a manner that will allow similar results to be obtained if someone else does the same study at a different time?
- iii. What should be done so that the research is done on time and within budget?

Research designs manifest themselves in various methods namely:

3.3.1 Cross-sectional design

Cross-sectional research involves using different groups of people who differ in the variable of interest but share other characteristics, such as socioeconomic status, educational background, and ethnicity. Cross-sectional research studies are often used by researchers studying developmental psychology.

Pros and cons of cross-sectional design

- i. Cheap and quick
- ii. Multiple variables at the time of data snapshot
- iii. Not ideal for determining cause and effect
- iv. Snapshot timing may not be representative

3.3.2 Experimental research design

Experimental research is a study that strictly adheres to a scientific research design. It includes a hypothesis, a variable that can be manipulated by the researcher, and

variables that can be measured, calculated, and compared. Most importantly, experimental research is completed in a controlled environment.

Pros and cons of experimental research

- i. It is highly prone to human error.
- ii. Exerting control over extraneous variables may lead to the personal bias of the researcher.
- iii. It is time-consuming.
- iv. It is expensive.
- v. Manipulating control variables may have ethical implications.
- vi. It produces artificial results.

3.3.3 Longitudinal research design

A longitudinal study is a type of correlational research study that involves looking at variables over an extended period. This research can take place over weeks, months, or even years. In some cases, longitudinal studies can last several decades.

Pros and cons of longitudinal research design

- i. They are effective in determining variable patterns over time.
- ii. They are very effective in researching developmental trends.
- iii. They can provide high accuracy when observing changes.
- iv. They require huge amounts of time.
- v. They require a large sample size.

- vi. They can be more expensive compared with cross-sectional studies.

3.3.4 Survey research design

Survey Research is defined as the process of conducting research using surveys that researchers send to survey respondents. The data collected from surveys is then statistically analyzed to draw meaningful research conclusions. This research type includes the recruitment of individuals, collection, and analysis of data. It's useful for researchers who aim at communicating new features or trends to their respondents.

Pros and cons of survey research

- i. Ideal for collecting emotional feedback
- ii. It is more accurate than interpreting behavior data
- iii. It promotes the collection of comprehensive data
- iv. Easy to implement
- v. Fast data collection turnaround
- vi. Allows collection of large volumes of data quickly and at a low cost
- vii. Effective remote data collection is possible
- viii. Surveys provide sampled data not complete data
- ix. Survey fatigue reduce response rates
- x. Respondent honesty and intention can impact accuracy
- xi. Unintentional biases and effects can impact accuracy
- xii. Poor survey design can lead to incorrect conclusions

Having considered the pros and cons of the research designs discussed, the survey method was selected.

3.4. Justification of the Survey Method

The survey method was chosen since it can be conducted using a blended method to meet the specific characteristics of respondents. This helps in guaranteeing the validity and reliability of responses. The survey methods were chosen to use the following data collection methods:

- i. Focus groups.
- ii. Questionnaires
- iii. Interviews

Questionnaires were used by the researcher to undertake quantitative research while the focus groups and interviews undertook qualitative research.

3.4.1 Focus group survey

This method generally groups the target population into a single group where they are interviewed interactively. The advantage of this method is that it allows participants to build on others' responses thereby stimulating participation and sharing of ideas. The method however suffers from incidences of a few vocal members dominating the discussion, in the process influencing the views of other participants or discouraging them from contributing altogether. As such two focus groups were chosen and engaged. The specific groups deal with mining finance transactions namely:

- i. Client relationship specialists
- ii. Credit management specialist

The researcher scheduled a virtual meeting with each of the identified groups and posed leading questions. A total of five leading questions were posed to each group.

3.4.2 Questionnaires

To complement the weakness of the virtual meeting results, from focus groups, the researcher also used questionnaires that were distributed to thirty-five participants. Participants were selected based on the following parameters:

- i. Experience in mining finance
- ii. Key role in the mining finance field

This was done as it helps to judge the consistency and reliability of responses through comparing information extracted. Questionnaires were chosen as they help in getting responses from other participants who could not take part in the focus group survey due to other commitments. Cohen (1989) defines a questionnaire as a self-report instrument used for gathering information about variables of interest to an investigation. Questionnaires can be grouped into the following:

Open-ended questionnaires

They do not provide participants with a predetermined set of answer choices, instead of allowing the participants to respond in their own words. Open-ended questionnaires are often used in qualitative research methods and exploratory studies.

Pros and cons of open-ended questionnaires

- i. They allow for unlimited responses
- ii. Deliver new, often unexpected, insights
- iii. Provide more detail

- iv. Offer deeper, qualitative data
- v. Provide researcher with sentiments and opinions

Closed-ended questionnaires

Closed-ended questions are questions that can only be answered by selecting from a limited number of options, usually multiple-choice questions with a single-word answer, 'yes' or 'no', or a rating scale (e.g. from strongly agree to strongly disagree).

Pros and cons of closed-ended questions

- i. Easy and quick to answer
- ii. Responses are consistent
- iii. Simple to analyse

Based on the pros and cons associated with the closed and open-ended questionnaires, the researcher selected closed-ended questions.

Keinath (2000) points out that closed questions have the following characteristics:

- i. It collects factual data.
- ii. Timeous to design.
- iii. The analysis is easier.
- iv. It saves respondents time.
- v. Does not deliver results if respondents fail to avail the answer; and
- vi. It also puts answers into the mind of the respondent.

Sakaran (2000) points out that exploratory research requires a sample size of between thirty up to five hundred. In this study, a sample size of thirty-five participants was chosen and fifteen closed-ended questionnaires were distributed.

The questionnaire sample shown in the appendix section was sent to the participants via email and returned after twelve working days.

3.4.3 Interviews

Interviews are one of the ways that are productive in conducting research. They give the researcher the platform to interact with respondents and provide a better explanation about the research. Usually, interview questions are open-ended, and this allows more information to be collected.

Creswell and Creswe (2019), point out that the total number of interview questions should be between five to ten to ensure coverage of the research problem. Interviews fall under three categories namely:

- i. Unstructured.
- ii. Semi-structured.
- iii. Structured.

Zojceska (2018), points out that a structured interview also called a formal interview is one where the researcher interacts with respondents and questions are prepared in advance and candidates experience the same questions.

Structured interviews are very useful research instruments that allow selected candidates to be asked the same questions and this makes it easier for the researcher to compare answers.

In an unstructured interview, the questions are not prepared in advance, and it is ideal in a free-flowing conversation, thus different candidates are asked different questions.

The main advantage of an unstructured interview is its personalised approach. This is especially useful when you compare candidates who are equally qualified or for jobs where their personality and communication skills are crucial.

Unstructured interviews have their disadvantages in that different candidates are asked different questions which makes it harder to compare answers. Based on the above, the researcher opted for structured interviews for the target population.

In conducting the interviews, the researcher followed the following five simple steps:

Step 1: Write down the interview questions.

Step 2: Develop a rating scale to assign grades to responses.

Step 3: Produce hard copies of the interview questions.

Step 4: Initiate the interview and explain the purpose.

Step 5: Grade participant's answers based on the scale

Having selected the nature of interview questions, the researcher selected the style of interviewing. Interviews can be done in many ways namely: telephone, face-to-face, virtual, panel, group, lunch, competency-based, and formal/informal Interviews. Due to the nature of the study, competency-based interviews were chosen and were conducted via a virtual platform due to COVID-19 lockdowns. Seven interview questions were distributed as shown in appendix I.

