CHINHOYI UNIVERSITY OF TECHNOLOGY

Funding models for gold productivity from artisanal and small-scale gold mines in Zimbabwe

By

Last Matsiwira

C19140307E

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Main Supervisor: Dr T.J Mabvure

Co– Supervisor: Prof O Sifile

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Approval Form

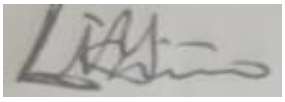
The undersigned certify that they have read and recommended to the Directorate of the Research and Graduate Studies, School of Entrepreneurship and Business Sciences, Chinhoyi University of Technology Zimbabwe, for acceptance a thesis entitled **"Funding models for optimum gold production from artisanal and small-scale gold mines in Zimbabwe"**, submitted by Last Matsiwira in fulfillment of the requirements for the Doctor of Philosophy Degree in Finance

Names of Supervisors

Dr. T.J. MABVURE	PROF. O. SIFILE
	
……..	…….
Signatures	
15 July 2022	15 July 2022
Date	

Declaration

I, Last Matsiwira student number C19140307E do hereby declare that this DPhil research thesis, submitted to the Directorate of Research and Graduate Studies, School of Entrepreneurship and Business Sciences of Chinhoyi University of Technology, Zimbabwe entitled: "**Funding models for optimum gold production from artisanal and small-scale gold mines in Zimbabwe**", is my own effort and is a reflection of research executed by me. This study has not been submitted for examination at this or any other university or institution.



15 July 2022 Chinhoyi

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Signature Date Place

Dedication

To Matsiwira family and my beautiful baby (Princess).

Acknowledgements

I do not have enough words to thank the Almighty God for giving me the opportunity, good health, wisdom and the strength to pursue this research. He has continuously given me courage during the course of the study up to the completion level. Had it not been for His love for me, this piece of work would not ever have been done. The revelation and understanding He has given me throughout this research are worth acknowledging.

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Abstract

The main objective of this research was to determine the best funding model(s) that would help Artisanal and Small-Scale Gold Mines achieve optimal gold productivity. The study noted that there was poor funding from RBZ and financial institutions which is affecting gold productivity. The study used the mixed approach guided by pragmatism philosophical thinking which included both quantitative and qualitative data collection techniques to have a balanced analysis. The survey design was employed and data was collected using questionnaires and an interview guide. For this study, three hundred and six (306) participants were selected using the random sampling method to answer the questionnaire using the Krejcie and Morgan Model (1970). The researcher also carried out interviews up to saturation point and thirty-one (31) mine owners were conducted. The participants who have taken part in the interviews were not selected to answer questionnaires. The study used exploration sequential mixed method research design to collect the data. The major findings of the study are: ASSGM used internal and external funding models. For ASSGM in Zimbabwe to achieve optimum gold production the following internal and external funding mechanisms should be employed: internal (personal savings and owner capital), external (private funding, tribute system, joint ventures cooperatives and partnerships). The study also noted that there was very weak association between government and other agencies support and gold productivity and the weak association was insufficient. The low use of funding from banks was mainly due to lack of collateral, lack of formalisation, non-availability of nearby banks, lack of paperwork required by banks and that other miners never visited banks looking for funding. The only financial players who were available to Artisanal and Small-Scale Gold Miners were microfinances and most ASSGM in Zimbabwe shunned them due to high interest rates. The major causes of ASSGM sector not to access funding from Ministry of Mines Industrial Loan Fund (MILF), Reserve Bank of Zimbabwe (RBZ) and Fidelity Printers and Refineries (FPL) was due to requirements that every miner had to meet. The study concluded that artisanal and small-scale gold miners needed both financial and non-financial assistance from the government. On non-financial assistance that the miners needed were: Geological Survey Reports, Tittle Deeds, Hire Purchase shops which could sell mining equipment at subsidized prices and there was need to decentralise Fidelity selling points (mobile shops) in areas that artisanal and small-scale gold mining normally took place. The following policies could be implemented to the ASSGM sector: consistency in the payments for ASSGM, payment of miners using same price with international buyers, improvement of ASSGM asset quality (collateral) by offering them hire purchase shops, education of ASSGGM on knowledge of finance and the need for RBZ/FPR and MILF to review their funding requirements since some miners were failing to meet the requirements. On theoretical implications, the study further strengthened funding theories already existing which shows that small firms should be funded by least cost funding theories as was shown that most miners were using personal savings. On academic

implications the study helped to widen funding theory as information on funding models to artisanal and small-scale mines is still scanty. To advance theory of funding models for small scale firms, there was need to do the same research in the agriculture sector (small scale farmers) who were accessing different funding mechanisms from the government.

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Abbreviations and Acronyms

ASSGM	Artisanal and Small-Scale Gold Mining
ASM	Artisanal and Small-Scale Mining
EMA	Environmental Management Agency
EU	European Union
FPR	Printers and Refiners
MILF	Ministry of Mines Industrial Loan Fund
MMMD	Ministry of Mines and Mining Development
NGOs	Non-governmental Organisations
RBZ	Reserve Bank of Zimbabwe
UN	United Nations
UNDP	United Nations Development Programme
ZANU PF	Zimbabwe African National Union Patriotic Front
ZELA	Zimbabwe Environmental Law Association
ZMDC	Zimbabwe Mining Development Corporation
ZMF	Zimbabwe Miners Federation
MMSD	Mining, Minerals and Sustainable Development

CHAPTER ONE: INTRODUCTION

1.0 Introduction

The study investigated funding models that could lead to optimum gold production for Artisanal and Small-Scale Gold Mines (ASSGMs) in Zimbabwe. What motivated the researcher to do this study was the importance of Artisanal and Small-Scale Gold Mine (ASSGM) sector to the economy of Zimbabwe. According to the Reserve Bank of Zimbabwe (RBZ) Mid Term Monetary Policy Statement (2019), more than 60% of national gold output was from ASSGM sector. The Mining and Sustainable Development Report (2020) also revealed that artisanal and small-scale gold mines' gold output had exceeded the amount produced by large-scale gold producers. In Zimbabwe through the country's biggest representatives of small-scale and artisanal miners, Zimbabwe Miners Federation (ZMF), it was estimated that around 50 000 small-scale miners were registered by the body with each employing at least ten workers (Zimbabwe Mining Sector Situational Report, 2020). It is estimated that there were almost 500,000 ASSGMs in Zimbabwe and of these only 16% were registered whilst 84% remained unregistered (Mines and Minerals Regulation Act Chapter 21:05). The Mining Sector Situational Report (2020) discovered that both registered and unregistered artisanal small-scale miners had over one million people benefiting directly and over three million benefiting indirectly from ASSGM which made this sector very important in employment creation since Zimbabwe had unemployment challenges.

According to Zimbabwe Ministry of Mines and Mining Development (2020), it is estimated that Zimbabwe had more than 4000 gold deposits and that gold mining started in the seventh century and that of more than 4000 present-day gold deposits, almost all were located on ancient workings done through small scale mining and exploration. The potential for growth of this sector was supported by the Mining Development Minister, Hon Winston Chitando who said that his ministry was relying on small scale mining gold sector for the industry to achieve 100 tonnes of gold annually by 2023 because Zimbabwe's geology entails that there were some mineral deposits that were not economically viable for mining by big conglomerates (Ministry of Mines and Mining Development, 2020). The contribution of gold to national output, employment creation and the potential this sector had, made it important to the economy of Zimbabwe. Although this sector had shown its importance to the economy of Zimbabwe, it was affected by

funding challenges. Zimbabwe Ministry of Mines Internal Report (2020) revealed that the majority of ASSGM in the country were using their own meagre resources for capital to fund their operations. Information gathered shows that although there was government funding to ASSGM sector, this funding was not adequate for all artisanal and small-scale mines, a reason which motivated the researcher to find alternative sources of funding to this important sector (artisanal and small-scale gold mines) that would lead to optimum gold production. Funding for mining ventures is core to the full realization of the full mining capacity of Zimbabwe's mineral resources towards achieving optimum Gross Domestic Product. This chapter presents background of the study, statement of the problem, research objectives, research questions, research hypotheses, assumptions, significance, delimitations, limitations of the study, motivation of the study and the structure of the thesis.

1.1 Background of the Study

A funding model is a methodical and institutionalised approach to building a reliable revenue base that will support an organization's core programs and services (Kim *et al.,* 2011). ASSGM is a formal or informal process mainly done with basic forms of assessment, mining, processing and transportation. Artisanal and Small-Scale Mining normally use low capital and high labour-intensive technology due to lack of finance to acquire equipment (Organisation for Economic Co-operation and Developments, 2016). Artisanal and Small-Scale Mining can include men and women working on an individual basis as well as those working in family groups, in partnership or as members of cooperatives or other types of legal associations and enterprises involving hundreds or thousands of miners (Organisation for Economic Co-operation and Developments, 2016). The difference between artisanal miners and small-scale miners is: "Artisanal miners" are usually individuals or family members involved in very small-scale manual mineral extraction without legal mining title, whereas 'small-scale miners' usually have legal mining title and their operations are larger and more mechanized (Mining, Minerals and Sustainable Development, [MMSD], 2002).

Artisanal and Small-Scale Gold Mines (ASSGMs) sustained the livelihood of at least two million people in Zimbabwe directly and indirectly through ancillary services and secondary economic activities (Maponga & Ngorima, 2003). Artisanal and Small-Scale Mining in

Zimbabwe was mainly driven by the decline in agriculture, economic crisis and often poverty in rural areas (MMSD, 2003). Miners were generally unskilled and earned very little. Individuals were involved in different types of Artisanal and Small-Scale Mining activities like gold or diamond, which were characterized by unstable communities which were prone to conflict (MMSD, 2003). ASSGM started in the early 1990s in Zimbabwe. It started along the Great Dyke and it later spread to all corners of the country due to the economic crisis, it became a viable livelihood strategy among poor families due to uncertainty and anxiety which characterised the Zimbabwean economic landscape (Murwendo *et al.,* 2011). The increase in small scale gold mining was enhanced by closure of large-scale gold mines due to operational costs which were high and political instability (Murwendo *et al.,* 2011). Many small- and large-scale mines in Zimbabwe had financial challenges which were causing them to contribute less to the economy. The need for funding to ASSGM was supported by the (Zimbabwe Mining Magazine, 2020). It claimed that to ensure that growth and viability were maintained, there was need for capital investment in the mining sector. The mining sector needed more than US$7 000 000 000 to recapitalise their processes for 5 years (Chamber of Mines of Zimbabwe [CoMZ], 2020). Another observation by CoMZ (2020) was that the major problem facing ASSGM sector was that banks were not offering long term capital to the ASSGM sector. This made it difficult for ASSGM to acquire loans for recapitalisation, sustain operations or undertake new projects. CoMZ (2020) discovered that most big and small-scale mines had to replace outdated machinery that had become unproductive and costly to maintain. CoMZ (2020) recommended that RBZ could offer cheap funding for both small and big producers. The minimum capital investment needed for operations by artisanal and small-scale gold panning groups was between US$10,000 and US$15,000 per 20 artisanal and small-scale gold panners to buy basic mining tools (Pact and the Institute for Sustainability Africa, 2015). This therefore meant for one to enter into artisanal and small-scale gold mining at least US$500 was needed. Pact and the Institute for Sustainability Africa (2015) went on to say that to have the machinery needed to set up ASSGM operations, the miners required capital in excess of US$12,300. According to United Nations Industrial Development Organization (UNIDO) (2018) basic mining tools are rudimentary tools like pans, pickaxes, shovels, spades, hammers and chisels.

Planet Gold Report (2020) revealed that for ASSGM to operate properly they needed a loan of US$10,000 to acquire items like a pump which is used to remove water from a water logged mine, whilst US$1.5 million was needed for machinery at the plant serving several ASSGM enterprises. These amounts cited by Pact and the Institute for Sustainability Africa (2015) and Planet Gold Report (2020) did not include registration fee, milling license, use of explosives fees, Environmental Management Agency (EMA) fees, Rural District Councils fees and Zimbabwe Electricity Supply Authority (ZESA) fees. Zimbabwe Mining Newsletter (2020) revealed that the Ministry of Mines and Mining Technology in 2017 forfeited over 1000 small gold mining claims in the country's Matabeleland North province after miners failed to pay an inspection fee of US$100 within six months of starting operations. This means that there was need for funding in the artisanal and small-scale gold mining activities. Certain funding models were applied to this sector in Zimbabwe with little success. The efforts done by Government through Mining Industry Loan Fund (MILF) and RBZ through Fidelity Printers and Refineries (FPR) in funding ASSGM have proved not to be enough for this sector. The donor funding, funding from formal financial institutions and personal funding had failed to sustain ASSGM sector. According to Zimbabwe National Budget (2015), the government raised US$100 million loan facility to support small-scale miners in the country.

The Government had an agreement with China's Xuzhou Construction Machinery Group for the provision of small-scale mining equipment on credit. It also proposed to have tax incentives to financial institutions accepting geologically-surveyed claims as collateral for small-scale miners' borrowing requirements. However, this loan facility did not yield fruits, Mines and Mining Development Deputy Minister Moyo noted that the ministry opted to reduce the funding to be sourced from the Chinese firm after government struggled to meet it's 30% bargain of the deal requirements for the service charges (Nsingo,2021). The deputy minister further revealed that though the deal was still available, no small-scale gold miners were yet to benefit due to security issues. The miners then preferred the fund to be disbursed in small trenches (Nsingo, 2021). Nsingo (2021) noted that the government of Zimbabwe through Sakunda Energy partnered with the Ministry of Mines and Mining Development, Ministry of Industry and Commerce, Environmental Management Agency and Zimbabwe School of Mines in pursuit of uplifting small-scale gold miners in Bulawayo. The Government was offered ZWL$ 50 million loan

funds. The fund was disbursed to these companies that were manufacturing mining and mineral processing machinery for ASSGM. This was done to capacitate them and to improve their production. Each ASSGM got equipment worth ZWL$200 000 payable in 3 years. They would also get ZWL$15 000 which they would use to buy raw materials such as protective clothing and other things which were necessary at the mines. The funding was for Bulawayo small scaler gold miners only and was only sufficient enough for basic artisanal and small-scale gold mining as was noted by Planet Gold Report (2020) that it needs least US$ 1 million to set a plant that service other ASSGM. Fig 1.1 shows gold productivity and funding from artisanal and small-scale gold miners and large-scale gold miners

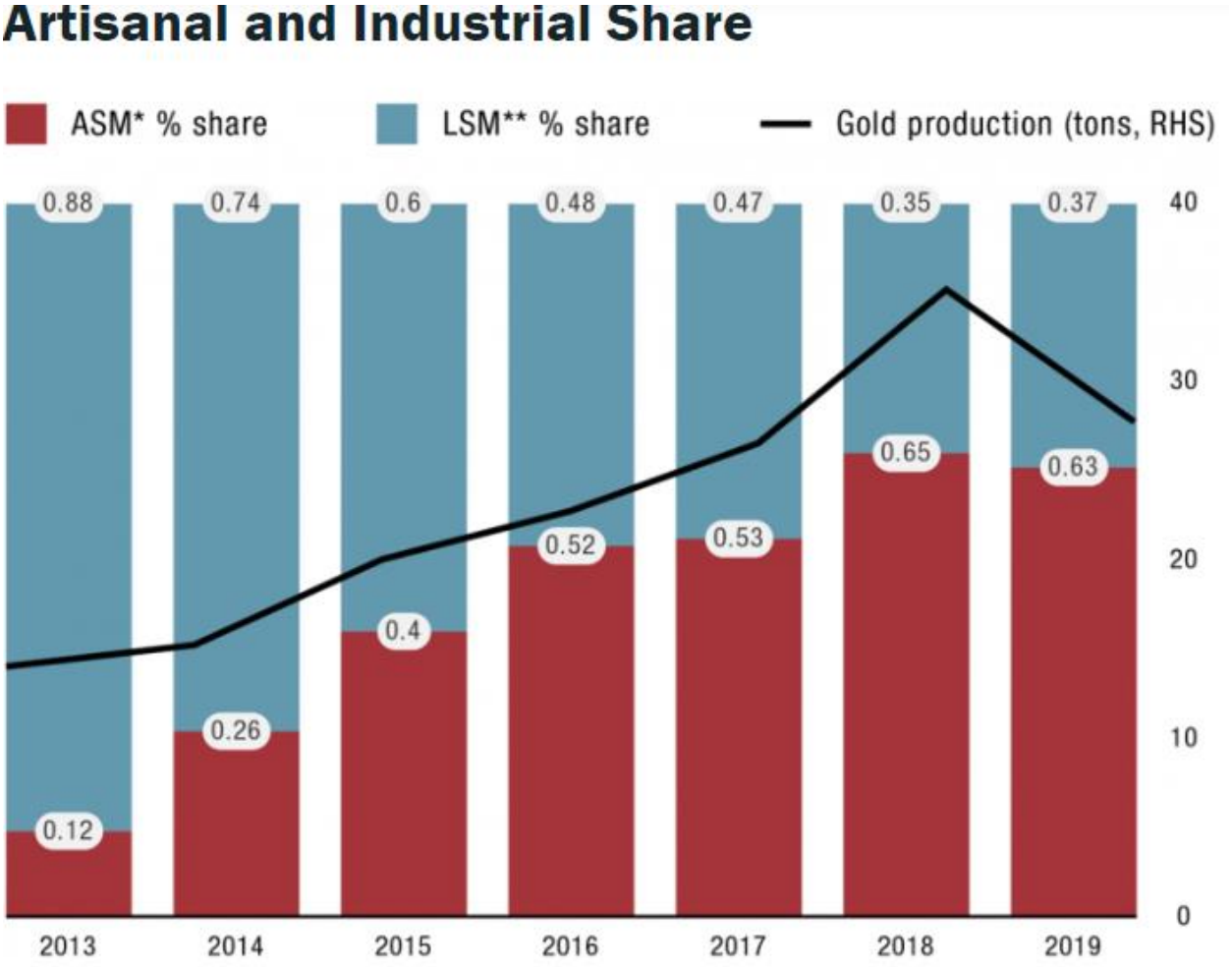

Fig 1.1: Gold Production and Funding from ASSGMs and LSGMs

Sources: Royal Bank of Zimbabwe, Fidelity Printers and Refiners, Zimbabwe Chamber of Mines, Zimbabwe Miners Federation, Mukasiri Sibanda, Zimbabwe Economic Policy and Analysis Research Group, Pact and Hollaway (2019)

The artisanal and small-scale mining sector was receiving less funding from banks and government. From 2006 up to 2010, the funding was mainly affected by inflation. As funding from RBZ/FPR increase, in 2015, the sector received US$100 loan facility and in 2018, it also received US$ 74 million, the production of gold by ASSGMs increased from 40% to 60%. After 2018, there was less funding that was unveiled to the sector and gold production started declining as can be seen from Fig 1.1. Therefore, there is need for funding in the sector for them to achieve optimal productivity.