3.4.4 Research participants

Central to data collection is the careful selection of participants to take part in the research study. Several factors are considered in the selection of participants namely research questions, research design, and the availability of study participants. The researcher, therefore, had to choose a sample to represent the population of interest. The sample chosen was made up of mining finance professionals categorized by the following variables:

- i. Experience in mining finance.
- ii. Relationship specialists and
- iii. Credit management specialists

Ideally, every researcher prefers to study the entire population which is possible if the population space is small as such since the players are very few, only banks with mining portfolios were considered to constitute the population namely ZB Bank, Met Bank, CBZ Bank, Agribank and Stanbic Bank.

To collect primary data, the researcher used the research instruments targeting participants working in banks with an investment appetite for the mining space. Thirty-five questionnaires were issued utilising non-probability purposive sampling, self-selection sampling, and convenience sampling techniques were used. Sakaran (2000) points out that sample sizes larger than 30 and less than 500 are appropriate for such research.

3.4.4 Credibility of research

Field (2005) points out that credibility refers to the extent to which research has been crafted to avoid wrong answers. To achieve this the researcher placed more emphasis on two issues namely reliability and validity. Kimberlin and Winterstein (2008) point

out that reliability and validity are the key indicators for ensuring the quality of a measuring instrument. Ghauri and Gronhaug, (2005) argue that validity is all about how well the area under investigation is being covered by data collected. Field (2005) points out that validity is all about measuring what is intended to be measured.

Reliability

It has been pointed out that reliability looks at the magnitude by which the chosen data collection techniques and analysis procedures will yield consistent findings (Smith *et al.* 2008). Marczyk *et al.* (2005) argue that reliability generally looks at the consistency or dependability of a measurement technique. The authors went on to highlight that reliability should meet the following three criteria:

- i. Measures should yield the same results on other occasions.
- ii. Similar observations must be reached by other observers; and
- iii. There should be transparency in how raw data was analyzed
- iv. Robson (2002), argues that there may be four threats to reliability namely:
- v. Participant error: This was controlled by choosing an appropriate day as a 'neutral' time where participants are most expected to be neither on a 'high', looking forward to the weekend. The researcher sent questionnaires on a Monday and got responses on Wednesday of the other week.
- vi. Subject or participant bias: Occurs when individuals involved in an experiment act or respond in ways, they believe correspond with what the researchers are looking for. The participant is not behaving how they normally would but are responding the way they think they are supposed to. This was addressed by sending questionnaires and participants given time to respond independently

- vii. Observer error: is an error of observation or measurement due to the failure of the observer to identify, measure accurately, or interpret some aspect of the phenomena that are being observed. This was addressed by crafting closed-ended questions which can be graded on a scale
- viii. Observer bias. Is a kind of systematic discrepancy from the truth during the process of observing and recording information for a study of safeguard against the observer bias, a response guideline was used to avoid variances in the interpretation of results.

Validity

Grazino & Raulin (2004) point out that validity is all about the soundness of the research. The authors further stress that each research should aim at yielding valid conclusions. Kimberlin (2008) points out that the primary purpose of validity is to enhance confidence in the findings of the study. To deal with the potential for lack of validity in the findings of the research, the researcher used a research design that derives data from focus groups constituting participants who have exposure to mining finance. This data was analysed into meaningful information and used to draw valid conclusions.

3.4.5 Research ethics and clearance letter

Saunders *et al.* (2009) point out that ethical concerns are of paramount importance in any research. Ethics and clearance letters allow the researcher to get access to confidential information, companies, and individuals.

Colin (2002) argues that ethics generally refers to principles, procedures, guidelines the researcher should follow when executing a research study. The researcher was followed the Wits university's code of ethics or ethical guidelines. The researcher also

used his investment banking network to identify target participants who were agreeable to participating in the research.

General Ethical Issues

Saunders *et.al* (2009), argues that several ethical issues must be considered seriously at all the stages of the research project, and these include:

- i. Participant privacy where possible.
- ii. Voluntary participation and option to withdraw from the process.
- iii. Consent to participate.
- iv. Assurance of confidentiality of data provided by respondents.
- v. Anonymity.
- vi. Reactions of participants to how you seek to collect data, including embarrassment, stress, discomfort, pain, and harm.

The researcher, therefore, used the internet as an anonymity tool to send and receive questionnaires. A participation information sheet was sent to participants to ensure informed consent. Data collected were coded and processed using a statistical package tool for social sciences (SSPS). Marshall and Rossman (1999) describe data analysis as the process of bringing order, structure, and meaning to the mass of collected data. It is described as messy, ambiguous, and time-consuming, but also as a creative and fascinating process.

The narrative analysis method was used to analyze content from various sources, such as interviews of respondents, observations from the field, and surveys. The researcher used SSPS because it has built-in data manipulation tools such as recoding,

transforming variables, unlike Excel, where one has a lot of work to do to achieve the same results. Pie charts and frequency tables were used to display responses.

3.5 Summary of Chapter 3

Chapter 3 discussed the research design chosen, research instruments used and target participants were chosen. The chapter concluded by discussing the ethical issues and data analysis programs the researcher chose to carry out the study.

4 DATA ANALYSIS

4.1 Overview of Chapter 4

This chapter discusses the data analysis tools used by the researcher after collecting data from the targeted participants. The chapter discusses the coding of data that was used and the use of SSP software for processing data to get a picture of responses from participants.

To analyse the data collected on due diligence and valuation of mineral assets for debt financing statistical packages for social sciences (SPSS) software was used. The researcher capitalized on the SPSS software features to enter the questions from the questionnaire on the variable view page of the software coding each question from the first to the last assigning codes in form of numbers to each question. The data collected from the field was then coded on the data view page of the SPSS and every data was coded accordingly to the assigned codes from the variable view page. After inputting data, the researcher then analysed the data using descriptive statistics which include frequencies in form of charts such as bar graphs, pie charts, and frequency tables.

4.2 Banking and Mining Finance Experience

Based on the questions distributed to respondents, banking and mining financing experience was required and several responses were coded as follows:

- i. 0-5 years which was coded as 1
- ii. 5-10 years coded as 2
- iii. 10-15 years coded as 3
- iv. 15-20 years coded as 4
- v. 20-25 years coded as 5

- vi. 25-30 years coded as 6
- vii. 30-35 years coded as 7
- viii. 35-40 Coded as 8
- ix. 40+ coded as 9

This means that, when the researcher was entering data collected from the field using questionnaires, answers given by the different respondents were entered on the data view panel of the software using the assigned codes. To produce the required report, the researcher commanded the software to represent data statistically. Frequency tables, bar graphs, and pie charts were used to show responses from participants.

Table 4 below shows the distribution of banking and mining finance experience associated with the thirty-five respondents that participated in the survey.

Table 4: Frequency Table showing Banking and Mining Experience

Banking and Mining Finance Experience (years)	Frequency	Percent	Valid Percent
0-5	0	0	0
5-10	0	0	0
10-15	11	31.4	31.4
15-20	16	45.7	45.7
20-25	2	5.7	5.7
25-30	6	17.1	17.1
30-35	0	0	0
35-40	0	0	0
40+	0	0	0
Total	35	100.0	100.0