From around 1990 up to 2006, the government of Zimbabwe through the Ministry of Mines established the Mining Industry Loan Fund (MILF). Its main purpose was to offer funding to ASSGM. The fund was administered by the Mining Affairs Board (MAB) and the funding was around ZWL$2 million a year (Pact and the Institute for Sustainability Africa, 2015). The funding was only enough for four ASSGM mines each obtaining ZWL$500,000. Apart from the loan being inadequate, the funding was also affected by hyperinflation in 2006 (Pact and the Institute for Sustainability Africa, 2015). The government of Zimbabwe raised a ZWL$40 million gold mobilization fund to assist ASSGM (Mining and Sustainable Development Articles, 2017). Of the ZWL$40 million, so far ZWL$30 million was disbursed. UNIDO (2018) revealed that there is no exact number of ASSGM who have benefitted from this facility and others failed to benefit from this program due to lack of collateral. These collateral requirements included ASSGM and millers who sold gold to FPR to be registered, submission of monthly performance reports and declaration of production and sales statistics to FPR. This amount is far less since ZMF had estimated that there were over 50 000 ASSGM in Zimbabwe. Gutu (2017) recommended that RBZ should review their funding requirements and use documents on gold sales to the RBZ as collateral.

Due to the economic slowdown that was caused by the Coronavirus pandemic in Zimbabwe, the President of Zimbabwe unveiled a ZWL$18 billion Economic Recovery and Stimulus Package.

The Stimulus Package was aimed at reinvigorating the economy and providing relief to individuals, families, small businesses and industries (Zimbabwe Environmental Law Association [ZELA], 2020). The mining sector was allocated ZWL$1 billion, a credit facility to the gold sector targeting both large- and small-scale miners (ZELA, 2020). This money was managed by Zimbabwe Miners Federation (ZMF). Part of the money was set to be available in foreign currency. However, miners in different parts of the country did not benefit from the recovery and stimulus package (ZELA, 2020).

Another funding from the government of Zimbabwe to the small-scale mining sector was a commercial loan facility of US$100 million to finance the purchase of equipment for small-scale miners, this program was controlled by the RBZ and it only benefited 307 people (Zimbabwe Mines Federation, 2020). In an attempt to increase gold from ASSGM sector RBZ MPS (2018) discovered that in 2017, US$74 million was given out to 255 ASSGM. This was noted as a remarkable achievement by RBZ since gold from small scale sector exceeded gold from primary ore producers. ASSGM accounted for 53% of the total gold output 24,843.87kgs. Even though there was an increase in gold output, only 2.5% (750) of the ASSGM who were registered accessed this funding. Apart from giving capital which did not cover the whole ASSGM sector, Fidelity Printers and Refineries was paying using the following procedure: for a Sample Grade of 90% and above it paid US$55.45/gram (g), 85% but below 90% it paid US$54.58/g, 80% but below 85% it paid US$53.99/g, 75% but below 80% it paid US$53, 41/g and a Sample below 10% but above 5% it paid US$52.25/g (Zimbabwe Mining Magazine, 2021). For Fire Assay, gold above 100g it paid US$55.74/g cash. For Fire Assay transfer price, a sample of not more than 10g is deducted (Fidelity Printers and Refiners, 2021). For the gold below 100g, it is not paying in US$ but it is using the Exchange Rate of that period. Artisanal and Small-Scale Gold Miners pay 2% royalties and Primary Producers (Large Scale) pays 5% royalties (Zimbabwe Mining Magazine, 2021). The prices they are offering for other Samples are lower than the world gold price markets of US$54.8 per gram (ZELA, 2020). Those with gold which is less than 100g, they were paid in Local Currency using Exchange Rate of that period (Zimbabwe Mining Magazine, 2021). This affected ASSGM since most suppliers of goods and services needed for gold production were demanding payments in US dollars or charged a premium for paying in bond notes (Intergovernmental Forum on Mining, Minerals, Metals and Sustainable

Development [IGF], 2018). This motivated ASSGM to sell their gold to parallel markets which offered higher payment in foreign currency. RBZ explains that the ASSGM sector should know that there are other critical sectors which also need foreign currency like health and manufacturing (ZELA, 2020).

According to Ministry of Mines Internal Report Mashonaland West Province (2020), the province had an estimated figure of more than 13 000 small scale miners including those who mined gold. Zimbabwe Mining and Smelting Company (ZIMSCO) allocated their land to small scale chrome miners through Tribute System Agreement where small miners would mine the mineral and sell it to ZIMASCO, only 203 small scale miners were allocated the land and others failed because they had not enough equipment to mine (Ministry of Mines Internal Report Mashonaland West Province, 2020).

Donor funding to ASSGM sector of Zimbabwe had little success. According to UNIDO (2018), Intermediate Technology Development Group (ITDG) worked with locals in Shamva Mine and was initially a success, however, this project did not find long-term success and was abandoned. Spiegel (2015) blamed insufficient support from the national government and the premature transfer of management from the international actors to a local association of miners, who abused their power as the major cause of the failure of this project. Another Donor funding by Stichting Nederlandse Vrijwilligers (SNV) a Netherlands NGO which had committed itself to developing a vibrant small-scale and artisanal mining sector in the Insiza and Umzingwane rural districts did not have long term success (Dreschler, 2002). In 2005 UNIDO worked with Ministry of Mines in Kadoma in training ASSGM and this program was initially a success which saw creation of microfinance to give credit to ASSGM. Although it was a success, there is no information on the number of small-scale miners or individuals who benefitted from the funding moreover, it is very difficult to recognise those who benefitted from the funding facility, particularly among female miners (UNIDO, 2018). This funding also did not find long term success, it was affected by hyperinflation which crippled the whole economy (Pact and the Institute of Sustainability Africa, 2015).

According to Dreschler (2001), banks such as ZimBank (now ZB Bank, Barclays (now First Capital Bank) and the Commercial Bank of Zimbabwe (now CBZ Bank) and other banks offered funding to ASSGM amounting to less than Z$300,000 per miner. Most ASSGM did not benefit from these loans because of lack of collateral. The funding was very little and not enough to get a miner into production to achieve optimum production. In addition, the loans were given around 2000s when inflation was already affecting the Zimbabwean dollar. The economy of Zimbabwe deteriorated rapidly after 2000. Inflation levels started to ascend significantly in 2006. Inflation was roughly 150,000% at the end of 2007 (Mugari, 2008). During economic crisis of 2006 and 2007, Gold trade Act Chapter 21:03 compelled all gold producers to sell their produce to Reserve Bank of Zimbabwe. According Gold Trade Act Chapter 21:03, all gold producers should sell their gold to Fidelity Printers and Refineries. RBZ was buying gold at a fraction of the international gold price. Sometimes RBZ was buying gold at a rate which was one thirtieth of the true international gold price when calculated at black market price. This further affected their funding since the money they were receiving was little and valueless.

Although some researchers concluded that funding was not of importance in ASSGM because capital to start is very low, individuals and family members may use personal money to finance mine operations (MMSD, 2001), ASSGM should have a sound funding model sufficient enough to buy mining equipment, pay workers and meet day to day demands from the mine to achieve optimum production. The capital needed may be raised by selling individual assets like agriculture produce such as maize and livestock or using personal savings, but the researcher noted that the money would not be able to sustain mining operations for optimum production. In addition, some ASSGM could need a sponsor to cover the US$100, the amount that may be needed to buy the most basic machinery (Pact and the Institute for Sustainability Africa, 2015). This suggests that funding is required in the mining sector. The ASSGM in Zimbabwe had no capital to mechanize their operations. This was due to non-availability of worthwhile business plans and collateral security required to obtain bank loans. According to Zimbabwe Economic Policy Analysis and Research Unit (2016), the ASSGM of Zimbabwe had no financial capacity to mechanize their mining processes because of lack of feasible business plans and collateral security needed to obtain funding from financial institutions. ASSGM also had health and safety related challenges at their work places which include lack of protective clothing and

unaffordable license requirements which make it difficult for ASSGM to remain legally compliant (Zimbabwe Economic Policy Analysis and Research Unit, 2016).

Hove and Hlongwana (2015) noted that lack of technical knowhow in mining, the inability to work in dangerous mining environment, the failure to access loans and men's indifference to accepting women as equal partners in small scale mining business were the major difficulties facing women in that sector. Amutabi and Mukhebi (2001) concluded that as a result of lack of finance, women in the artisanal and small-scale mining had limited means to raise funds to buy mining equipment, or to transport their produce to better markets or meet application fees for mining leases. Thus, policies and customs that restricted or deterred women from obtaining capital contributed to the stunting or failure of women headed business. Most ASSGMs were looking for sponsorship which shows that there was need for funding models. Several artisanal and small-scale gold mines used basic hand tools such as picks, shovels and hoes because they did not have the capital that was required to procure mining equipment that could enhance efficiency (Munyoro *et al.*, 2017). Munyoro *et al* (2017) noted that in cases where they could blast the land to open pits, they took forever using hand tools which were not only tiring but very time consuming. Not only did these tools pose a risk but minimised profitability as more time was devoted to manual labour in trying to extract the minerals (Msechu, 2013). The equipment will also need adequate maintenance which could only be possible with necessary funds (Munyoro *et al.*, 2017). The only solution to the problems lay on a proper funding model which would help them acquire mining equipment and machinery for their operations.

There are royalties that are paid by small scale gold mines which also affect their operations since it leaves them with less money. This was supported by Zimbabwe Chamber of Mines (2012) which said royalties being charged undermined the objectives of the Indigenization and Empowerment Act Chapter 14:33 were too high for Artisanal and Small-Scale Mines as they left the small- scale miners with little to take home for self-sustenance. Otto (2006) supports this notion that royalties as a form of taxation affect the investment climate of any nation. The current levies being charged in Zimbabwe are quite steep for Artisanal and Small-Scale Gold Mines with services like Environmental Impact Assessments sometimes being foregone (Munyoro *et al.*, 2017). The small-scale gold miners had some difficulties in accessing funding

from financial institutions because they did not have collateral security requirements to be given loans. Javia and Siop (2010) on challenges of women in small scale gold mines highlighted that most women had less or no forms of collateral to guarantee them financial support from commercial institutions. Ndhlovu *et al.* (2019) highlighted that the dearth of finance prevalent in the Zimbabwean economy since the year 2000 as well as the high interest rates charged by the financial institutions could be a deterrent to women in small scale gold mines. The issue of collateral was discussed by Munyoro *et al.* (2017) when they proposed that the markets where small scale gold miners sell their minerals should be used as collateral in such a way that microfinance providers can recoup their money without any fear that miners may divert funds to other uses.

The most cited hindrances to investment were that ASSGM was simply asymmetrical with the investment mandate, the procedures and regulations that order how finance was distributed. Even if investors saw a potential fit for ASSGM within their mandate, ASSGM was largely excluded due to its perception as a high-risk investment (Planet Gold Report, 2020). Because of the risky nature of mining, securing funding was a constant challenge for most ASM producers, and buyers often pre financed miners by loaning them money against future production or in exchange for miners' agreement to sell at preferential prices (Pact and the Institute for Sustainability Africa, 2015). According to RBZ MPS (2009), the SMEs sector though it played a critical role in economic growth and development, it was confronted with a number of challenges which included accessing finance and this was the critical challenge facing SMEs worldwide. Accessibility and availability of finance was very limited, as the majority of SMEs were owner capitalised so access to finance was a major obstacle to development of SMEs in Zimbabwe and Africa (RBZ MPS, 2009). Their inherent higher perceived risk and lack of collateral made financial institutions reluctant to lend them money (RBZ MPS, 2009).

Hentschel *et al.* (2003) found out that most ASSGMs operations had financing problems and difficulty obtaining credit to improve production. Hentschel *et al.* (2003) further state that as most rotating funds had not worked well, the financing of ASSGM projects needed to be tailor-made and consider non-traditional forms of financing such as own capital resources, joint ventures, risk capital, equity partnerships and the leasing of equipment. In Ghana, Hilson (2001)

notes that there is need for a comprehensive policy to provide technical and financial support to ASSGM operators to increase productivity through efficient and best practices, as well as pay equal attention to other sectors of artisanal and small-scale mines such as Salt Mining and Sand Weaning. In Tanzania, Masanja (2013) established that lack of capital, and reluctance of banks and financial institutions to provide loans and other financial assistance to artisan and small-scale mines (especially the unregulated subsector) was one of the challenges affecting artisanal and small- scale mines to achieve optimum production. Adebisi and Olayinka (2013) noted that small businesses faced funding constraints, in developing economies, which hampered their development and long-term existence. The government of Tanzania formalised traditional funding systems by promoting the following: hire purchase system, forward sales, mutual group savings schemes and encouraging financial institutions to formulate affordable credit schemes to the miners as well as establishment of mobile banking systems to improve small-scale miners' access to credit (Dreschler, 2001). A study by Sturmes (2017) discovered that even in cases where ASSGM could access financial services, loan applications were often rejected. Planet Gold (2020) revealed that in Uganda Busia region, most ASSGM enterprises had applied for loans to local banks and all of them did not access funding from them. This sector was not given funding by financial institutions due to perceived high risk of default and common poor reputation of the ASSGM sector.

Due to lack of access to capital to buy equipment, the processes at ASSGM places were restricted and Planet Gold (2020) noted that there were several reasons for ASSGM not to be given formal funding. These reasons included lack of collateral requirements, lack of competitive interest rates, lack of attractive repayment terms and excessive cost of compliance to meet due diligence expectations. According to Planet Gold Report (2020), the report concluded that the ASSGM is relatively new as an investment sector, there is a lack of market infrastructure, including, for example: established intermediaries to act as convening points, an ASSGM due-diligence toolkit, or accepted impact metrics for the sector. Lack of expertise and mechanism to assess this sector made it difficult for investors to access, or even understand potential ASSGMs projects. These factors combined by inaccessibility of other ASSGMs places made it hard for this sector to access funding. Banchirigah and Hilson (2010) noted that many Artisanal and Small Scale Mine (ASM) operators were poor and were forced to borrow money from informal

and often inequitable channels. Sofala Partners Limited (2019) noted that unavailability of credit lines to ASSGM was working as a barrier to formalisation for this sector which was worsened by the non-formality of most ASSGM processes in DRC. This prevented banks from giving funding to this sector. Several ASSGM in DRC relied on cash-based finance and payment advances down the supply chain. Without access to working capital to purchase machinery, the productivity of ASM sites is restricted (Sofala Partners Limited, 2019).

1.1.1 Contribution of ASSGM sector to the economy of Zimbabwe

A survey on the ASSGM sector from 1990s up to date showed that ASSGM is contributing significantly to the economy of Zimbabwe hence the need for proper funding model for the sector to continue contributing and achieving optimum production. Fig 1.1 shows gold production from 1998 to 2017.