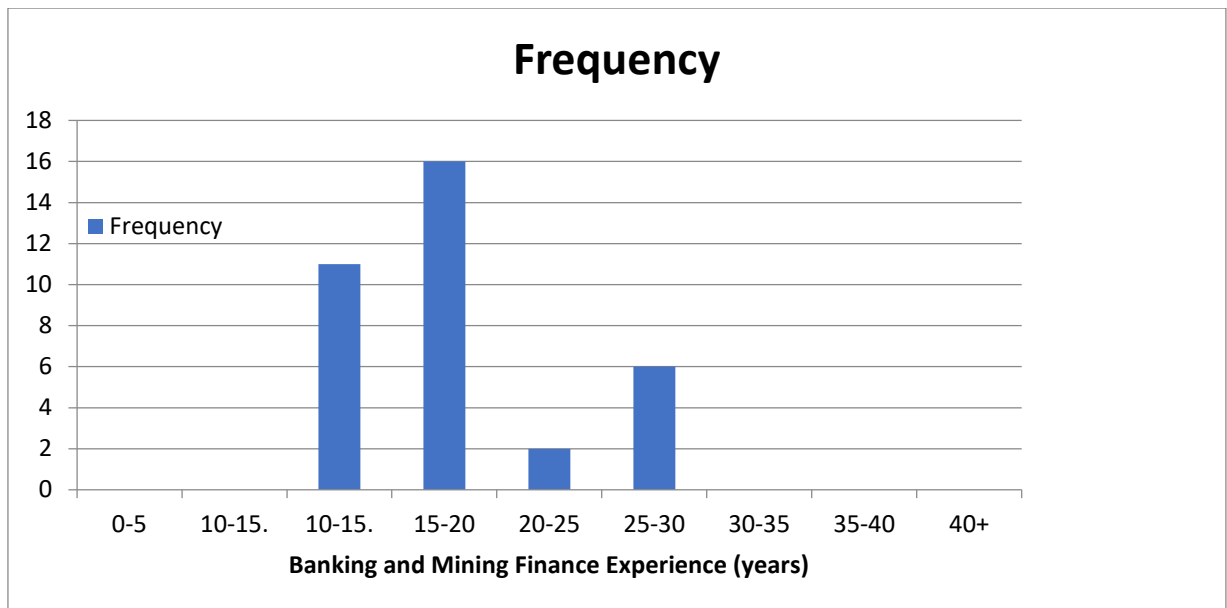


Figure 6. Participants Banking and Mining Finance Experience

From the table, 68.6% of the respondents have between 15-30 years of experience in mining finance. Categories 0-5; 10-15, 30-35, 35-40, and 40+ have zero frequencies. Hence only categories with recorded frequencies ranging from one had valid frequencies as shown in table 2 and figure 6.

4.2.1 Job role

Based on the investment process discussed in chapter 2, two job roles were chosen as they are the ones involved in conducting due diligence and valuations of mining projects namely:

- i. Client relationship specialist
- ii. Credit specialist.

In the SPSS software, the client relationship specialist was assigned 1 as the code, and the credit specialist was assigned 2 as the code. In undertaking the analysis of data, the researcher aimed at obtaining frequencies to come up with a conclusion. Frequency tables and pie charts were used in the analysis of data. Table 5 and figure 7 shown below show the distribution of job roles among the participants.

Table 5: Participants Job Role

Job role	Frequency	Percent	Valid percent	Cumulative percent
Client relationship	23	65.7	65.7	65.7
Credit assessment	12	34.3	34.3	100
Total	35	100	100	

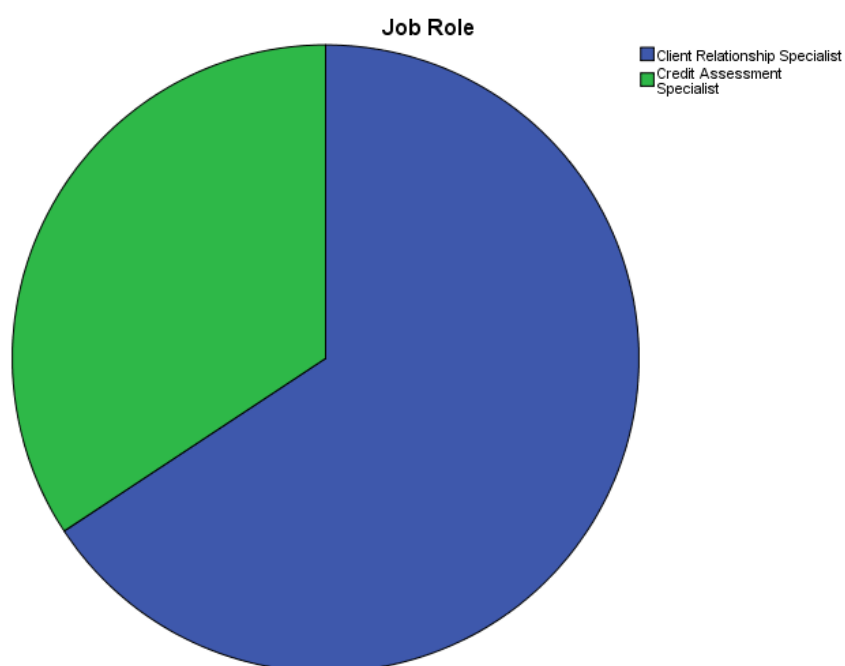


Figure 7. Participants Job Roles

From the frequency table and pie chart, 65.7% of the respondents were credit relationship specialists while 34.3% were credit assessment specialists. The distribution has more front office personnel than middle office personnel which is typical of a credit facility set up as more relationship personnel are required to source opportunities.

4.3 Level of Agreement on Due diligence and Skills Availability

On the level of agreement on various aspects were investigated namely:

- i. Importance of mine due diligence in debt financing of mineral projects.
- ii. The due diligence team should have geological experts.
- iii. The due diligence team should have mining engineering experts.
- iv. The due diligence team should have metallurgical experts.
- v. The due diligence team should have human resources experts.
- vi. The due diligence team should have legal experts.
- vii. The due diligence team should have financial experts.
- viii. The due diligence team should have commercial experts.
- ix. The due diligence team should have environmental experts.
- x. Valuation of mineral assets should be done by competent valuers

To analyse the responses, the researcher used the coding system as follows: some strongly agreed (coded as 1), agree (coded as 2), neutral (coded as 3), disagreed (coded as 4) and strongly disagreed (coded as 5). The researcher used frequency tables and bar graphs as shown below.

4.3.1 Importance of mine due diligence

To analyse the data concerning the various levels of agreement on the importance of due diligence, participants had one position as shown in table 6 and Figure 8.

Table 6: Agreement on the Importance of Due Diligence

Agreement level	Frequency	Percent
Strongly disagree	0	0
Disagree	0	0
Neutral	0	0
Agree	0	0
Strongly Agree	35	100