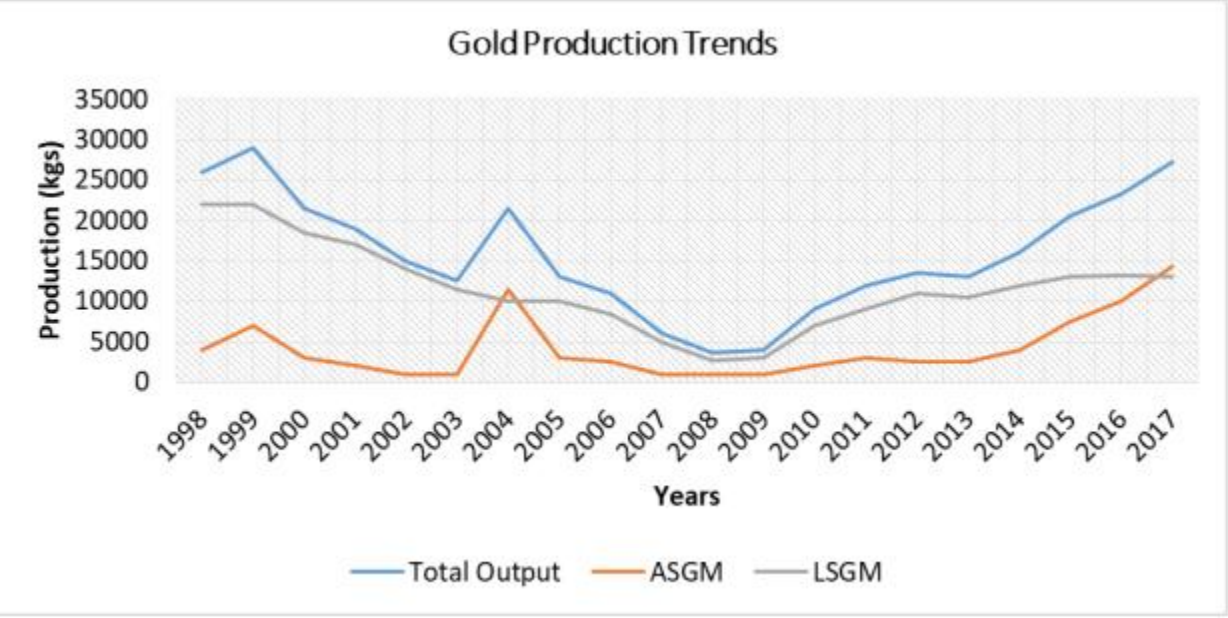

Figure 1.2: Gold Production Trends for ASSGM and Large-Scale Gold Miners (LSGM)

Source: Gold production trends for both ASSGM and LSGM for the twenty first century (Chamber of Mines of Zimbabwe, 2016; RBZ, 2016 & ZMF, 2018)

Figure 1.1 shows that there was a decrease in gold production from large scale gold producers from the year 2005 to 2008 to around 4000 kgs and this might have been due to economic crisis

that was in the country. In 2009, there was a steady increase in the production of gold to around 13,000 kgs from large scale producers. Artisanal and Small Scale were contributing less than 5000kgs accept in1999 and 2004 and from 2014 up to 2017. According to RBZ MPS (2015) from 2010 to 2014, large scale producers had contributed 75% to total gold production, while the balance (25%) was accounted for by small scale miners. The less contribution of Small Scale was due to poor funding. To increase the production of gold from small scale, RBZ arranged a financing facility which included the mechanization of small-scale producers' operations. RBZ through Fidelity Printers and Refiners, has engaged with suppliers of mining equipment targeted at small scale miners (MPS, 2015). The engagement was to come up with arrangements that would increase funding to ASSGM. Increase access to long term funding for both small scale and large-scale gold producers and harnessing the potential of small scale and artisanal miners (Mid Term Monetary Policy Statement, 2015).

Another way the government encouraged production of gold from ASSGMs was through allowing RBZ and Fidelity Printers and Refiners on buying gold from ASSGM on a "no questions asked basis" via moveable buying centres that were positioned throughout the country. FPR had to give permits to gold buyers in those areas that had high activity of ASSGM. All these activities were done to help ASSGM funding which had also helped to increase production. In 2015 there was an increase in the contribution of the small-scale sector from an average of 25% realized back in 2014 to about 40% in 2015 (RBZ MPS, 2016).

Pact and the Institute for Sustainability Africa (2015) noted that although there was an increase in production of gold from ASSGM measured by official figures from RBZ and FPR, some of the output from ASSGM was un-accounted for. This therefore meant the official figures being underestimated. It is believed that 50% of ASSGM output was lost through smuggling in Zimbabwe. Gold deliveries from ASSGM in 2018 increased to 21,678.42 kgs and fell by 4,289.68 kgs to 17,478.74 kgs in 2019. The decrease of ASSGM gold deliveries in 2019 was attributed to electricity shortages, inadequate equipment for small scale miners to access deep gold reefs and gold leakages through smuggling (RBZ MPS, 2020). The increase in gold supply by ASSGM resulted in ASSGM surpassing the deliveries from large scale producers. ZELA (2020) noted that from 2017 to 2019, ASSGM delivered more gold to FPR than Large Scale

Mines (LSM). ASSGM sector accounted for 63 % (17 478,74kg) of total gold deliveries (27 650,26kg) to FPR in 2019. Between January to April 2020, ASSGM delivered 4,300.61 kgs of gold, a 19% decline over a comparable period in 2019, 5,332.37 kgs (RBZ MPS, 2020). According to Finance and Economic Development Minister, Hon Mthuli Ncube close to 34 tonnes of the yellow metal were smuggled to Rand Refinery in South Africa whereas President Emmerson Mnangagwa also disclosed in 2019 that he discovered that US$60 million worth of gold was sold through informal channels to a Dubai-based company (CoMZ, 2020). The reservations by government minister and president that there was smuggling and an increase in production from ASSGM after government had intervened shows that if there was proper management to prevent smuggling and funding in the ASSGM, their contribution to the economy would increase. Fig 1.2 shows contribution of Artisanal and Small-Scale Gold Mining (ASSGM) and Large-Scale Gold mining (LSGM) to Zimbabwe' GDP, royalties and employment in 2016.

	ASGM	LSGM	total gold mining
production in ounces	31,000	428,000	739,000
% of GDP	1.2%	1.4%	2.6%
royalty in US$ (% of government revenue)	3.8 million (0.24%)	11.8 million (0.76%)	15.6 million (1%)
employment numbers (% of labor force)	500,000 (7%)	11,000 (0.1%)	511,000 (7.1%)
direct and indirect jobs	1 million	81,000	1.1 million

Figure 1. 3: Gold mining's contributions to Zimbabwe's economy in (2017)

Source: Pact and The Institute for Sustainability Africa, 2017

Zimbabwe's gold mining sector as a whole, consisted of both artisanal and small-scale gold mining (ASSGM) and large-scale gold mining (LSGM) (Pact and the Institute for Sustainability Africa, 2017). From Fig. 1.2 it can be seen that both large scale and small scale contributed 2.6% of gross domestic product (GDP) with ASSGM contributing 1.2% and LSGM contributing 1.4%, ASSGM was contributing 0.24% and LSGM was contributing 0.76% of government revenues

(royalties only) and employed 7.1% (ASGM 7% and LSGM 0.1%) of the labour force in 2016. ASSGM was contributing significantly to these figures and to the growth and development of the economy of Zimbabwe. In the past, different royalty rates for ASSGM and LSM including different payment arrangements for gold deliveries created arbitrate opportunities for LSM to funnel their gold under ASSGM. In response, the 2019 Midterm Budget Review Statement increased royalty rates of ASSGM from 1% to 2% to narrow the gap of 3% royalty fee for gold below US$1,200 from LSM (Midterm Budget Review Statement, 2019). There was less difference on GDP on large scale and small scale therefore if there was a funding model, small scale miners could contribute the same or more than large scale miners. Small scale miners were employing more than large scale which was helping to eradicate unemployment in the country. Pact and the Institute for Sustainability Africa (2017) went on to argue that the improvement on the contribution of Artisanal and Small Scale to the economy could be easily seen if all gold from this sector was traded formally. There was need to improve access to and protection of the mining claims for ASSGM and also establishing affordable financing and technical services for this sector to improve their production. This also points out that there was need for funding in the small-scale gold sector.

The mining sector was contributing a lot to the exports and had the potential to continue exporting. According to ZMF (2020) Mashonaland Central Chairperson Mr. Masango Mahlahla in an interview with Mining Zimbabwe in 2019, the country's chrome industry had the potential to establish a USD Billion-dollar industry with the small-scale sector able to generate over USD300 million in export sales. Fig. 1.3 depicts the contribution of ASSGM and LSGM to total exports. ASSGM contributed to total exports of the country hence this sector is of vital important to the economy of Zimbabwe.

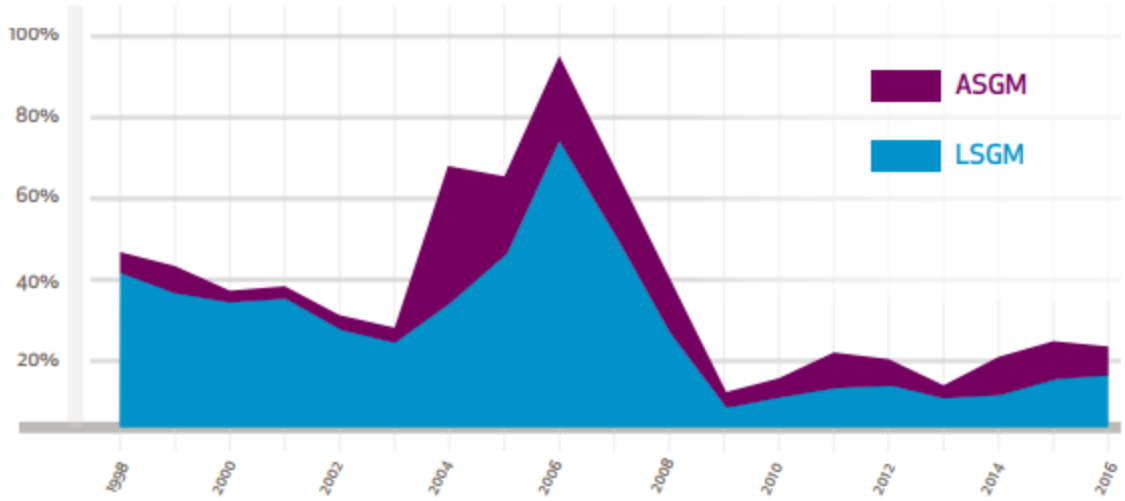

Figure 1. 4: ASSGM and LSGM contribution to total exports

Source: Pact and the Institute for Sustainability Africa (2016)

The mining sector is one of the major contributors to Zimbabwe's exports. In 2016, mining contributed 62% of exports, up from 55% in 2015 and 52% in 2014 (Pact and the Institute for Sustainability, 2015). Some of the minerals that were exported from Zimbabwe are diamond, gold, platinum group metals, chromite, coal and nickel. Other sectors that also exported are agriculture, manufacturing, and services sectors. In Zimbabwe, Gold was the major mineral that was being exported. Between 1998 and 2008, LSGM was contributing more to exports than ASSGM, from 2010 to 2016 the contribution of both sectors still existed but with less difference between the two sectors, this points out the relevance of the ASSGM sector to the economy of Zimbabwe. Even though some sectors collapsed during the 2000 to 2008, the mining sector exports actually rose so much during that period. According to RBZ MPS (2018) both large scale and small scale contributed 28% of exports.

1.1.2 The Growth of ASSGM in Zimbabwe

The projections of Svotwa and Sibanda (2000) concurs with the actual findings of Pact and the Institute for Sustainability Africa (2015) which revealed that ASSGM then had more than 1 000 000 people. There was no exact figure on the number of ASSGM in Zimbabwe. Different researchers have come up with different figures. Initially the informal small-scale or artisanal

mining sector in Zimbabwe comprised primarily unregistered gold diggers and panners (men, women and children alike) scattered along some 5000km or so of Zimbabwe's main rivers (Shamu & Wolff, 1994). Shamu and Wolff (1994) first estimated that the number of these people was around 100 000. In 1997, Svotwa and Mtetwa (1997) estimated their number to be around 190 000. In 1999, the International Labour Organization (ILO) (Sectoral Activities Program, 1999) estimated the number of small-scale and artisanal miners in Zimbabwe to be between 50 000 and 350 000. Svotwa *et al.* (1999) attempted to estimate the number of gold panners in Zimbabwe by using panner densities derived from the number of gold panners physically counted per km of river course traversed during the United Nations Industrial Development Organization (UNIDO) study and estimated the number to be between 200 000 and 250 000. In 2020, Zimbabwe Mining Sector Situational Report (2020) estimated the number of both registered and unregistered gold panners to be around 1 million and ZMF (2020) estimated it to be around 500 000. These figures are showing that this sector was increasing which means that there was need for funding models that would sustain this industry. The other reasons for the increase in number of ASSGM are the availability of the market for gold (Fidelity Printers and Refineries) and parallel market. This motivated the researcher to investigate for funding models which would help artisanal and the small-scale gold sector.

1.1.3 Problems of small-scale gold miners in Zimbabwe

Although artisanal and small-scale gold mines are significant to the economy of Zimbabwe, however, this industry faces several financial problems.

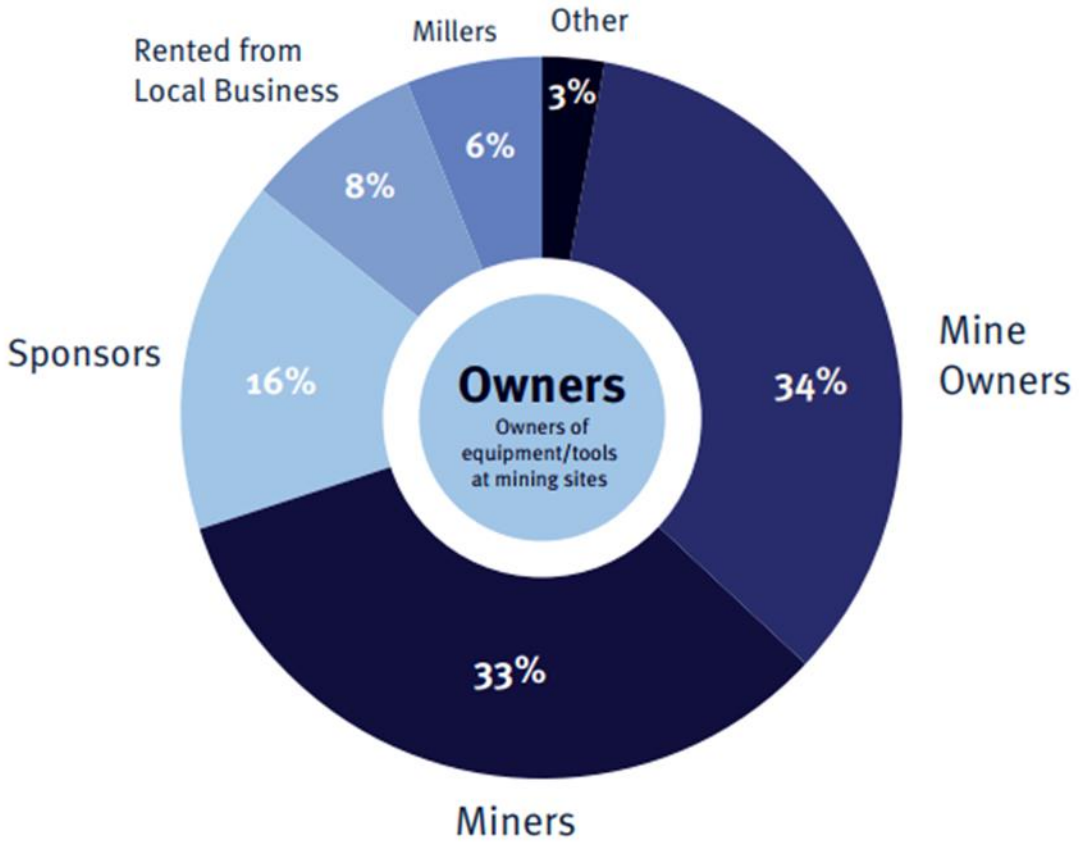

Figure 1. 5: Equipment and tool ownership at mine sites in Zimbabwe sites

Source: Source: Pact and the Institute for Sustainability Africa (2017)

It can be clearly seen that there is need for funding in the ASSGM sector since mine owners are not able to provide all the needed equipment. Pact and the Institute for Sustainability Africa (2017) noted that there were a lot of sponsors in the ASSGM sector. Some of the sponsors were gold buyers who normally provided equipment and other support to this sector. They provided equipment such as compressors, explosives and rudimentary tools such as spades, chisels, pickaxes and hammers. While equipment could be hired, most of them belonged to sponsors and mine owners (Pact and the Institute for Sustainability Africa, 2017).

Despite the unprecedented numerical growth rate of the sector as shown by Svotwa and Sibanda (2000), financing of artisanal and small-scale mining remained a grey area in the mining industry. There are several factors that explain the ASSGM sectors' under development such as lack of availability of credit finance, lack of institutional framework and restraining marketing environment. The major problem of ASSGM in Zimbabwe was its limited access to credit

finance. The Environmental Management Act (2002) which requires all miners to submit Environmental Impact Assessment (EIA) reports was another challenge. This Act allows miners to resume operations, only after an environment management assessment is done by a consultant who should be a qualified EIA consultant and listed on the national roster. The services of an approved prospector are reported to cost an average of US$400, but EIA prospectus only costs US$138, the cost of undertaking an EIA is quoted at US$3,000 to more than US$4000 (UNIDO, 2018). Furthermore, to have a permit to buy and keep explosives costs US$1,000. Mawowa (2013) revealed that in April 2009, a senior director in the Ministry of Mines stressed that unskilled, unqualified artisanal miners were a threat to the mining industry's productive potential. These threats included mining regulatory compliance issues and equipment challenges. The director in the Ministry of Mines further noted that ASSGM were a threat to the livelihoods of non-miners as they caused pollution and they were also a threat to health and safety of non-miners. His emphasis was on the need for artisanal miners to grow up and become real miners. This affected ASSGMs since they were still small and did not have enough capital to have machines that were required in the ASSGM sector.

Millers are also facing challenges in obtaining milling licenses, Pact and the Institute for Sustainability Africa (2015) revealed that for a miner to have legal authorisation to start operating a custom mill, a miner had to go through 17 processes, the whole procedure took almost 271 days, and the cost required for the whole process was US$12,300. Artisanal and Small-Scale Miners incurred several expenses before they even started their operations. There was need for a comprehensive business plan, metallurgical and geological reports, cash flow projections for 12 months and carbon removal permit before a miner started to operate. Also, millers were to pay for annual licensing (US$8,000), EMA needed to be paid their own fee (US$1,000 every 3 months), all ASSGM sites are required to have adequate power and millers are required to buy their own materials for the power installation, which is very expensive for ASSGM. Other expenses included US$3,000 for labour, US$ 4, 800 per kilometre for ZESA cables and US$11,000 for a transformer, needed by ZESA (Pact and the Institute for Sustainability Africa, 2017).

UNIDO (2018) also found out that there was need to construct milling plants even though FPR gave loans to ASSGM for startup capital, most Artisanal and Small-Scale Gold Miners did not have collateral to secure those loans. For buyers to be registered and to start operating, they needed to have US$3,500 or more and they had to deposit 500g of gold or more every month.

1.1.4 A Summary of Shortcomings of the Funding Mechanisms of ASSGM in Zimbabwe

There are a few studies specific to funding models for ASSGM in Zimbabwe and most studies relate to the contribution of ASSGM to the Zimbabwean economy (RBZ, 2016; RBZ MPS, 2019; CoMZ, 2016 & Pact and the Institute for Sustainability Africa, 2016). There was less funding from formal financial institutions due to perceived high-risk nature of the sector. Those institutions who offered funding offered to few small-scale miners and the funding was affected by inflation (Dreschler, 2001 & Pact and the Institute for Sustainability Africa, 2015). Funding from RBZ to ASSGM did not cover the whole sector. The funding was only covering less than 1000 ASSGMs from the whole sector which had over 50 000 artisanal and small-scale miners (see CoMZ, 2020 & RBZ MPS, 2018). This therefore means that it was covering 3.3 % of the total population in the ASSGM up to 2017 when Zimbabwe Miners federation announced that it had 30 000 registered ASSGM. In 2020, the number of registered ASSGM increased to 50 000, which means that the funding was now too small for the whole sector. The highest funding from RBZ of US$100 million to set up plant and equipment was only sufficient to cover 307 artisanal and small-scale gold miners (CoMZ, 2020). This funding would be US$ 325 732.90 per individual, which is not sufficient since Planet Gold Africa report noted that it needed at least US$1.5 million to set up a ASSGM plant. The loan amount only covered 21.7% of the required capital.

Also, several funding by government and donors to ASSGM did not benefit the whole sector as was shown in the background of the study. The government of Zimbabwe created Mining Industry Loan Facility (MILF) to fund ASSGM, but the findings show that this loan facility was adequate for few ASSGM every time the government of Zimbabwe provided funding to this sector (Spiegel, 2015, Mining and Sustainable Development Articles, 2017 & Pact and the Institute for Sustainability Africa, 2015). The need for funding in the ASSGM was also seen in Matebeleland North province when other artisanal and small-scale miners forfeited their claims

because of inability to raise funding for inspection fees of US$100. 00 only as was highlighted in the background of the study (Zimbabwe Mining Newsletter, 2020).

The importance of ASSGM sector in Zimbabwe had become unquestionable given its contribution to the economy as was shown in the background. ASSGM of Zimbabwe needed funding as was highlighted in the background of the study. Artisanal and small-scale gold miners realised that its challenging to raise all the necessary requirements needed by different organisations in the mining sector including EMA, Ministry of Mines and other agencies (see Zimbabwe Mining Newsletter, 2020; UNIDO, 2018 & Environmental Management Act 2000). There were costs which include mining and operating licenses, ZESA charges and plant installation expenditure and EMA fees which would be difficult to raise without proper funding. Even though the Government of Zimbabwe was continuously helping this sector, artisanal and small-scale gold mines were still far away from achieving optimum production as was seen in background that whenever funding is given to the sector, there is an increase in gold production (RBZ MPS, 2019).

The research gaps identified show the need to increase literature on funding models that would help ASSGM achieve optimum gold production and coming up with other funding models to sustain this important sector (ASSGM) to achieve optimum gold production. ASSGM used their own funding and sometimes they were funded by sponsors mainly because these methods were relatively cheaper and there were no preconditions needed unlike in formal financial institutions. ASSGM normally do not want debt funding even though it has some advantages to their operations Onoja and Ovayioza (2015), despite the fact that others do not meet the requirements and others are unfamiliar with financial institutions, ASSGM do not want to be associated with interests and bankruptcy costs that follow if they fail to repay the loans

1.2 Statement of the Problem

Government funding covered only 3.3% of the whole ASSGM sector. This funding was enough for 21.7% of the required capital. Funding from the donor community did not benefit the whole sector and it has shown little success to those who have benefited. Over 1000 small scale gold claims were forfeited in Matebeleland province due to inability to raise US$100.00 for inspection fees. This sector found it difficult to raise all the necessary fees required by different agencies

including EMA, ZESA and Ministry of Mines. Access to finance continued to be one of the critical problems that remained threatening Artisanal and Small-Scale Gold Miners in Zimbabwe. Artisanal and Small-Scale Gold Mines had difficulties in accessing finance for them to achieve optimum gold production to expand the GDP of Zimbabwe. Other small scale gold miners failed to get finance for start - up capital, to buy equipment and machinery, payment of mine workers and capital for day-to-day operations on the mines. Access to finance was an important factor to this sector leading to employment creation, contribution of gold to the Fidelity Printers and Refineries who were the official buyer and contribution of ASSGM to GPD and Exports. ASSGMs had limited options of gaining access to funding except relying on their personal money to fund their investments. The Government of Zimbabwe through Mining Industry Loan Fund, RBZ and FPR was providing funding to ASSGM and thus funding was not adequate for the whole ASSGM sector. It has been revealed that less than only 500 ASSGM were benefiting from the funding from Government out of an estimated number of 50 000 ASSGM. They had difficulties in accessing funding from financial institutions, thus motivating this study to find alternative sources of funding to sustain this important sector.

1.3 Research objectives

The major aim of this research was to assess funding models that were used by artisanal and small-scale gold mining companies in Zimbabwe and to determine the best funding model(s) that would help Artisanal and Small-Scale Gold Mines to achieve optimum production. The specific objectives of the study were:

1. To examine funding mechanisms available to Artisanal and Small-Scale Gold Mines in Zimbabwe.
2. To determine institutional factors that were considered before funding was given to Artisanal and Small-Scale Gold Mines by banks.

3. To establish the effect of funding models to Artisanal and Small-Scale Gold Mines productivity

1.4 Research questions

1. What are the funding mechanisms available to artisanal and Small-Scale Gold Mines in Zimbabwe?
2. What are the institutional factors that were considered before funding was given to Artisanal and Small-Scale Gold Mines?
3. What is the effect of funding models to Artisanal and Small-Scale Gold Mines productivity

1.5 Research Hypotheses

The hypotheses for the study are:

H_1: Use of Personal savings lead to gold productivity.

H_2: Sale of an asset as a funding model leads to gold productivity.

H_3: Joint Ventures funding to Artisanal and Small-Scale Gold Miners is associated optimal gold productivity.

H_4: Partnerships funding to artisanal and Small-Scale Gold Mines is associated with optimal gold productivity.

H_5: RBZ funding to Artisanal and Small-Scale Gold Mines is associated with optimal gold productivity.

H_6: Government and agencies support is associated with optimal gold productivity.

1.6 Assumptions of the study

This research had the following assumptions:

Setting on the course of the research, the researcher assumed:

1. Samples that fully represent the items under study would be identified.
2. There was an equal chance of selection to each and every member of the targeted population to be in the sample.

3. The researcher also assumed that there were funding models for optimum gold production from Artisanal and Small-Scale Gold Mines in Zimbabwe.
4. The ASSGM sector had a great impact on the whole economy and if this sector was working at full capacity with adequate funding, the whole economy would revive hence the reason the researcher chose to look into this sector.

1.7 Significance of the Study

This study will be significant to academic, policy and theory

1.7.1 Academic significance

The study sought to make contribution to the body of knowledge. Findings of the research were expected to add to the existing body of knowledge and fill the knowledge gap currently existing by illustrating the funding models that Artisanal and Small-Scale Gold could use to achieve optimum gold production. Background of the study has revealed that funding from financial institution's was hindered by lack of collateral and funding from government was not covering the whole ASSGM sector. The results will also go a long way in helping other researchers who might want to do their studies in ASSGM sector which is highly commendable for knowledge production. This study also added value to the researcher's ability and experience in conducting research. It also gave the opportunity to the researcher to combine academic theories and practical procedures in doing a research study. The experience and the results of doing research in the mining sector would be of future use for the researcher.

1.7.2 Policy significance

In a nation, rules are framed in response to certain challenges that the nation or a specific sector is facing (Mapeto, 2016). Those who are critical in formulation of policies are the citizens, executive branch, the legislature and the courts and private actors such as interest groups (O'Toole, 2003). In this study the researcher focused on challenges the ASSGM were facing and the policies that could be established by the government in order to address these challenges. At micro- and macro-economic level, ASSGM was playing an important role, at micro level it was a source of income for several livelihoods as it was providing employment to different impoverished families in rural and urban families and helping growth of small business and at macro level it was contributing to GDP, exports and employment. Zimbabwe showed shifting of

regulatory frameworks mainly due to conflicts arising from ASSGM, government and its agencies the forestry commission, Environmental Management Agency (EMA) and other agencies. There were challenges of obtaining mining licenses, registration processes and marketing conditions. ASSGM are also finding it difficult to obtain funding, paying taxes and royalties which is affecting their ability to achieve optimum gold production and growth of the sector (Basu *et al.,* 2015*)*. The government of Zimbabwe could benefit immensely from the findings of this study since the study shall help them in policy formulation and implementation in relation to ASSGM sector. The government will realise the need for formalisation of the ASSGM sector in order for it to acquire funding from formal financial institution. Also, the impact of children participation and high rate of accidents in the sector shall guide the government to have a regulatory framework that will protect children and improve safety at mine sites. The results could be availed to the ASSGM sector who should have an informed picture of their relevance to their welfare and the economy as a whole. Again, the study's findings are likely to help the Ministry of Mines who will assess the importance of this sector and will come up with rules that will help ASSGM register their business.

1.7.3 Theoretical Significance

Studies of ASSGMs in different countries are showing that this sector is now becoming the major driver of a country's economy. The results of this study could help to widen theory on funding models that might be used by ASSGM in Zimbabwe. The sector would then have a realistic yardstick on all funding models available to them and those that will help to revive their sector and achieve optimum production. After this study, they could know necessary conditions which are suitable for different funding models and funding methods that suits Artisanal and Small-Scale Gold Mines.

1.8 Delimitations of the study

The research was confined to the Artisanal and Small-Scale Gold Mines of Zimbabwe. It was confined to Mashonaland West and Midlands provinces. Gold hotspot were also included that's Shamva, Shurugwi, Bindura and Mazowe area. The areas were chosen due to high volumes of artisanal and small-scale gold mining activities that take place there. The study chose the following districts in the two provinces Makonde, Zvimba, Chegutu, Sanyati, Mhondoro Ngezi

and Kwekwe. The study mainly focused on the funding models for optimum gold production from Artisanal and Small-Scale Gold Mines of Zimbabwe. In methodology, the research used pragmatism approach

1.9 Limitations of the study

Some of the Artisanal and Small-Scale Gold Mines in Zimbabwe were not registered, the outcome from this analysis was not affected by those that were not registered because those Artisanal and Small-Scale Gold Mines (ASSGMs) that were not registered were part of the population that was included in the sample. Secondary data had many distortions and was collected for other purposes, this study depended on secondary data from FPR, RBZ and Ministry of Mines to avoid all the limitations associated with published secondary data, the researcher used authentic sources of information. Some of the respondents were not give enough information for confidentiality purposes, to avoid lack of full information disclosure; the researcher used data from ministry of mines, chamber of mines and Zimbabwe Mines Federation.

1.10 Personal motivation

The collapse of the Zimbabwean economy around 2000s and the rise of informal sector in the country motivated me to investigate funding mechanisms which would sustain the small-scale firms in the country since they are now proving to be the back born of the country's economy. Closure of industries due to hyperinflation, shifting of the country's economy from agriculture based to mining and higher levels of unemployment influenced the decision to pursue this study since it had an opportunity to be one of the drivers of this economy. This sector as was highlighted in the background of the study, was contributing more than 60% of gold to the nation, 1.2% to the GDP of the country, 0.76% of government revenues and they were more than a million of people benefiting directly and indirectly from this sector, therefore its success was of great importance to the economy of the country. I spent much time meditating on appropriate funding mechanisms which will sustain this sector due to its relevance it now has to our country. The studies by other researchers which were discussed above exposed the need of funding to this sector.

The researcher's publications which had focused on the ASSGM sector financing issues have motivated the researcher to undertake this study. As a result of such publications and employment challenges which our country is facing had inspired the researcher to craft funding mechanisms which would lead to survival, growth and expansion of the artisanal and small-scale mining sector of Zimbabwe. I was puzzled by the land reform program which has affected our economy greatly since our economy depended heavily on farming and continued closure of hundreds of firms in the country have left thousands of people unemployed. The study was motivated by the need to come up with funding models for the optimum gold production form artisanal and small-scale gold mines in Zimbabwe. As was discussed in the background, the sector is facing funding challenges from financial institution. The funding from RBZ/FPR and MILF was not covering the whole sector, the researcher carried out this research to come up with other funding mechanisms which would sustain this sector.

1.11 Structure of the thesis

This study is an investigation of the funding models for optimum gold production from artisanal and small-scale gold mines in Zimbabwe**.** The main theories that underpin this study are Pecking Order Theory put forward by Myers and Majluf (1984) and Financial Cycle Theories put forward by Berger and Udell (1998), Fluck *et al.* (1997) and Diamond (1989) and Petersen and Rajan (1994) and Hamilton and Fox (1998). Chapter 3 covered the methodology, Chapter 4 data analysis and chapter 5 covered summary, conclusions and recommendations. To achieve the aims of this thesis in an effective and orderly manner, the study was structured as follows:

Chapter 1 Introduction

This chapter opened by giving an introduction which highlighted the research problem at hand. This chapter covered: statement of the problem, research objectives, research questions, research hypotheses, assumptions, significance, delimitations and limitations of the study. The summary of shortcomings of the funding mechanisms of ASSGM in Zimbabwe which has gave justification for the current study.

Chapter 2 Literature Review

This section covers the literature review on funding models for optimum gold production from artisanal and small-scale gold mines in Zimbabwe. The following areas were discussed in this chapter: main theories underpinning the study, international and local empirical studies on ASSGM**,** legal framework for ASSGM Sector of Zimbabwe, issues of Formalisation of ASSGM Sector of Zimbabwe, funding models available to the ASSGM sector, challenges that were faced by ASSGM in accessing funding from financial institutions and the involvement of different countries in the ASSGM. This has helped the researcher to come up with a conceptual framework form this study.

Chapter 3 Methodology.

This chapter covered the methods that were employed by the researcher in gathering the data. The following issues: research philosophy, approach, type and design were discussed. The sampling method together with the data collection techniques were analysed. The hypotheses were discussed together with ethical issues. It ended with a brief discussion of how data will be analysed and presented at data analysis stage.