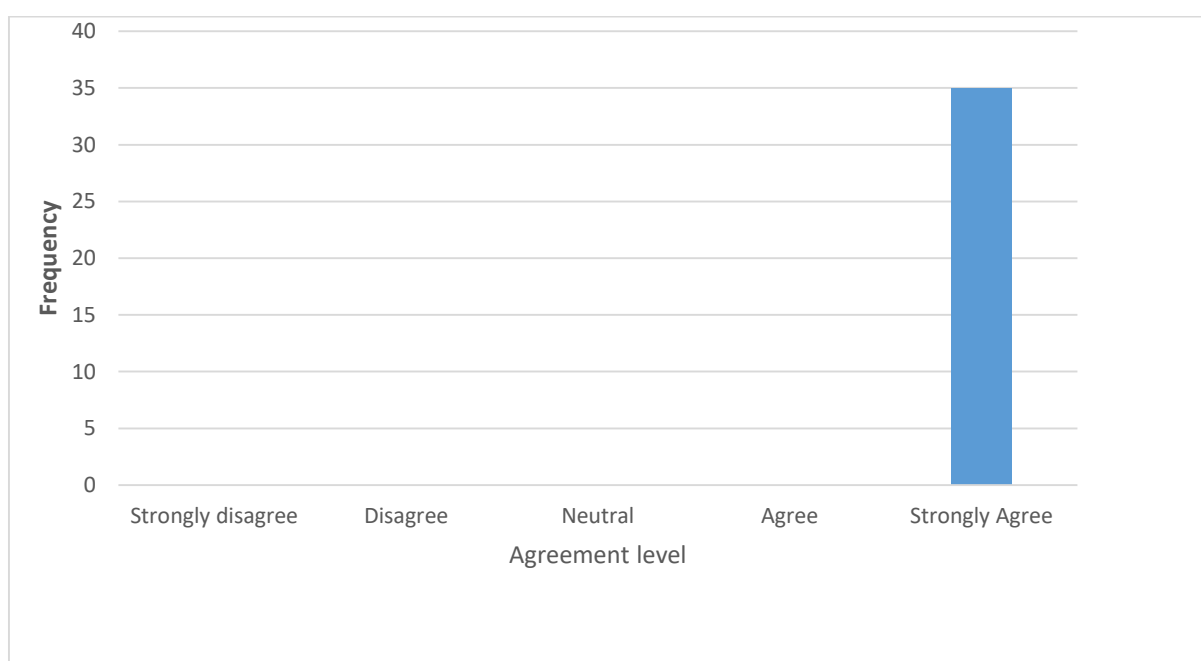


Figure 8. Agreement on the Importance of Due Diligence

From table 6 and figure 8, all the respondents strongly agree that mine due diligence is critical in debt financing of mineral projects. Butler (1994) points out that due diligence is a very critical step that should be done. Based on literature and findings from the study, the importance of mine due diligence in debt financing cannot be overemphasized.

4.3.2 Geological expertise in due diligence team

Geological expertise is responsible for conducting resource and reserve audits including geotechnical studies. Data analysis regarding levels of agreement on this aspect is shown in Table 7 and Figure 9.

Table 7: Agreement on Geological Expertise

Agreement level	Frequency	Percent
Strongly disagree	0	0
Disagree	0	0
Neutral	5	14.3
Agree	17	48.6
Strongly Agree	13	37.1
Total	35	100

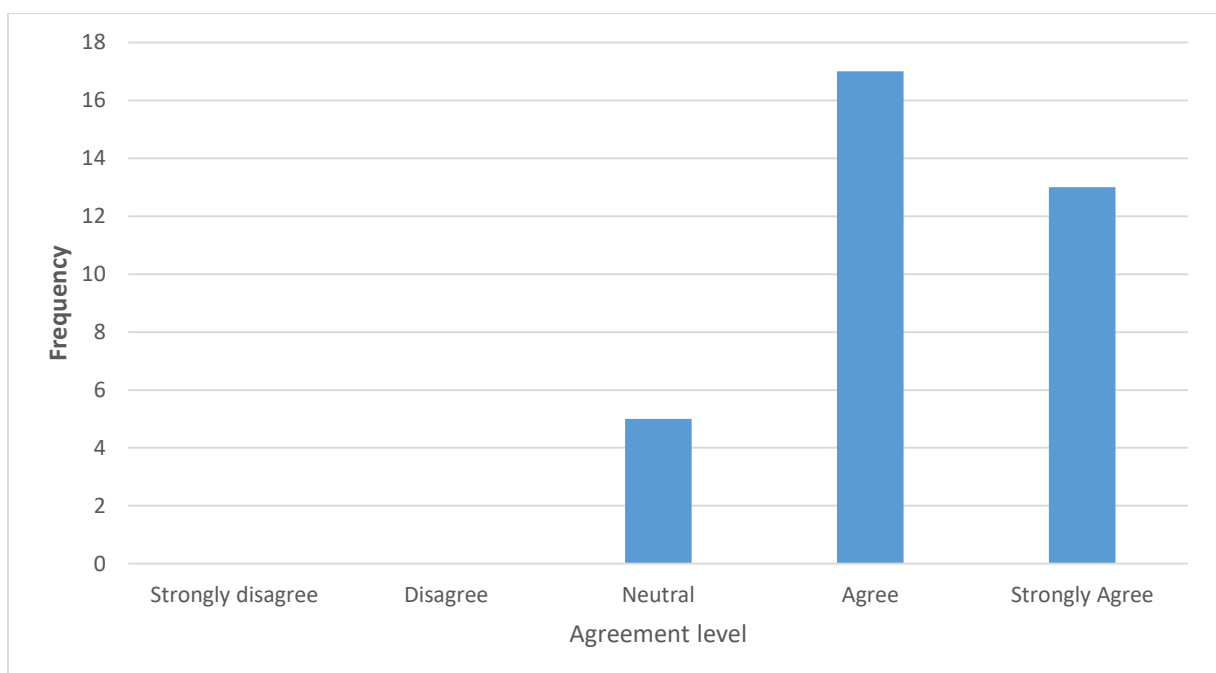


Figure 9. Agreement Level on Geological Expertise

From the information presented above, it is shown that 48.8% agree on the importance of having geological experts as part of the mine due diligence team. 37.1% of the respondents strongly agree while 14.3% are neutral.

Categories such as strongly disagree and disagree were displayed on the frequency table and graph showing zero responses. Henceforth justifying the importance of having geological experts as part of the mine due diligence team. Geological experts are ones involved in assessing the status of the mineral resource and Scriven (1999) Marcfalane (2019) points out that the mineral resource is the principal asset of the mining project hence the need to have geologists as part of the due diligence team.

4.3.3 Mining expertise in due diligence team

The mining expertise is one responsible for assessing mining data and costs. To analyse the data concerning the various levels of agreement on this aspect the researcher used a frequency table and bar graph as shown in Table 8 and Figure 10.

Table 8: Agreement level on Mining Expertise

Agreement level	Frequency	Percent
Strongly disagree	0	0
Disagree	0	0
Neutral	10	28.6
Agree	11	31.4
Strongly Agree	14	40
Total	35	100

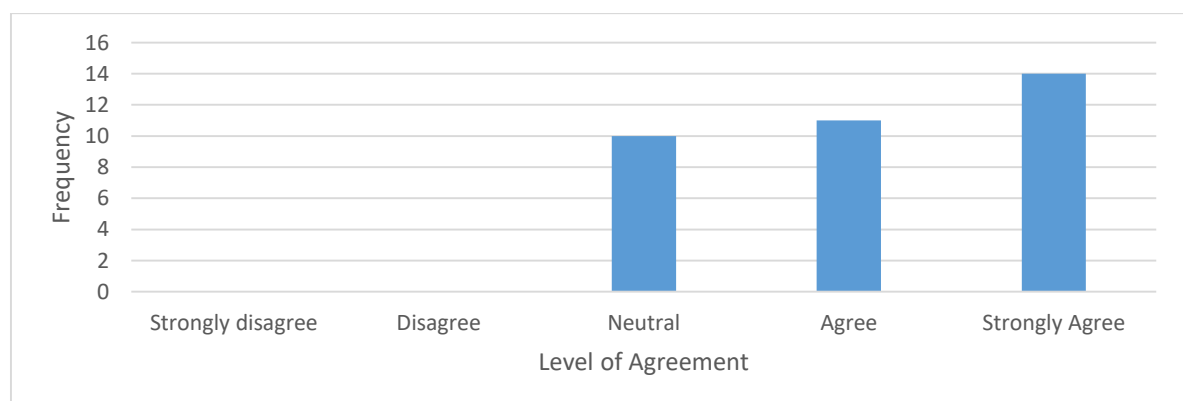


Figure 10. Agreement Level on Mining Experts

Figure 10 and Table 8 show the different agreement levels from participants on the need for mining experts in a due diligence team. About 40% of the respondents

strongly agree while 31.4% of respondents agree and 28.6% are neutral. Although 28.6% of the practitioners remained neutral, Sriven (199) points out that mining expertise is key in assessing mining projects hence it is therefore important for the due diligence team to have mining experts.