Chapter 4 Data Analysis

The data that was gathered from questionnaires and interview questions was discussed in this section. The section covered descriptive and inferential data analyses. The descriptive data related to the background characteristics of both the respondents and the artisanal and small-scale gold mining firms. The associations between the following: collateral security, technical skills in the mining sector, financial skills, mine size and formalisation and access to funding was discussed. These associations were analysed using inferential statistics the chi-square tests. This chapter also covers the institutional factors affecting ASSGM from accessing funding from financial institutions.

Chapter 5

This final chapter started by reviewing the overall summary of the study followed by conclusions and recommendations. Conclusions and recommendations were drawn from the discussions of the findings from data analysis stage. The areas for further research were highlighted and the importance of this thesis to the researcher was also revealed.

1.13 Chapter Summary

Chapter One focused on the following: background of the study, which discussed the events that led to the problem under study; statement of the problem, which highlighted the focus of the study; objectives of the study were stated and four key questions were posed; research hypotheses; significant of the study; delimitations of the study, motivation of the study, structure of the thesis and the limitations that the researcher encountered were discussed. The next chapter delves into literature review

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

The purpose of this research is to discover funding models that could help the ASSGM sector achieve optimal gold productivity. Good Funding models to this sector should have an influence on the economy of Zimbabwe as was noted by Pact World (2015) which revealed the influence of Artisanal and Small-Scale Gold Mines to Gross Domestic Product, gold to Fidelity Printers and Refineries, exports and employment creation. ASSGM sector was affected by various factors including lack of collateral, legal framework, policy changes and lack of formalization. These challenges were limiting them from accessing funding especially from formal financial institutions. To have an understanding, this Chapter analyses different funding models to ASSGM sector and their effects. Empirical studies on ASSGM internationally and in Zimbabwe are analysed to give more detailed information on the nature of existing research on ASSGM. To locate this study in the existing literature thus investigate ASSGM sector in Zimbabwe which had helped to see how it is affected by other funding methods which had helped to come up with funding models that will assist them achieve optimum gold production. This stage will also discuss relevant literature on the field of ASSGM and other studies conducted in the field of finance on funding theory and models. Literature review had helped the researcher to develop the conceptual framework for this study and will be used to support the discussions on data analysis stage. Areas where ASSGM operate in Zimbabwe had also be analysed, this had helped the researcher on coming up with a good methodology which had helped in data collection.

2.1 Areas where ASSGM is mainly taking place in Zimbabwe

According to UNIDO (2018), two provinces where Large Scale Mines and Artisanal Small-Scale Mines are densely populated is Midlands and Mashonaland West provinces in Zimbabwe. Fig 2.1 shows Map of Gold Deposits and ASSGMs hotspots and FPR buying centres in Zimbabwe. From the map, it can be seen that most gold is in Midlands and Mashonaland West provinces.

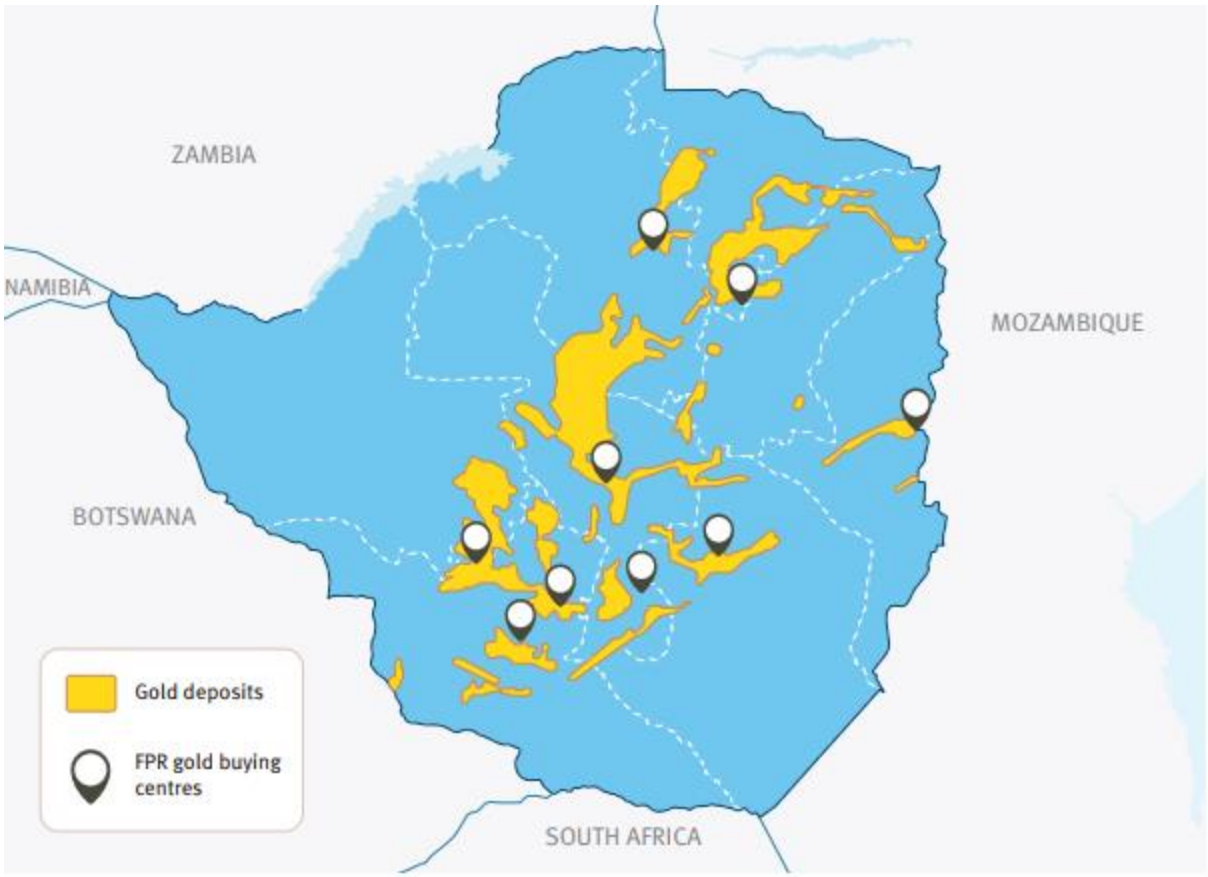

Figure 2. 1: Map of Zimbabwe Showing Gold Deposits and Hotspots for ASSGMs Gold Deposits and Hotspots for ASSGMs

Source: UNIDO (2018)

Mugumbate (2005) argued that the sites of gold mines in Zimbabwe are mainly dictated by the availability of greenstone belts, which have the richest gold deposits. Mashonaland West and Midlands house the central plateau that has granites, granitic gneisses and greenstone belts. In Zimbabwe one of the largest gold belts is in Kadoma-Chakari area and this area has the highest number of ASSGM, panners and millers (UNIDO, 2018). Most gold that is produced in Zimbabwe by ASSGM is thought to be from Kadoma, Kwekwe and Shurugwi (Butsher *et al.*, 2020). These areas mainly have gold that is found in rocks that are known as bedrock deposits. There is a lot of gold panning along Zimbabwe major rivers and these are areas where gold is coming from. This is called alluvial gold mining which is mainly done along major rivers and streams. This gold is fine and mainly comes from eroded bedrock deposits (Pact and the Institute for Sustainability Africa, 2015). Fig 2.2 shows gold mining along Zimbabwe main rivers

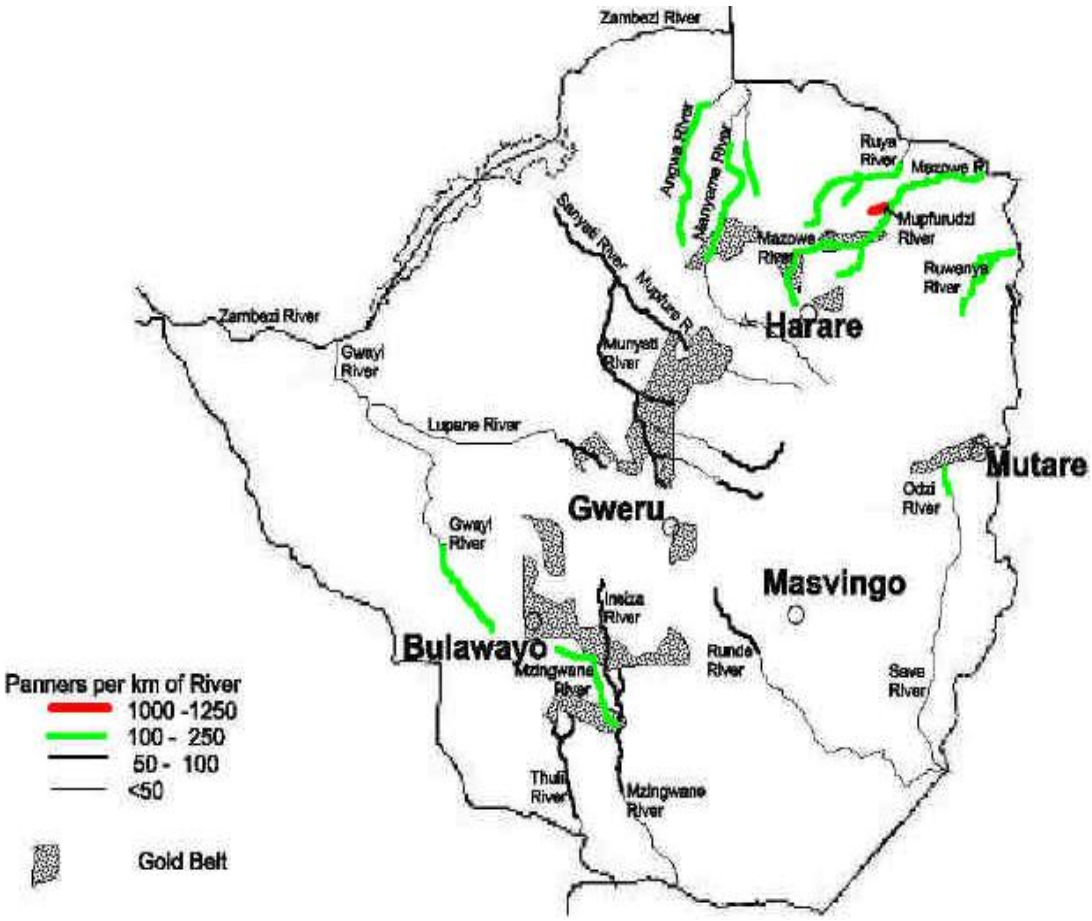

Figure 2. 2 Gold Mining along Zimbabwe Main Rivers

Source: Shoko and Veiga (2004). Global Mercury Project

Fig 2.2 is showing formal gold mining being done in areas with gold belts and panning along rivers. It can be seen that most panners were along the following rivers: Mazowe, Mupfurudza, Angwa, Manyame, Odzi, Gwayi, Ruwenya and Mzingwane. A study by Chouinard and Veiga (2008) indicated that the Kadoma-Chakari area, which lies within Muzvezve sub catchment produced about 10% of the country's artisanal small scale mining gold. This shows that some rivers had gold deposits, however this is a threat to the sub catchment's water resources which was noted by several researchers on gold punning along rivers and the danger it has to aquatic life. Shoko (2002) cited by Jamba (2015) projected that about two million people benefit directly or indirectly from ASSGM through alluvial gold panning along Zambezi Basin.

2.2 Theoretical Studies

The main theories that underpin this study are Pecking Order Theory put forward by Myers and Majluf (1984) and Financial Cycle Theories put forward by Berger and Udell (1998), Fluck *et al.* (1997) Diamond (1989) and Petersen and Rajan (1994) and Hamilton and Fox (1998). Other supporting theories are: The Static Tradeoff Theory put forward by Modigliani and Miller (1963) and Agency Cost Theory put forward by Jensen and Meckling (1976). The theories put forward by Myers and Majluf (1984) and Berger and Udell (1998) are useful to the ASSGM sector in Zimbabwe. These theories mainly suit small business, they also apply to the ASSGM sector since they are also small firms. ASSGM needed funding models that would give them ability to operate efficiently and generate income which would enable them to have a going concern and expand. Although there existed other challenges which affected the survival and expansion of ASSGM, funding was regarded as the most common factor. Most ASSGM in Zimbabwe might not have proper financial records and collateral which are needed by financial institutions, this limits them from accessing funding from them.

2.2.1 Pecking order theory

The Pecking Order Theory that was advanced by Myers and Majluf (1984), proposes that firms have some preferences in raising capital. The theory states that firms mainly start with least risk form of funding that is retained earnings, if this does not meet all their financial obligation, they move on to safe debt and they finally move on to equity. The theory suggests that when a business is looking for funding, it prefers to start by those that are less risky and those sources of funding that are of least cost, Aabi (2014) also proposes that for any firms to increase its cash flows and profits, they need to follow a specific ordered fashion of financing their processes. He further noted that firms should start with less cost source of funding like retained earnings and then move to safe debt and equity at last to address organisation's funding needs. The organisation should start with internal funding, debt and use equity lastly. As the business grows, the firm may engage in sources of funding that are relatively safe though there is debt and at the end firms want equity funding if it is well up. This model could be good for small scale firms who do not have collateral to acquire funding from formal financial institutions at initial stage but as it grows it will have the ability to look for other sources of funding that includes debt. This was supported by Holmes and Kent (1991) who argued that small businesses experience a more

intense version of pecking order in their decisions because their access to appropriate external sources of capital is limited. As ASSGM grows, they may have more asserts that may be used as collateral and they may engage in sources of funding that require debt.

2.2.2 Financial Cycle Theories

2.2.2.1 Financial Growth Cycle

This model was proposed by Berger and Udell (1998) for small business who have funding needs that change as their business grows. As every business grows especially small business, their need for funding also changes and they may favor sources that offer more funding which retained earnings or owner's capital may not afford. From Fig 2.3, it can be seen that this approach assumes that new and small businesses start using their own contributions and as their businesses grows, their funding will no longer be enough for their requirements and this will force them to use other sources of funding like trade credit and loans from medium term financial institutions. Firms that follow the growth life cycle as they grow, will then use equity capital and other types of equity more as they continue to grow. Berger and Udell (1998) further suggest that firms lie on a size/age/information continuum where the smaller/younger/more opaque firms "lie near the left end of the continuum indicating that they must rely on initial insider finance, trade credit, and/or angel finance. This theory assumes that as the firms expand, they will increase chances of obtaining other funding methods. When firms grow from being small and young, they will get funding from venture capital and mid-term funding and in the final stage it will get funding from financial institutions, this is because firms will be much old with more experience and information. This-helps firms to obtain public equity and debt for long term financing. Fig 2.3 shows Financial Growth Cycle.

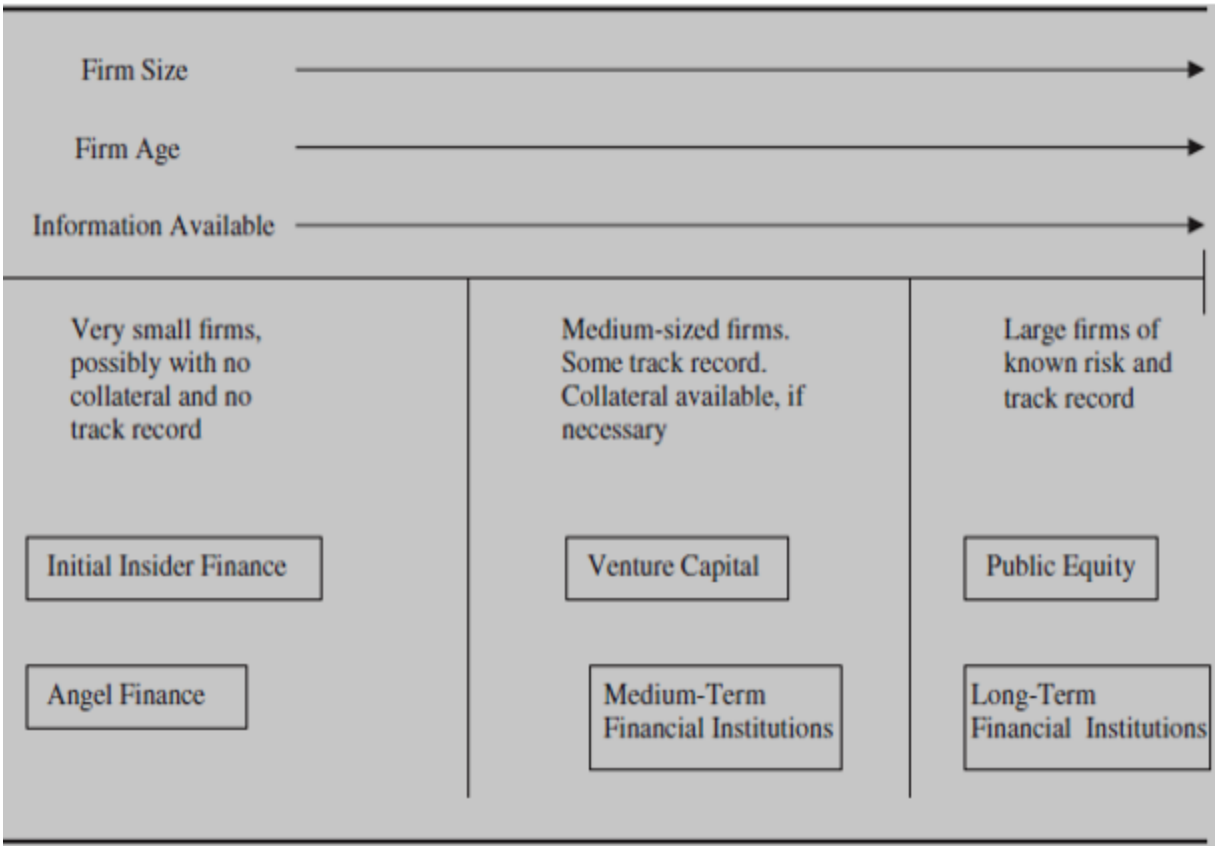

Figure 2. 3: Financial Growth Cycle

Source: Berger and Udell (1998)

2.2.2.2 Reputational Effect Hypothesis on Growth Cycle

This hypothesis was put forward by Diamond (1989) and Fluck *et al.* (1997) and it is consistent with Berger and Udell (1998) financial growth cycle for young firms to use debt at maturity stage. The hypothesis argues that young and small firms that do not have past experience and a well-established track record have less chances of obtaining debt funding which is consistent with The Perking Order Theory. If a firm has past history, past profitability, track record, credibility and reliability in the product market, they will be able to get funding from formal financial institutions with good business terms because these firms have developed a positive reputation with the financial markets (Diamond 1989). Financial institutions are not willing to offer funding to firms at the early phase in the growth cycle because these firms have little repayment history or record of profitability upon which financial institutions will rely on so they have to use internal resources and venture capital as was proposed by Berger and Udell (1998).

Diamond (1989) argued that as the firm matures, outside stakeholders can examine the firm's track record and its creditworthiness over time and a firm's reputation attenuates the problem of asymmetric information and improves its access to external sources of funding, such as trade credit and bank debt. Therefore, if artisanal and small-scale gold mine firms have attained good reputation in the market for a time and have less moral hazard challenges, it gives those firms better conditions for obtaining debt funding from financial institutions and other investors.

2.2.2.3. Reverse financial life cycle Hypothesis

This hypothesis was proposed by Petersen and Rajan (1994) and Hamilton and Fox (1998) who argued that funding and resources from small firms and their families are not sufficient enough to allow start up and growth. Hamilton and Fox (1998) revealed that there is need for debt funds in providing needed financial support beginning at the start-up phase and continuing thereafter for young firms to grow and retain the control of the business. In other cases, young firms may have more funding from external debt because this financing is not debt entirely (Berger & Udell, 1998). Although financial institutions require collateral security to guarantee the loan, Petersen and Rajan (1994) observed that young firms rely most heavily on loans from the owner and his or her family and then on bank loans at the initial stage. This is because relying on firm and family capital alone will not be enough to sustain startup expenses. This hypothesis argues that initially young firms' source of funding is from financial institutions and less from owners' funds. But as the business grow, the entrepreneur will have enough capital to retain in the business and this will limit the chances of the firm to continue borrowing from banks. As the firm continues to grow, there will be a balance between debt and equity at maturity stage. Petersen and Rajan (1994) believe that the level of debt in the business will decrease with the age of the firm, young firms use more of external funding whilst mature firms use retained earnings and equity.

2.2.3 Other Supporting Theories

Other than the two main theories which underpin this research, there are other supporting theories to funding models that can be used by firms. These theories include Static Tradeoff Theory put forward by Modigliani and Millar (1963) and The Agency Cost theory put forward by Jensen and Meckling (1976).

2.2.3.1 The Static Tradeoff Theory

This financial theory was proposed by Modigliani and Miller (1963), they argued that a firm may have less risk in having more debt than equity since debt funds are tax-deductible. This therefore means that debt funding is initially cheaper than equity funding. This was also noted by Myers, (2001) who argued that interest on debt is deducted from income before tax in the income statement leading to tremendous tax saving resulting in increased profits. This will give companies an opportunity to adjust their capital structure (debt over equity) by lowering their Weighted Average Cost of Capital (WACC). But if debt increases, risk also increases offsetting the decrease in the WACC. This theory identifies the correct combination of the capital structure where an increase in financial risk of a company is offset by a decrease in WACC. Heshemi (2013) noted that the static tradeoff theory equates the returns and the cost of debt, whereby the equilibrium point is referred to as the optimal capital structure. Modigliani and Miller (1963) state that the static tradeoff theory helps companies to select the supreme financial structure by matching the tax benefits of debt, to finance cost including agency and bankruptcy costs. Therefore, optimal leverage has an effect of lowering cost of capital while maximizing the value of the firm. This infers that those profitable enterprises rely on debt financing option because of tax advantage.

2.2.3.2 Agency Cost Agency theory

The theory refers to the conflicts that arise between managers and stakeholders, if there is conflicting of interest between firm management and stakeholders. Jensen and Meckling (1976) came up with the agency problem in the governance of firms. Management may want other objectives other than that of owners. Managers may be looking for job security, prerequisites, and in the worst cases getting a hand on assets and cash flows and it is assumed that the final objective of all stakeholders is to maximize their wealth (Heshemi, 2013). This will create conflicts and to solve this challenge, stakeholders use more debt financing in capital structure to restrict management. This will result in management minimizing spending and cutting their perks to avoid bankruptcy and default risk. This may not apply to ASSGM since most ASSGM owners are also the managers, Ang *et al.* (2000) argued that family or small firms can be

considered as zero agency cost since the level of conflict is low in these kinds of firms this was also supported by Jensen and Meckling (1976) who argued that there is less conflict between principals and agents in small and medium size enterprises

2.3 Empirical Studies on ASSGM

Several studies have dealt with ASSGM in Zimbabwe, Africa and the rest of the world. These studies were mainly focusing on importance of this sector to youths, women and the economy. Little was done on funding models which will help this sector to achieve optimum production (see Planet Gold Report 2020; Pact and the Institute for Sustainability Africa 2018; United Nations Economic Commission for Africa 2011, Asli *et al.* 2017 & UNIDO 2018), their coverage was mainly limited to ASSGM contributions to the economy. Most of these studies highlighted lack of collateral as the major hindrance affecting ASSGM from accessing funding from financial institutions (banks). There is no detailed information that exists on funding models that can be used by ASSGM in Zimbabwe. These studies in Zimbabwe analysed mainly contribution of ASSGM to GDP, Gold to Fidelity Printers and Refineries, exports and employment creation (RBZ, 2018 & Pact and the Institute for Sustainability Africa 2018). The need for funding of ASSGM in Zimbabwe was highlighted by (Munyoro *et al.* 2017, UNIDO, 2018 & The Institute for Sustainability Africa 2018). These researches clearly showed that there is need for funding in ASSGM. The studies pointed out that ASSGM do not have enough capital to have all the necessary tools needed for optimum production. They also highlighted that their contribution to the economy was hampered by lack of adequate funding due to lack of collateral to access funding from banks (Pact and the Institute for Sustainability Africa, 2017)

2.3.1 International Studies for ASSGM

Carstens (2017) studied artisanal and small-scale mining (ASSGM) sector and its importance for EU cooperation with resource-rich developing and emerging countries. The study noted that the ASSGM sector is important, it increases gold production and creates employment. The study further noted that ASSGM had a positive impact mainly on the contribution to rural development and poverty alleviation. Carstens (2017) revealed that despite its relevance, an improved knowledge base, the attention increasingly given to the sector and the policy brief shows that ASSGM has been marginalised in the international development debate and the development of

developing countries' mining sectors over many decades and project successes have been limited due to a piecemeal approach and the lack of continuous long-term and holistic support programs. Carstens (2017) concluded that the following should be done: an appropriate legal and regulatory framework, a minimum level of organization of the miners, adequate local governance capacities, capacity building and technical support, access to finance, gender equality and improve ASSGM-LSM relations for ASSGM sector to improve.

Huggins (2018) analysed resource nationalism, implications for artisanal and small-scale mining in Tanzania, the study observed that several African countries had enacted mining laws that could be described as resource nationalist which included increasing state investment in the sector, increasing royalty rates, and/or requiring local content. Huggins (2018) noted that these laws mostly focused on large-scale mining (LSM) and were not considering artisanal and small mining (ASM). Huggins (2018) concluded that there was need for decentralization of decision-making, consultation with stakeholders and increased access to training, capital and technology to ASSGM. Kecha (2018) studied ASSGM in Kenya and noted that the focus on large scale mining companies, as well as the overlooking of critical role of ASSGM by focusing only on the externalities had led to neglect of the sector and the ASSGM had not been well understood leading to lumping it together with industrial mining, yet the two were distinct with distinct challenges. The study concluded that the sectors needed to be approached separately.

Sauerwein (2019) studied gold mining development, trajectories, opportunities and oversights in Côte d'Ivoire and discovered that over the past four decades, many countries in sub-Saharan Africa had undergone different waves of mining sector reform in a bid to catalyse growth. The study noted that most of the region's governments had overlooked the importance of formalising and supporting artisanal and small-scale mining (ASSGM) which by comparison, had a much greater impact locally and in many instances, developmentally. Artisanal mining has now become the source of income especially to the unemployed, a study by Hilson *et al* (2018) on women and Artisanal and Small-scale Mining in sub-Saharan Africa revealed that although women in Sierra Leone and Zambia worked informally and faced very challenging circumstances daily, many had adapted to their surroundings and were now earning far more money than they would from any other income-earning activity.

Haundi *et al.* (2021) analysed socio-economic benefits of small-scale gold mining in Malawi and observed that ASSGM was characterised by people with low literacy levels who used traditional tools (low-tech) and used methods fueled by lack of capital, and deficiency of basic knowledge of mining and geology. Haundi *et al*. (2021) found out that the government could achieve substantial socio-economic development from the sector by: revising the current artisanal and small-scale mining (ASM) legislation so that it embraces the customary practices whilst safeguarding the environment and improving the tax collection base: providing support in form of mining related training and education to these communities; leading in transfer of modern technologies for improved extraction; supporting ASSGM cooperatives in securing credit facilities from financial institutions and closing the existing knowledge gap for ASSGM related issues through introduction of mining desk officers in district councils.

Bansah *et al.* (2018) studied socio-economic and environmental assessment of informal artisanal and small-scale mining in Ghana, the study noted that even though the informal ASSGM was a significant source of livelihood for many rural people who have few employment alternatives, it promoted truancy, child labour, teenage pregnancy, and environmental degradation. The study concluded that formalisation of the informal ASSGM in Ghana would minimise the socioeconomic impacts and ensure environmental performance. Perfect (2017) studied sustainable mining for long term poverty alleviation in the Democratic Republic of Congo on ASSGM and discovered that government should not be a policy maker only but should be part of international financing and oversight bodies and should also act as a mediator. Perfect (2017) further noted that major source of failure for ASSGM projects even for well-constructed programs with high community uptake is due to unsustainable funding or management. Another study by Hilson (2016) analysing artisanal and small-scale mining and agriculture in sub-Saharan Africa recommended that there should be simplification in licensing procedure for ASSGM, he noted that most miners were being frustrated with the licensing process. This is similar to situation in Zimbabwe where it was difficult and expensive to have a mining license for ASSGM owners which was discovered by (Gutu, 2017). The process should be simplified and be done at a lower cost as supported by Hilson (2016) who said that licensing process schemes must be simplified, adequately decentralised, and unnecessary costs must be eliminated and artisanal and

mall scale miners must be given adequate mining land. Hilson (2016) further recommended that there is need to empower local artisanal and small-scale miner's associations and coordinate donor activity because artisanal and small-scale miners were badly resourced, poorly staffed and limited in their reach.

Another study by Hagos *et al.* (2016) in Ethiopia on participation in traditional gold mining and its impact on natural resources, indicated that a majority of the traditional gold miners were youths (below 35 years old), unemployed (80%), and landless (90%). Hogas *et al*. (2016) noted that due to lack of funding and poverty, miners were using very traditional equipment and arbitrary approaches that were causing unavoidable natural resources degradations, depletion and pollution of water resources, land disturbances and severe soil erosion and vegetation and biodiversity loses. Hogas et al. (2016) recommended that the government and the local communities should come up with toothed and sustainable strategies to make it environmentally friendly with optimum benefits. A study in Ghana by Crawford and Botchwey (2017) on conflict, collusion and corruption in small-scale gold mining between the Chinese miners and the state in Ghana Gordon gold prices around 2008 onwards, noted that foreigners especially Chinese, entered the small-scale mining sector in Ghana, despite it being 'reserved for Ghanaian citizens' by law and the state was aware. Foreign miners operated with impunity because the state was aware and this had increased informality and corruption in the ASSGM sector.

2.3.2 ASSGM Studies in Zimbabwe

Munyoro *et al.* (2017) studied the importance of microfinance funding to the development of ASSGM sector in Zimbabwe. They discovered that ASSGM sector had some challenges in accessing funding from formal financial system such as commercial banks because of non-availability of collateral security and rigid loan requirements. The study further noted that accessing microfinance funding was also affected by unfavorable interest rates, lending terms, non-availability of books of accounts and mine permits and the informality of the ASSGM sector. Munyoro *et al.* (2017) further noted that lack of funding was curtailing productivity levels while increasing risks to the miners' personal health and safety and, environmental degradation and they recommended that the government and key stakeholders should promulgate regulations that guide the artisanal and small-scale mining and develop a framework for attracting funding

for the sector by private and public institutions. The government of Zimbabwe through RBZ could support and encourage microfinance sector to continue provide funding to ASSGM sector since it was the official buyer of gold in the country.

Ndhlovu *et al.* (2019) analyzed challenges faced by female small scale mine owners in Gwanda, Zimbabwe, they indicated that female mine owners faced daunting challenges such as lack of financial capital and high costs associated with mining activities, lack of equipment, lack of technical knowledge of mining, as well as legal and policy constraints. Ndhlovu *et al.* (2019) discovered that the women managed to survive and even grow in the harsh economic and political environment of Zimbabwe and they recommended that they should be legal and policy frameworks to support women. Another study by Hove and Hlongwana (2015) on women's participation in mining Kwekwe District, Zimbabwe, revealed that Zimbabwe tended to empower men more than women resulting in serious economic and social gender inequalities in the society since both women and men possessed inherent skills and weaknesses gender inclusive syndicates would ensure optimum utilization of their individual skills. Government of Zimbabwe should encourage equal opportunity of participation in the ASSGM sector for both men and women as was supported by African Mining Vision (2017) who argued that there should be use it or lose it policy which should be enacted into law, to open up ground for new entrants, such as the youth and women, who had been marginalized in the ASSGM sector for a long time.

On formalisation challenges to Zimbabwe, Mkodzongi and Zano (2020) discovered that lack of political will to enforce legal instruments to address the problem of informality, involvement of politicians in illicit trade in gold which made them reluctant to formalise the sector as this threatened their economic interests. Furthermore, they also observed lack of capacity in key ministries, such as the Ministry of Mines and Mining Development (MMMD), to address many of the challenges facing the mining sector at large. To avoid other conflicts in the ASSGM sector, there was need for a comprehensive cadastral process which would also help in the formalisation processes. Spiegel (2015) established that Zimbabwe was once regarded as a pioneer and a good model for the control and management of the ASSGM sector but due to increase in political interference and lack of policies in the ASSGM sector, the model was no

longer followed. Mkodzongi and Zano (2020) noted the need for formalisation since ASSGM was underpinned by undemocratic access to resource rents, so formalisation could create a conducive environment for poorly resourced artisanal miners to gain access to mine claims and escape exploitative labour arrangements. UNIDO (2018) argued that while the government of Zimbabwe had undertaken efforts to make regulation of the mining sector more ASSGM friendly, obstacles which prevented success remained, namely that the Mines Minerals Act (MMA) did not differentiate between different mining types and the cadastre system made it vulnerable to mismanagement. UNIDO (2018) noted that at many stages throughout the gold supply chain, legislation governing ASSGM remains difficult to both enforce and comply with. UNIDO (2018) further noted that without adequate support, ASSGM were unable to engage with formalisation efforts due to a reliance on more powerful actors who were more likely to be engaged in illicit activity.

African Mining Vision (2020) argued that the Central Bank should continue to fund the operations of ASSGM through the revolving fund as a strategy to encourage formalisation of the sector. According to Parliamentary Portfolio Committee on Mines and Energy, Zimbabwe, (2017), decriminalisation of ASSGM should be inscribed in law and should not be left to the discretion of the Minister of Finance or the Central Bank Governor. The Gold Trade Act (Chapter 21:03) should be amended clearly outlining decriminalisation of ASSGM (According to Parliamentary Portfolio Committee on Mines and Energy, Zimbabwe, (2017).