4.3.4 Metallurgical expertise in due diligence team

The metallurgical expertise is one responsible for assessing plant data and processing costs. To analyse the data concerning the various levels of agreement on this aspect the researcher used Table 9 and Figure 11 below.

Table 9: Agreement Level Metallurgical Experts

Agreement level	Frequency	Percent
Strongly disagree	1	2.9
Disagree	0	0
Neutral	3	8.6
Agree	19	54.3
Strongly Agree	12	34.3
Total	35	100

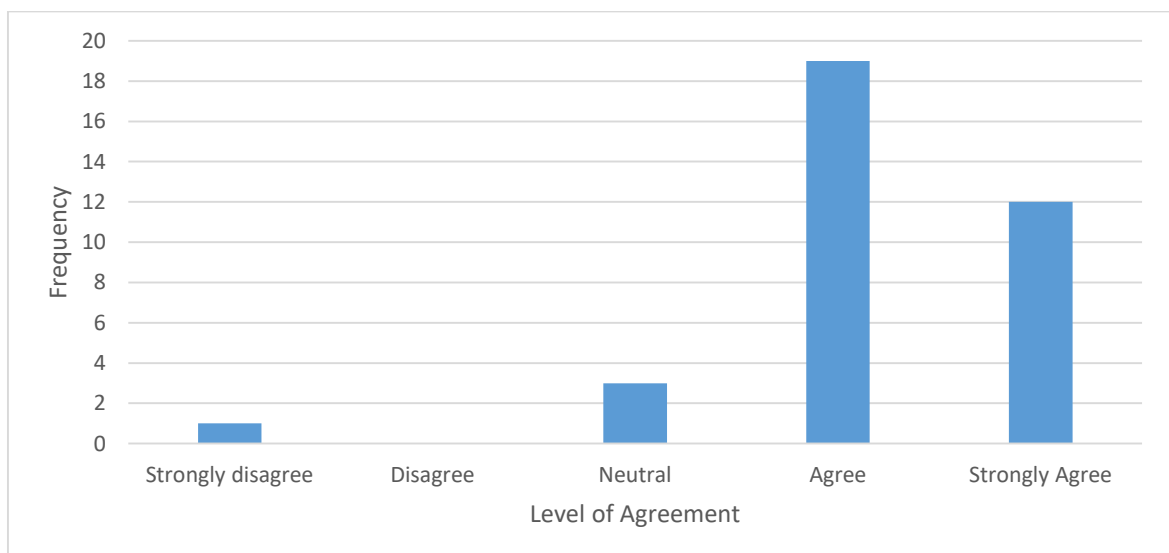


Figure 11. Agreement Level on Metallurgical Expertise

From the information presented above, 54.3% of the respondents agreed while 34.3% strongly agree on the need for metallurgists. Only 8.6% of the respondents were

neutral and only 2.9% of the respondents strongly while none of the participants disagreed. Hence from the responses obtained, the need for metallurgical experts as part of mine due diligence team is of high importance. Buntzen (1999) argues that process engineers and metallurgists must be part of the due diligence team.

4.3.5 Human resources experts in due diligence team

The human resources expertise conducts assessment on human resources strategy and structure, payroll taxes, and employee welfare. To analyse the data concerning the various levels of agreement on this aspect the researcher used a frequency table and bar graph as shown in Table 10 and Figure 12.

Table 10: Agreement Level on Human Resources Expertise

Agreement level	Frequency	Percent
Strongly disagree	0	0
Disagree	0	0
Neutral	23	65.7
Agree	10	28.6
Strongly Agree	2	5.7
Total	35	100

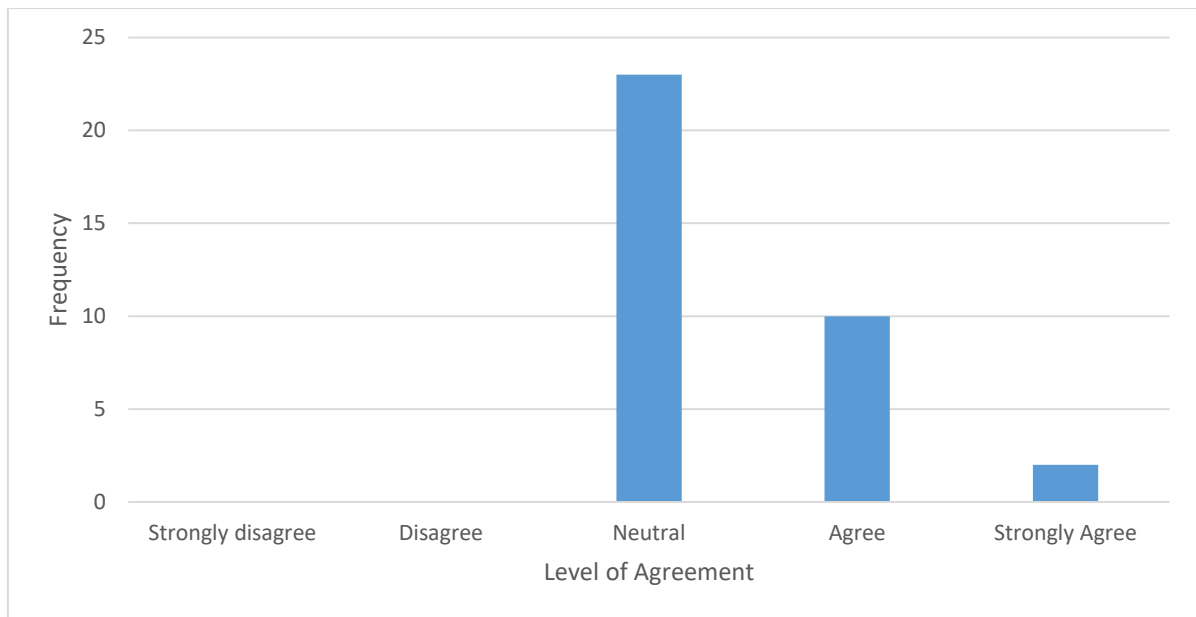


Figure 12. Agreement level on Human Resource Expertise

In the above presentation of data, 5.6% of the respondents strongly agree while 28.6% of the respondents disagree and the bulk of respondents (65.7%) are neutral. Categories of strongly disagree and agree recorded zero percentages. From the responses obtained, it is argued that having human resources experts as part of a due diligence team is not of great importance however Humpries (1999) points out that people are the business, and adequacy of competencies must be assessed.

4.3.6 Legal experts in due diligence team

Legal expertise is required in due diligence to assess ownership issues, pending legal litigation matters, review of legal agreements. To analyse the data concerning levels of agreement on this aspect the researcher used Table 11 and Figure 13 shown below:

Table 11: Agreement Level on Legal Expertise

Agreement level	Frequency	Percent
Strongly disagree	19	54.3
Disagree	0	0
Neutral	9	25.7
Agree	1	2.9
Strongly Agree	6	17.1
Total	35	100