Pact and the Institute for Sustainability Africa (2017) noted that small-scale miners, like any other entrepreneurs, needed a complete package of business development services to thrive and grow. In addition to technology and information about mining methods and sustainable environmental management, they required business planning and management skills and access to credit and profitable markets. Planet Gold (2020) argued that access to investment, finance and markets was essential for small-scale miners and their communities to safeguard the long-term viability and ASSGM sector development. The study further noted that a number of financial interventions could be feasible options for ASSGM enterprises, such as government-backed finance schemes or innovative impact investments. Planet Gold Report (2020) further argued that there was to blend finance models that offset risk since private sector financiers were

not willing to fund this sector since it was regarded as a high-risk industry and seeking financing from impact-driven wealth individuals and investors willing to take risk would maximise the chances of an ASSGM sector securing financing. The study recommended the need to document more positive experiences in the sector providing proof of concept that these enterprises were viable, this would help other financial actors that were less risk-tolerant to engage ASSGM and provide funding to them. There was also the need to develop the knowledge and capacity to both miners and financial institutions which would help open up access to more formal financial services.

Pact and the Institute for Sustainability Africa (2016) assessed the contribution of artisanal and small-scale gold mining to Zimbabwe's economic growth and development. The study found that ASSGM made noteworthy contributions to both economic growth and economic development but these contributions were limited by the operating environment that ASSGM found itself in. The study concluded that there was need to create an enabling environment for ASSGM through bold changes to laws, policies, and how institutions implemented these. Pact and the Institute for Sustainability Africa (2016) went on to say that these conditions included creating property rights that were suitable for ASSGM and deregulation of gold mining in a manner that decriminalised gold possession, improve market access, and ensure that the government of Zimbabwe benefits from the ASSGM sector. The study recommended the following: develop miners' skills and grant them access to education, promote the development of formal financial institutions located in the rural communities (micro-finance) to foster a saving culture among the miners. The need for education and training was also supported by Mukono *et al.* (2018) when they argued that education and training were key strategies to improve processing and sustainability in the ASSGM sector. The study of Pact and the Institute for Sustainability African (2015) also shows that policies had a huge impact on the amount of contribution that ASSGM could make to economic growth and economic development. Policies that created a disincentive for selling gold on the formal market limited ASSGM's contribution to measures of economic growth and fiscal revenue.

ZEPARU (2016) studied best practices for supporting artisanal and small-scale mining in Zimbabwe and found out that although ASSGM sector was initially treated with disdain, many

governments in developing countries, particularly in African were increasingly appreciating the contribution of the ASSGM sector to gold production and there was now economic growth in their countries. ZEPARU (2016) concluded that there was need for governments, development partners and financial institutions to support this sector. He noted that the framework for technical support existed in Zimbabwe and could further be developed, but that framework was currently under-resourced and the country was also lacking on supporting the social and welfare side of ASSGM sector (ZEPARU, 2016).

Mkodzongi and Spiegel (2019) analysed artisanal gold mining and farming after the land reforms in Mhondoro Ngezi, Zimbabwe and established that although ASSGM had become an important source of income and employment for peasants and other unemployed people from urban areas, some had benefited and others had struggled drastically, some had accumulated enough capital to hire labour and acquire assets while others remained wage labourers. They went on to notice that ASSGM had deleterious effects on health and the surroundings. The impact of ASSGM to the environment was also noted by Gutu (2017) when he argued that there is need for Environmental Management Agency (EMA) to raise awareness and to educate ASSGM on sustainable mining methods. Mkodzongi and Spiegel (2019) noted that there is a need for both academics and policy-makers to learn from the struggles that labourers experienced and to recognise that existing mining laws and policies, which focus on the established small-scale mining entrepreneurs, needed to better appreciate that ASSGM was still, for many, a vital source of income or coping strategy – and for whom artisanal mining could be a local strategy to advance smallholder agriculture as well

Mukono *et al.* (2020) analysed strategies for sustainable gold processing in the artisanal and small-scale mining sector in Zimbabwe, they concluded that since some ASSGM operators were located closer to Large Scale Gold Mines (LSGMs) operations then these LSGMs were encouraged to improve communication and assistance in educating and training to ASSGM to foster good relationships in cohabitation. The need for LSGM helping ASSGM was also supported by African Mining Vision (2017) when they argued that there should be linkages between ASSGM and LSGM producers where large-scale producers should be compelled either by law or through a Memorandum of Understanding (MoU) to offer technical support to

ASSGM within their vicinity in order to promote sustainable mining methods and to minimise invasion of mining claims. Mukono *et al.* (2020) further argued that since ASSGM faced serious challenges in obtaining access to credit and formal banking as they were considered to be too risky and lacked capital to acquire improved tools and equipment for processing their ores, the government of Zimbabwe should create a special fund to assist the ASSGM sector in acquiring improved processing facilities and (NGOs) should also support ASSGM sector by creating funds available for prospective operators in the ASSGM sector and encourage dialogue between NGOs and ASSGM sector to ensure sustainable development in the ASSGM sector of Zimbabwe.

2.4 Legal Framework for ASSGM Sector of Zimbabwe

According to Pact and the Institute for Sustainability Africa (2015), Zimbabwe's legal and policy framework for mining was generally burdensome, with more than 40 acts of parliament regulating mining operations. ASSGM was directly affected by 24 of these acts and by the statutory instruments that fell under them (Zimbabwe Mining Laws and Regulations, 2021). Pact and the Institute for Sustainability Africa (2015) revealed that the Mines Minerals Act (MMA)'s silence on Small Scale Mines put those engaged in it at a disadvantage, these individuals not only lacked Large Scale Mines levels of financial and technical resources but also were ill-informed on the mining law's various requirements. Parliamentary Portfolio Committee on Mines and Energy, Zimbabwe (2017) argued that the Parliament of Zimbabwe should ensure that the amendment to the Mines and Minerals Act fully define and recognize artisanal and small-scale miners. In Zimbabwe, Gold Trade Act of 1940 governed the ASSGM sector together with the Mines and Minerals Act of 1961, Mines and Minerals Act of 1961 was later changed to Ministry of Mines and Mineral Development (MMMD) (chapter 21:05) to regulate the sector. UNIDO (2018) noted that the MMMD was the ministry responsible for mines and mining in Zimbabwe, it oversaw the Zimbabwe Geological Survey and the Zimbabwe Government Mining Engineer and the MMMD mainly controlled smuggling at the border, monitored illegal mines and the activities of gold buyers to ensure their records matched with the FPR's records. In addition to regulating the sector, the MMMD's work included providing technical assistance, approving licences and work sites, conducting dispute resolution and monitor compliance of ASSGM (UNIDO, 2018). The cost of compliance was high for ASSGM, some were failing to

comply, AMV (2017) argued that the government through the mining ministry should come up with a comprehensive cost structure that is suitable to the ASSGM sector. The ASSGM sector work under the requirements of different mining and environmental regulations Acts which include Mines and Minerals Act, the EMA Act (2002; chapter 20:27), NSSA and ZINWA.

According to Moyo (2017) cited by UNIDO (2018), the Reserve Bank of Zimbabwe (RBZ) - Fidelity Printers and Refiners (FPR), is the sole buyer and exporter of gold in Zimbabwe. Moyo (2017) revealed that this was done to strengthen the RBZ's hand in monitoring and mobilisation of the ASSGM sector and to boost foreign currency earnings. The FPR acts as the RBZ's gold-buying agency, giving FPR a monopoly to buy, refine and export gold in Zimbabwe (ZELA, 2020). FPR has the authority to buy gold from small scale producers and holders of gold buying permits, as well as LSGM operations (ZELA,2020). There is decentralisation of offices which buy gold for RBZ in Harare to different centres throughout the whole country. Although there is decentralisation of buying gold to the entire country, access to licenses is still in major towns and cities. ASSGM have no choice but to sell gold to FPR who might not offer good prices. Better part of the information on titles which is needed for registration processes is available at provincial offices under the control of Mining Commissioner who is now called Provincial Mining Director, Zimbabwe Mining Laws and Regulations (2021), and some ASSGM may not have access to those areas. Chidakwa (2016) argued that Mines and Minerals Act needed to be revised or amended to specifically address ASSGM issues, such as ASSGM access to mineralised ground, simplification of licencing procedures and improved prices/ flexibility in minerals marketing. Since FPR has decentralised throughout the country, it could buy directly from miners or through secondary buyers and agents licenced licensed to buy on behalf of FPR (ZELA, 2020).

At the local level, ASSGM is subject to the Rural District Councils Act (chapter 29:13), which empowers the local council to impose a land development levy on any rural land owners, including miners, that fall within the council's jurisdiction (Rural District Councils Act [Chapter 29:13]). UNIDO (2018) noted that Zimbabwe Republic Police (ZRP), the ZRP's are there for enforcing the MMA, in partnership with the MMMD, and combatting the smuggling of gold out of the country. Specific action includes checking mining permits and taking action when other

authorities (such as the MMMD, the FPR, traditional authorities, or others) report illegal mining to the ZRP (UNIDO, 2018).

According to Pact and the Institute for Sustainability Africa (2017), ASSGM are charged 3 percent mining royalties on gold and millers are charged the cost of annual licencing (US$8,000). These costs are too high for ASSGM. Parliament Portfolio Committee on Mines and Energy, Zimbabwe (2017) argued that the minister of finance needed to rationalise the taxation structure in the mining sector in line with promoting the ease of doing business so as to encourage investment into the sector.

2.5 Formalisation of ASSGM Sector of Zimbabwe

2.5.1 Efforts Done by Zimbabwe Government to Formalise ASSGM Sector

Previous findings in Zimbabwe and abroad cited, informality of ASSGM, and legal framework as some of the challenges that were affecting funding to ASSGM. Zimbabwe ASSGM sector had both artisanal and small-scale miners and different Statutory Instruments have been issued to try to formalise the sector. African Mineral Development Centre Report (2017) observed that the artisanal miners were the majority in the ASSGM sector. This implies that there could be more than 90% which means only 10% are Small Scale Miners (SSM) (African Mineral Development Centre Report, 2017). Since this sector had more artisanal miners than small scale, it therefore means that it needed a proper strategy for formalisation or granting them mining rights that could allow them to survive and grow. Zimbabwe used decentralised policy approach on gold panning activities by issuing Statutory Instrument 275 (1991), Regulations on Alluvial Gold Panning in Public Streams, this instrument created a framework that allowed Rural District Councils (RDCs) to issue licenses to riverbed gold panners that was separate from MMMD and local governments were responsible for coordinating training centres which were also served as gold-marketing centres for panners (Spiegel, 2015 & UNIDO, 2018). Statutory Instrument 275, ensures that permits were to be given directly to individuals and or cooperatives to panners who were residents of the district and were at least 18 years of age (Spiegel, 2015). If given work permit, panners had to agree to work at a distance from the lowest point of the naturally defined banks of a river stream and avoid disturbing the bank, and no mining was allowed to occur closer than 3m to either bank (Spiegel, 2015).

Statutory Instrument 275 further stipulates that trenches and pits that were dug near the rivers had to be backfilled, and it prohibited the use of mechanized equipment while also stipulating that it did not permit any working to have a vertical depth of more than 1.5 metres unless such working was terraced or sloped at an angle sufficient to ensure the safety of persons or was adequately supported (Statutory Instrument 275, 1991). This Statutory Instrument 275 according to Spiegel (2015) created international development linkages to support ASSGM livelihoods through donations which has seen Intermediate Technology Development Group (ITDG) and the Netherlands Development Organization (SNV) become active in providing funding in Insiza District, with German consultants heading a program focusing on educating panners on ways to reduce ecological impacts. According to UNIDO (2018), the Shamva project was widely viewed as a proactive step toward improving economic efficiency through technology sharing, and creating incentives for artisanal and small-scale miners to become licensed as only registered miners could use the milling services. United Nations Economic Commission for Africa heralded the Shamva project as a best practice in small-scale mining (Pact and the Institute for Sustainability Africa, 2015). Although this was revealed as the best approach to control the impacts of panning, Spiegel (2015) argue that MMMD also issued its own gold panning licences, which led to confusion and overlap between central and local government licences. Hilson (2009) also argues that regulation by the RDCs was not entirely successful, owing to insufficient resources and a lack of technical support by government. Spiegel (2015) also concurs with Hilson (2009) when he argued that the decentralisation in the 1990s and early 2000s was thwarted due to a variety of political factors at play, including changing power dynamics within the ruling party and the failure to build the capacity of RDCs. Although this policy had some challenges, it helped in providing donor funding to ASSGM of Zimbabwe and it still stands out as an example of efforts done by government of Zimbabwe to encourage formalisation between 1990s to 2000s. It shows that the country was actively supporting the ASSGM sector.

Statutory Instrument 275 was issued around 1991 and in 1993, the government of Zimbabwe formed the Policy Approach to encourage formalisation for Small-Scale Primary Ore. According to Maponga (1993), the government of Zimbabwe formed mining engineering department, the department was made up of mining engineers, mechanical/ electrical engineers, technicians and

mine surveyors all of whom offered free services to the Zimbabwe mining industry. This engineering department worked in major towns and regional offices of Harare, Gweru, Bulawayo, Masvingo Chinhoyi, Kadoma and Hwange. The major objectives of this department were to monitor the application and interpretation of the Mining Management and Safety Regulations, 1981 and the Explosives (Licencing and Use) Regulations, 1970 (Maponga, 1993). This department further offered the following services to ASSGM sector: advisory, free surveying, sampling, mine inspection, mine safety, management and sanitisation of the ASSGM sector. In addition, the department carried out feasibility studies on mines for loan applications and controlled the manufacture, storage and transportation of explosives necessary for mining (Maponga 1993). Spiegel (2015) noted that the government of Zimbabwe kept gold prices for small-scale miners at favorable rates to minimise smuggling which created incentives for miner registration. The government even had a special support price for gold that small-scale miners sold to the Reserve Bank in the 1990s, which was at certain times higher than international market prices to encourage ASSGM and increase government gold collection (Spiegel, 2015). The policies that were being done by the government of Zimbabwe to formalise the sector have attracted international funding. The donor community noted that Zimbabwe was working towards changing the informal ASSGM to work formally and they became confident to work in the ASSGM. This also attracted donor funding. In 2005 United Nations Industrial Development Organization (UNIDO) combined with the Ministry of Mines and the University of Zimbabwe worked together on the Train-the-Trainer program in the Kadoma Chakari area where gold is mined. This program has helped to educated ASSGM in different areas including pollution reduction, technologies to business and organisational training. This program was supposed to be used as a case study which other districts could copy and implement in their districts.

Another policy that was issued was recentralisation and reconfiguration of power from 2006 up to 2009. This policy forced all ASSGM to sell their gold to RBZ. Spiegel (2015) noted that all gold miners were to sell their gold to the Reserve Bank of Zimbabwe at a fraction of the international gold price. During the same period, the government of Zimbabwe also launched Operation "*Chikorokoza Chapera"* (No More Illegal Mining) in November 2006 (UNIDO, 2018). According to UNIDO (2018), at the begging of 2007 the crackdown was in full swing and police units were traveling to different mining sites across the country, arresting hundreds of

miners at a time and within first few months, the crackdown had left thousands of people jobless and involved the arrest of tens of thousands of miners. The crackdown extended to both licenced and unlicenced miners. They were to shut down until they complied with environmental regulations (UNIDO, 2018). UNIDO (2018) revealed that the Environmental Management Act (2002), suggested that all miners had to submit Environmental Impact Assessment (EIA) reports. The crackdown was being monitored by RBZ, police and other civil servants and Reserve Bank of Zimbabwe (RBZ) confiscated stockpiles of ore from ASSGM operators and set up mills to process the gold (Pact and the Institute for Sustainability Africa, 2015). Even though there were other operations implemented by Government on illegal mining like nationwide militarised intervention named Operation "*Mariyawanda"* (too much money) in 2003, Operation "*Chikorokoza Chapera"* marked a pivotal turn in policy, effectively criminalising ASSGM and adversely affecting many legitimate artisanal and small-scale miners and custom millers (UNIDO, 2018). All these efforts were to encourage or force ASSGM in Zimbabwe to be formal.

2.5.2 Challenges to formalisation of ASSGM Sector in Zimbabwe

There are several factors that were hindering formalisation of ASSGM in Zimbabwe, these include none separation of LSGM and ASSGM, there is need to recognise ASSGM and formalise their operations (Zvarivadza, 2018). Parliamentary Portfolio Committee on Mines and Energy needed to repeal the MMA and pass a bill that addresses issues such as the formalisation of artisanal miners (Parliamentary Portfolio Committee on Mines and Energy, Zimbabwe, December, 2017 cited by UNIDO, 2018). A call was made that there was need for formalisation of all unregistered artisanal and small-scale miners and a holistic approach was needed for this process to succeed (Zimbabwe National Assembly Hansard, 2021). The legislation favored LSGM operations to have ownership over large pieces of land this was revealed in the Zimbabwe National Assembly Hansard (2021) when they stated that large-scale producers were accused of holding on to vast tracks of land which they were not fully utilising. Pact and the Institute for Sustainability Africa (2017) argued that the richest gold deposits were already owned by LSGM, these large-scale gold producers had enough capital to hold those pieces of land over a long period of time exceeding 10 years. This would force ASSGM to wait for long periods of time or they would operate close to those areas without being registered. UNIDO (2018) argued that there was need to facilitate access to land and deposits to various mining

advocacy groups because small-scale mining associations had criticised the fact that many of the country's mineral titles were held by large companies and not small-scale miners.