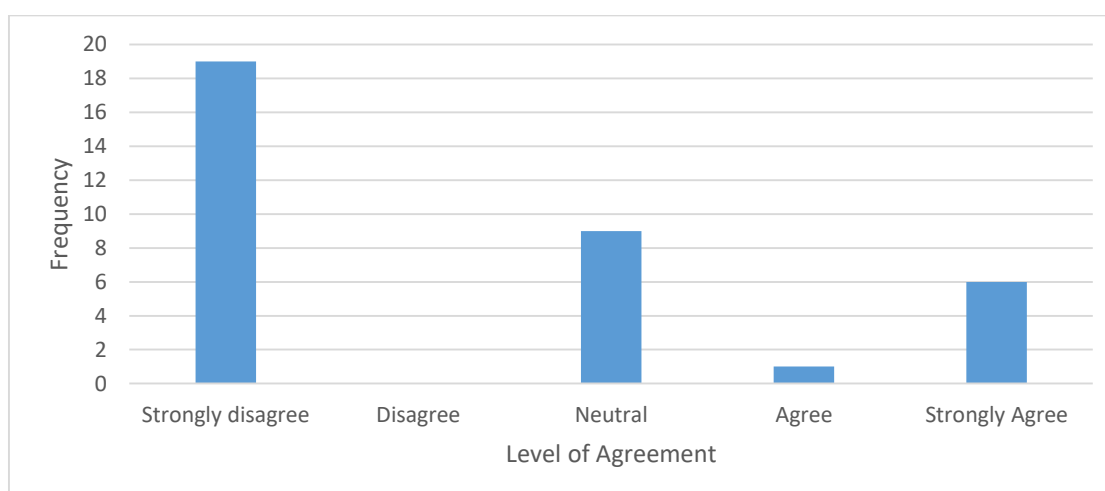


Figure 13. Agreement Level on Legal Expertise

The frequency table shows that 54.3% of the respondents strongly disagree that the due diligence team should have legal experts. Only 17.1% of the respondents strongly agreed while 25.7% of the respondents were neutral and 2.9% agreed. Based on the above data, it is very clear that the aspect of having legal experts as part of a due diligence team is of little importance.

4.3.7 Financial expertise in due diligence team

Financial expertise reviews the financial performance and position of the company. To analyse the data on the various levels of agreement on this aspect the researcher used Table 12 and Figure 14 shown below:

Table 12: Agreement Level on Financial Expertise

Agreement level	Frequency	Percent	Valid percent	Cumulative percent
Strongly disagree	0	0	0	0
Disagree	0	0	0	0
Neutral	5	14.3	14.3	14.3
Agree	26	74.3	74.3	88.6
Strongly Agree	4	11.4	11.4	100
Total	35	100	100	

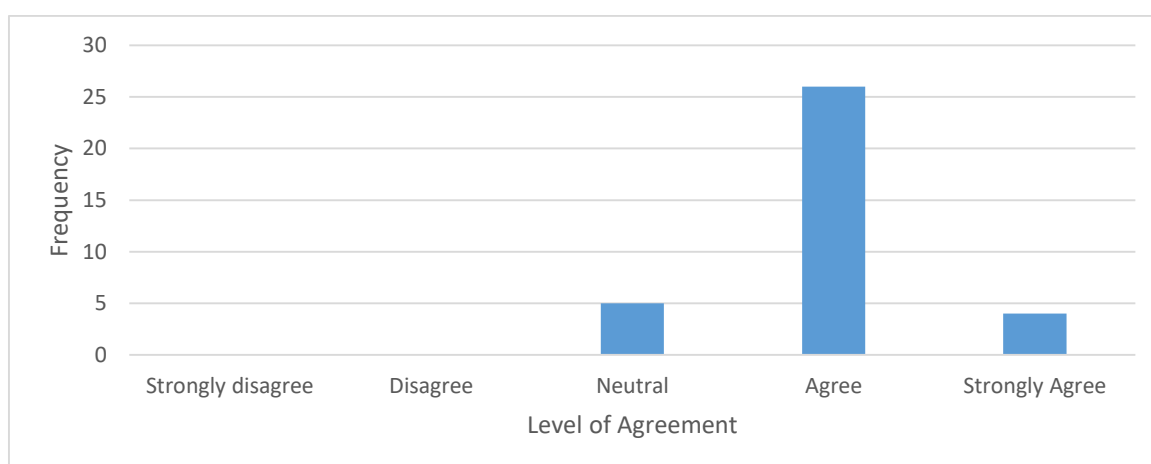


Figure 14. Agreement Level on Financial Expertise

Based on the information presented above, 74.3% of the participants agree to the fact that the due diligence team should have financial experts; 11.4% strongly agree and 14.3% are neutral. Therefore, one can give a conclusion based on the statistics provided that the aspect of the due diligence team having financial experts is of high importance. The other categories such as strongly disagree and disagree on the recorded zero percentages. Therefore, one is justified to argue that, having financial experts in a due diligence team is of high importance. National Association of Certified Valuators and Analysts (2015) points out that financial analysis is very important as it assists in assessing the potential of the business.

4.3.8 Commercial expertise in due diligence team

Commercial expertise assesses the competitiveness of the company relative to its peers in the industry. To analyse the data concerning the various levels of agreement on this aspect the researcher used Table 13 and Figure 15 shown below:

Table 13: Agreement Level on Commercial Expertise

Agreement level	Frequency	Percent
Strongly disagree	0	0
Disagree	0	0
Neutral	5	14.3
Agree	28	80
Strongly Agree	2	5.7
Total	35	100

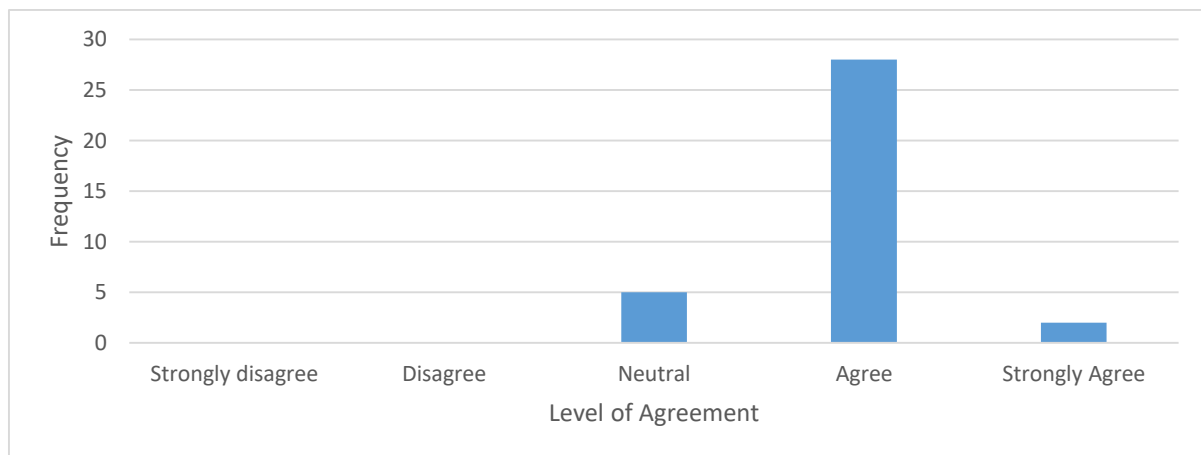


Figure 15. Agreement Level on Commercial Expertise

The processed data presented above shows that 80% of the respondents strongly agreed to a having commercial expert while 5.3% strongly agreed and about 14.7% remained neutral. No respondents strongly disagreed or disagreed. Therefore, it can be argued that it is very important for a due diligence team to have commercial experts.

Mangi (2016) points out that the commercial due diligence touches on the competitiveness of the target hence the need for commercial due diligence to be done.

4.3.9 Environmental expertise in due diligence team

The environmental expertise deals with compliance of the organization to applicable environmental laws. To analyse the data concerning the various levels of agreement on this aspect the researcher used table 14 and Figure 16 shown below:

Table 14: Agreement Level Environmental Expertise

Agreement level	Frequency	Percent
Strongly disagree	0	0
Disagree	0	0
Neutral	9	25.7
Agree	13	37.1
Strongly Agree	13	37.1
Total	35	100

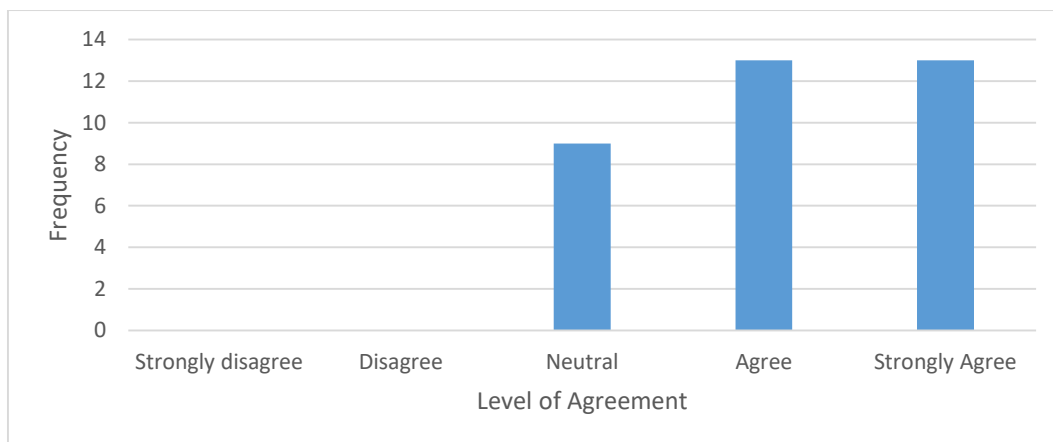


Figure 16. Agreement Level on Environmental Expertise

Table 14, shows that 37.1% of the respondents, agree and strongly agree. This means that in total those who agree and strongly agree are 74.2% which clearly shows the importance of environmental experts as part of the due diligence team. No respondents either disagreed or strongly disagreed which justifies the importance of environmental experts as part of the due diligence team. Scriven (1999) points out that mining

businesses must comply with environmental laws to get the social license to operate hence the need for environmental due diligence.

4.3.10 Competent valuers in mine due diligence

Marcfalane (2017) argues that competent valuers are responsible for building valuation models required to justify debt financing. Various levels of agreement on this aspect are shown in Table 15 and Figure 17 below.

Table 15: Agreement Level on Competent Valuers

Agreement level	Frequency	Percent
Strongly disagree	0	0
Disagree	0	0
Neutral	1	2.9
Agree	12	34.3
Strongly Agree	22	62.9
Total	35	100

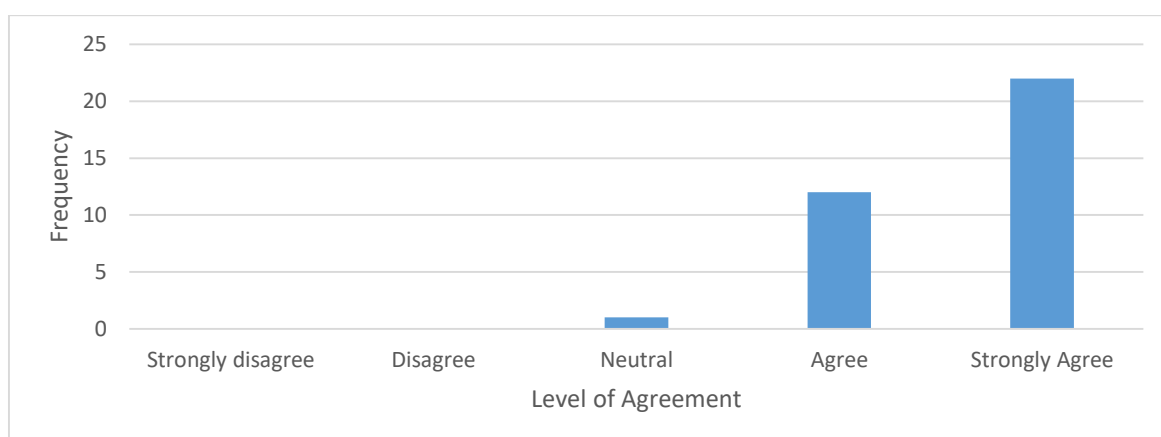


Figure 17. Agreement Level on Competent Valuers

Table 15 shows that 62.9 % of the respondents strongly agreed while 34.3% agreed with this view. Based on the various responses from the survey participants, one can argue that competent mineral asset valuers should be part of the mine due diligence team to undertake the valuation of mineral assets. No respondents disagreed which

clearly shows that competent mineral asset valuers are required in a due diligence team.

4.3.11 Competencies in financial institutions in Zimbabwe

Financial institutions must possess the right mix of skills to originate and structure successful deals. To analyse the data concerning the various levels of agreement on this aspect the researcher used Table 16 and Figure 18 shown below:

Table 16: Agreement Level on Skills Availability

Agreement level	Frequency	Percent	Valid percent	Cumulative percent
Strongly disagree	13	37.1	37.1	37.1
Disagree	1	2.9	2.9	40
Valid Neutral	12	34.3	34.3	74.3
Agree	7	20	20	94.3
Strongly Agree	2	5.7	5.7	100
Total	35	100	100	

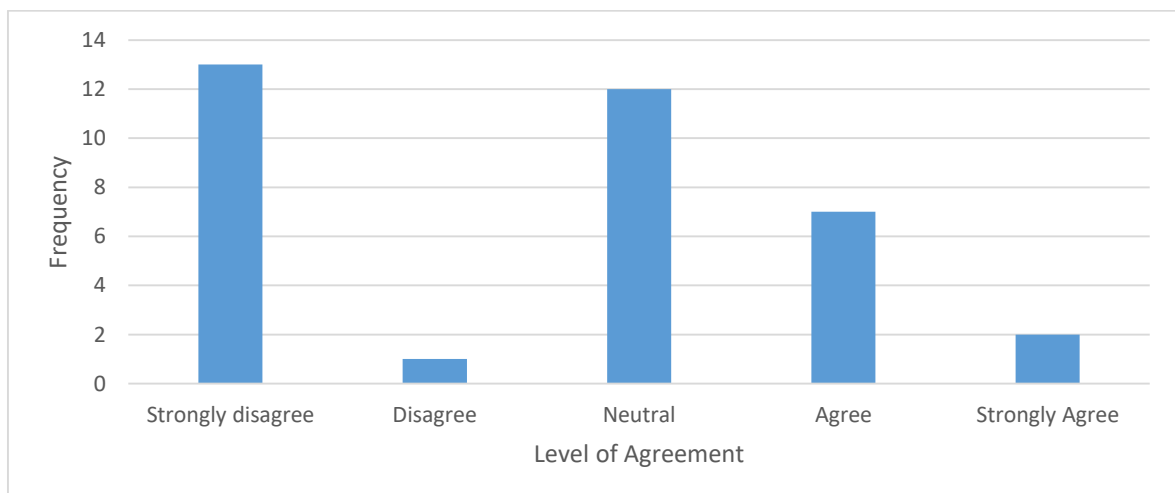


Figure 18. Agreement Level on Skills Availability

Table 16 shows the responses from participants regarding competencies in financial institutions in Zimbabwe. The table shows that 37.1% of the respondents disagree; 34.3% remained neutral; 5.7% agreed while 20% strongly agreed. With 34.3% of

respondents being neutral, financial institutions cannot give a clear position as to whether they have the right skills to undertake mine due diligence and financial valuations.

4.4 Interviews and Focus Group

Five structured interviews were conducted with 3 executives who indicated they had more than 25 years of experience in the banking and mining finance sector. Focus group interviews were done and the responses are shown in table 17 below:

Table 17: Focus Group Responses

Investigation area	Executives response	Focus Group response
Importance of mine due diligence	executives pointed out that failure to undertake due diligence is the first step of transaction failure in mining finance however executives pointed out that the mining sector is so unique and as such needs the right skills.	All the respondents indicated that without conducting due diligence justification of funding will be difficult and there is no way risks can be known.
Composition of due diligence team	executives pointed out that the team should be properly constituted and	focus groups pointed out that although financials are important, the due

	it is advised to engage mining investment advisory firms to assist in that.	diligence team should be made up of mining professionals as well.
Skills availability in Zimbabwe	Executives pointed out due to skills flight affecting the country, financial institutions in Zimbabwe do not have a complete skill set required to run and manage the mining finance portfolios, especially at the deal origination level.	The focus groups pointed out that due shortage of skills funders should outsource from consultancy firms in the region.

4.5 Summary of Chapter 4

Chapter 4 discussed the data analysis tools used by the researcher, which includes frequency tables, bar graphs, and pie charts. These tools were used to display levels of agreements on various expertise needed in a mine due diligence team and availability of competencies in financiers operating in Zimbabwe.

5 CONCLUSION AND RECOMMENDATIONS

5.1 Overview of Chapter 5

This chapter focuses on the conclusions drawn from the research study. These conclusions are based on the following focus areas:

- i. Importance of mine due diligence in debt financing.
- ii. Skills set that should constitute a mine due diligence team.
- iii. Importance of competent mineral asset valuers.
- iv. Availability of skills in financial institutions in Zimbabwe.

5.2 Importance of Mine Due Diligence in Debt Financing

The executives who participated in interviews and focus groups stressed the importance of mine due diligence in debt financing. They pointed out that, failure to undertake due diligence is the first step of transaction failure in mining finance. Therefore, according to these study participants, the mining sector is so unique and as such needs mine due diligence to be done in debt financing. This is justified by the survey results.

5.3 Set of Skills to Constitute a Mine Due Diligence Team

The research has proved that mining due diligence should be done by a team of experts. The surveys conducted involved interviews, focus group discussions have shown the same results where respondents agreed that expertise in every area concerning mining due diligence is very crucial. They also had a common view that the due diligence team should have geological experts, mining engineering experts, metallurgical and mineral processing experts, financial experts, commercial experts, and environmental experts. This is supported by Scriven (1999) who postulated that

mining due diligence should be done by mining personnel who possesses knowledge of the mineral deposits.

Respondents also supported the view that the mine due diligence team should have financial experts. These are critical as they focus on other key issues such as financial statement analysis and the tax position of the company. The National Association of Certified Valuers and Analysts (2015) points out that financial statement analysis is one of the most important steps in gaining an understanding of the historical, current, and/or potential profitability of a company.

Respondents had a mixed view on the importance of having environmental experts and legal experts in the due diligence team. Most of them agreed to the need for having environmental experts. 54,3% of the respondents disagreed on the need for legal experts as part of the due diligence team 2,9 % of the respondents agreed and saw the importance.

This implies that there is a knowledge gap concerning the importance of legal expertise in due diligence mining and debt financing which needs attention. This is justified by scholars like Hayes (1999) who argued that laws affect every area of a business hence the need to conduct legal due diligence reviews focusing on legal ownership, compliance to environmental laws, compliance to permits, tariffs, and quotas, tax holidays, repatriation of profits, litigation cases, statutory regulations, business contracts. Furthermore, the study has shown that the importance of human resources experts as part of the due diligence team is not very important as shown by the 5,7% (2 out of the 35 respondents where n=35) of those who agree to its importance vis-a-vis 10 respondents (28.6%) disagree and the bulk of respondents (65.7%) are neutral. The frequencies of agreement levels showed that the fact that the due diligence team should have human resources experts is not of great importance. However, Humphries

(1999), argues that human resources are one of the critical areas to be paid attention to for the long-term success of an organization. For an organization to achieve its intended objectives, the need for a skilled and experienced labor force cannot be overemphasized.

5.4 Importance of Competent Mineral Asset Valuers

There were mixed views on the importance of competent mineral asset valuers. From the frequencies presented, 62.9% strongly agree and 34.3% agree that competent mineral asset valuers must be part of the due diligence team. Based on the various responses from the study, only competent mineral asset valuers should do the valuation of mineral assets. This was also the same view from other respondents who participated in focus groups and interviews.

Poal Code (2008) points out that mineral deposit valuation is a separate area of expertise, and it requires knowledge and experience in geology, mining engineering, mineral processing, and corporate finance.

5.5 Skills Availability in Financial Institutions in Zimbabwe

Respondents in this survey acknowledged the existence of an expertise gap in the area of due diligence and valuation of mineral assets.

The respondents pointed out that, due to skills flight, financial institutions in Zimbabwe do not have the skills set required for a complete due diligence team. 20% of the respondents strongly agree while 5.7% agree with this view. This is a clear indication of the lack of these skills in Zimbabwe. Therefore, it can be generally said that financial institutions in Zimbabwe need to train or attract the skills required to undertake mine due diligence and financial valuations

In conclusion, the Zimbabwe financial services sector highly appreciates the need for due diligence before financing however there are mixed practitioner views regarding the composition of a due diligence team. For Zimbabwe to position itself very well, it must adopt global best practices. Gillette (2005) argues that the due diligence team will usually comprise a geologist, mining engineer, metallurgist, environmental financial, and commercial specialists. Gillette (2005) further points out that The team may also include other specialists if specific issues are foreseen such as geotechnical or social issues.

5.6 Recommendations

Based on the findings of the study, the following actions are recommended by the researcher:

- i. Mining schools should start offering professional development courses in mine due diligence and investment finance to close the existing skills gap.
- ii. Banks should appreciate that mining investments are unique and investing in this space requires the right skills hence banks should employ mining investment specialists.
- iii. Financial institutions should do internal training or outsource skills and expertise in the region to remain fully functional because due to brain drain most people who are experts are no longer available in the country
- iv. Banks to consider the need for legal and human resources experts as part of the mine due diligence team.

5.7 Research for Future Work

- i. Mining schools, business schools, and financial institutions in Zimbabwe must collaborate and investigate if their curriculum equips students with knowledge on mining investment finance.
- ii. Feasibility for the establishment of a minerals development bank in Zimbabwe

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APPENDIX A

Table A- 1: Questionnaire for Mining Credit Managers

Q1: Indicate your banking and mining finance experience

0 - 5	5- 10	10 - 15	15 -20	20 -25	25 - 30	30-35	35 - 40	40+

Table A-2: Questionnaire of Job Role

Q2: Indicate your job role

Client Relationship Specialist	Credit Assessment Specialist

Table A- 3: Questionnaire on levels of agreement

Q3 Please indicate your level of agreement or disagreement with each of these statements by ticking the box of your answer.

Item	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Mine due diligence is critical in the debt financing of mineral projects					
2	The due diligence team should have geological experts					
3	The due diligence team should have mining engineering experts					
4	The due diligence team should have metallurgical and mineral processing experts					
5	The due diligence team should have human resources experts					
6	The due diligence team should have legal experts					
7	The due diligence team should have financial experts					
8	The due diligence team should have commercial experts					
9	The due diligence team should have environmental experts					
10	Valuation of mineral assets should only be done by competent mineral asset valuers					
11	Financial institutions in Zimbabwe have the right skills to undertake mine due diligence and financial valuations					

Table A-4: Questionnaire on skills availability

Q4 Does your institution have the above skills?

Yes	No

APPENDIX B

STRUCTURED INTERVIEW QUESTIONS

1. What is the number of experience you have in mining finance?
2. Are you into client relationship management or credit management?
3. What is your view on the need to undertake due diligence and valuation before extending a credit facility to the lender?
4. What do you think should constitute the technical due diligence team for a mining transaction?
5. What do you think should constitute the non-technical due diligence team for mining transactions?
6. In your view who should do the valuation of mineral assets for debt financing?
7. Do you think financial institutions in Zimbabwe have the requisite skills required to undertake due diligence and valuation of mineral assets?