There was lack of computerised cadastre which was causing deliberate encroaching of ASSGM to LSGM mining cites due to lack of adequate mapping. Artisanal and Small-Scale Gold Miners would do illegal mining on legally registered claims causing disputes and conflicts between the two sectors (Mambondiyani, 2017). Furthermore, accountability and transparency of ASSGM was affected by non-availability of a computerised cadastre system. There was high level of corruption in ownership disputes and the award of mining tables, UNIDO (2018) argued that a mining sponsor could exploit political connections to register a claim after a gold rush confirms the richness of a site. Zimbabwe Mining and Sustainable Development (2020) noted that to curb corruption and disputes in the ASSGM claims allocation, there was need to operationalise the computerised mining cadastre system. UNIDO (2018) noted that the combination of unclear land ownership and mining rights, paired with opportunity for corruption, is a significant challenge to formalisation efforts as it further increased hurdles for ASSGM seeking to operate legally and government actors seeking to regulate the sector.

Spiegel (2015) revealed that problems such as bureaucratic delays in paying producers for gold output, institutional confusion, and conflict damaged relationships between national authorities and miners. According to UNIDO (2018), the licencing process is long, hectic and arduous, it involves long distances to licencing areas, lengthy processing times and costs are a deterrent to obtaining a licence at all points in the supply chain (mining, milling, and buying). UNIDO (2018) noted that there are multiple vulnerable points in the supply chain which can be exploited by illicit actors. Chidhakwa (2016) noted that illegal ASSGM did not sell their gold to FPR but rather went to informal markets. UNIDO (2018) noted that for one to be given a licence, the following were to be done: the individual must buy a prospecting licence whether ordinary or special, which gives the holder permission to conduct prospecting for two (2) years, a miner must then get consent to access land, which may require a letter of consent from the landowner or the local government or permission from traditional authorities, the miner must then engage an approved prospector to take the coordinates of the area of interest, the coordinates are then brought to a maps office, where the surveyor checks whether the area is available, if available a

prospecting notice is posted for 30 days, MMMD officers also have to inspect the location and verify the coordinates, after verification the registration fees must be paid within fourteen (14) days, a mine manager must be appointed before the mining licence is given, EIA must also be conducted, a worksite plan approved and the licence must be renewed annually.

Apart from process of obtaining licences being long and hectic, the fees are too high for ASSGM who are still small but willing to engage in this sector. EMA Act (2002) needs all ASSGM to have EIA reports. This Act allows miners to resume operations, after an environment management assessment has been carried out by qualified EIA consultant who is listed on the national roster.

2.6 ASSGM in Zimbabwe

In Zimbabwe there are legal (formal) ASSGM, these are the miners who have permits to work in the artisanal and small-scale mines. They are registered and they are governed by legal framework of ASSGM sector. They work within the provisions of the Mines and Minerals Act (Chapter 21:05, 1996), Gold Trade Act (Chapter 21:03), Environmental Management Act Chapter 20:27 (2002) Mining (Management and Safety) Regulations (1990), and Environmental Management (Control of Alluvial Mining) Regulations (EMR 2014) and various other mining and environmental regulations. According to Environmental Management Agency Act 20:27 any miner working without EIA is illegal/informal. Informal artisanal and small-scale mining comprises the unregistered gold miners. They include men, women and children who mainly do panning along rivers and scattered everywhere in Zimbabwe. UNIDO (2018) defined this practice as "*Chikorokoza"* this is mining undertaken outside the legal framework of the country laws. Zimbabwe Mining Sector Situational Report (2020) tried to estimate the number of both formal and informal miners and found out that it was between 200 000 and 250 000 and it could surpass this number to over two million if it includes illegal miners and people who provide other support services like transport, food and other basic services.

Chidhakwa (2016) defined illegal miners as those miners who work with no mining permits. These are miners who work without government approval. Some of illegal miners work very close to areas where LSGM companies operate because the areas are rich in minerals and this

causes conflicts amongst the miners. The presence of these illegal miners in different parts of Zimbabwe and near properties of LSM is causing some challenges. Around 2019, there was emergency of violent groups, the machete wielding gangs popularly known as "*Mashurugwi"* of illegal miners who were causing criminal activities in Zimbabwe ranging from theft, sabotage, vandalism of properties of other ASSGM, assault/killing other miners and community members (Mkodzongi, 2020).

Fig 2.4 was extracted from Hentschel *et al.* (2003) showing factors influencing the willingness of small-scale miners to operate legally and formalisation. They found out that if the following factors are addressed, small scale mines would be willing to formalise.

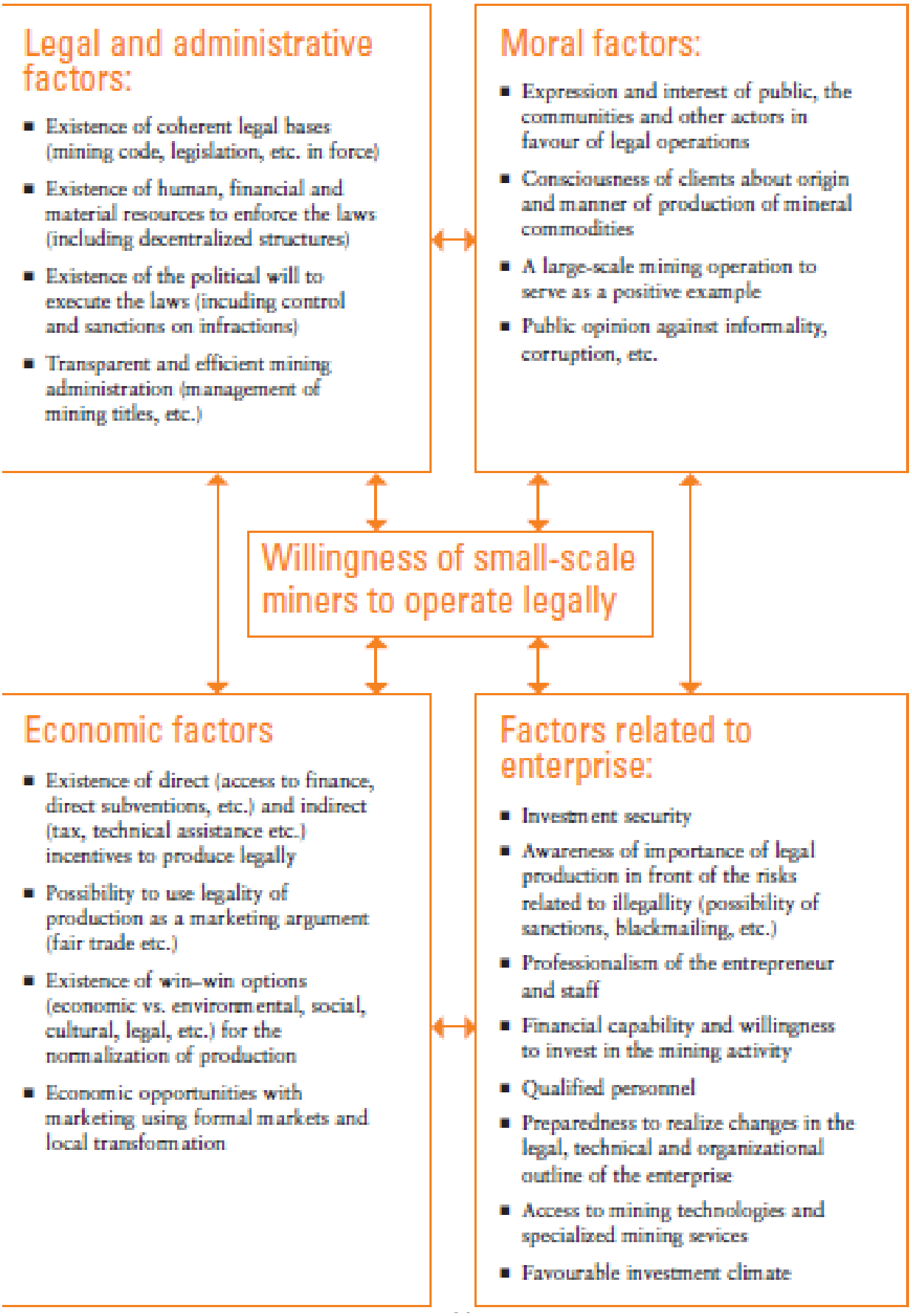
Legal and administrative factors:
Existence of coherent legal bases (mining code, legislation, etc. in force)
Existence of human, financial and material resources to enforce the laws (including decentralized structures)
Existence of the political will to execute the laws (incuding control and sanctions on infractions)
Transparent and efficient mining administration (management of mining titles, etc.)
Moral factors:
Expression and interest of public, the communities and other actors in favour of legal operations
Consciousness of clients about origin and manner of production of mineral commodities
A large-scale mining operation to serve as a positive example
Public opinion against informality, corruption, etc.
Willingness of small-scale miners to operate legally
Economic factors
Existence of direct (access to finance, direct subventions, etc.) and indirect (tax, technical assistance etc.) incentives to produce legally
Possibility to use legality of production as a marketing argument (fair trade etc.)
Existence of win–win options (economic vs. environmental, social, cultural, legal, etc.) for the normalization of production
Economic opportunities with marketing using formal markets and local transformation
Factors related to enterprise:
Investment security
Awareness of importance of legal production in front of the risks related to illegallity (possibility of sanctions, blackmailing, etc.)
Professionalism of the entrepreneur and staff
Financial capability and willingness to invest in the mining activity
Qualified personnel
Preparedness to realize changes in the legal, technical and organizational outline of the enterprise
Access to mining technologies and specialized mining sevices
Favourable investment climate

Figure 2. 4: Factors that influence the Small-Scale Miners to operate legally

Source: Hentschel *et al.* (2003)

2.7 Funding Mechanisms Available to ASSGMs

2.7.1 Funding from family and friends

Family members and friends who may want to support the idea of ASSGM could provide funding to ASSGM or small-scale gold miners may use their money to buy machinery and equipment for day-to-day operations at the mine place. This funding model is cheap and fast. If they use their family money, then there is no debt and if they borrow from friends, repayment terms may be more flexible than a bank loan. Fay (2021) argued that the main advantage of receiving a loan from a friend or family member is that your "lender" is more likely to be flexible about the amount borrowed and payment arrangements. This means you could borrow 100% of the amount you need at a very low-interest rate possibly 0% and get an affordable monthly repayment schedule (Fay, 2021).

2.7.2 Plough Back Profits

Plough back profits is a process which utilizes undistributed profit for meeting all the financial needs of a firm (Account Leaning Contents for Management Studies, 2021). This funding method is available to ASSGM who have been in business trading for at least a year. This is when the ASSGM businesses are able to retain back the profits of previous years into the business. This funding method does not attract interest and the money is not paid back to lenders. The only problem with this funding method is that it is only available to businesses that has more than one year in operation. Account Leaning Contents for Management Studies (2021) also noted that internal financing may not always be useful to the company or its shareholders.

2.7.3 Sale of Assets

For ASSGM, selling an asset to start business involves selling assets such as livestock, vehicles or other assets by ASSGM to start up the business. As a disadvantage some businesses are unlikely to have surplus assets to sell to raise capital needed to start an ASSGM and can be a slow method of raising finance, it was also revealed by Munyoro *et al* (2017) that the capital which may be raised by ASSGM through selling assets may not be adequate. Several studies

have noted that ASSGM is mainly ventured in to alleviate poverty by rural communities, so it will be rare for them to have assets they may sell to raise capital.

2.7.4 Banks loans

Zimbabwe Economic Policy Analysis and Research Unit, (ZEPARU) 2016 noted that lack of access to credit by the ASSGM sector is considered a major impediment to the sector's growth and sustainability. Many banks consider loans to ASSGM to be high-risk, which is largely true because the sector generally has no capacity to provide bankable mineral resources estimates (ZEPARU, 2016). Unfortunately, the challenge is cyclic because it is not cheap to hire experts to conduct bankable resource estimates. ZEPARU (2016) noted that there was need for technical and financial support to the artisanal and small-scale sector before projects could be regarded bankable thereby enhancing their chances of getting loan approvals from banks. In Zimbabwe, traditional banks are generally considered less supportive to the ASSGM sector compared to microfinance institutions that are prepared to take risks of potentially bad loans (ZEPARU,2016). Government of Zimbabwe itself runs the Mining Industry Loan Fund which has previously supported the ASSGM sector (UNIDO, 2018). Most financial institution in Zimbabwe are reluctant in funding ASSGM, this is because they lack collateral (Planet Gold Report 2020). This leaves them with less funding options. ASSGM is dominated by youths who are unemployed with no assets to act as security and women who do not have collateral security (Hogas *et al.,* 2016). Some institutions who are giving funding are microfinances. Funding from microfinance is not adequate for ASSGM who may want to buy big machines (Planet Gold Report, 2020). In Guyana, small-scale mining families who control the Guyana Gold and Diamond Miners Association take out mortgages using their houses and cars as collateral, from banks such as Citizens Bank Guyana and Republic Bank, to finance operations (Asli *et al.,* 2017). Ghana-based banks, including National Investment Bank, Stanbic and SG-SSB have also experimented with lending to ASSGM operators. In most of these cases, the commercial loans provided are highly collateralized, have high interests with strict repayment schedules, and require substantial amounts of money upfront (up to US$1 million) to land (Adu-Darko, 2014 cited by UNIDO, 2018). In Kenya, K-Rep (now Sidian) Bank and Rafiki Microfinance a commercial lender and conventional microfinance facility, respectively, have at times been pitched as ASSGM lenders (Rafik, 2019)

2.7.5 Leasing and hire purchase (asset financing)

Most small-scale gold mines use this method when it comes to acquiring the service of a machine in Zimbabwe. Leasing is a financial instrument that either grants the right of use or control of a tangible asset such as property, vehicles or equipment, to a third-party (lessee). Leasing usually involves three parties: namely, the lessor (entity that leases the asset), the lessee (the entity that acquires the asset) and a financier (provider of finance to the lessee; this could be a third party or the lessor). Where a lease only involves the right of use of an asset, the lessor maintains control and ownership of the asset while the lessee has the right to use the asset in exchange for periodic payments. When a lease involves the transfer of control of an asset to the lessee, the lessee is usually responsible for insuring and maintaining the asset. The lessee makes periodic payments to the lessor/financier and recognizes the lease as an asset and lease payments as a liability on his/her balance sheet. (International Financial Reporting Standards IFRS, 2015). Dzimunya *et al.* (2018) noted that for improvement of ASSGM environmental, access for hire-purchase loans for critical equipment such as jackhammers, compressors, generators, stamp mills and ball mills, concentrating tables within ASSGM, should also be facilitated by government. According to ZEPARU (2018), the Tanzanian government offers equipment hire/purchase which enhances the operations of ASSGM sector. ZEPARU (2018) also noted that to improve access to finance for small-scale miners, there is need for fair market prices for their minerals, control of illicit dealings, trading of minerals through appropriate licensing and providing necessary market information and access to equipment leasing arrangements.

2.7.6 Revolving funds

According to Thaku and Vaidya (2021), the revolving fund is established for the purpose of carrying specific activities, and the primary advantage of this fund is it may be loaned or spent repeatedly. The basic idea behind that fund is that, it is a fund or money backup that remains available to finance organizations continuing activities. It circulates between the fund and the members (Thaku & Vaidya, 2021). The initial contribution of this fund comes from its members, that is through initial fund investment in the case of Non-Governmental Organizations (NGOs). In the case of Governmental organizations, it comes from the National (Central or State) Government, and in the case of non-profit making organisations, it comes from donors (Thaku &

Vaidya, 2021). The Government of Zimbabwe and Non – Governmental Organisations (NGOs) first engaged in the revolving fund around 1990s, the scheme was implemented to finance low-cost mining equipment (pumps, generators and crushers), with payback periods of between one and three years (United Nations Economic Commission for Africa, 2002). The scheme was controlled by the Chief Government Mining Engineer and was administered to ASSGM as a revolving fund.

2.7.7 Joint Ventures

Joint venture is coming together of two or more people or businesses to start a new project. Each individual will contribute towards the project and share the proceeds and expenditure. Joint ventures of artisanal and small-scale gold mining are when two or more ASSGM engaged in a solitary mining business for profit without actual partnership or incorporation (Pact and the Institute for Sustainability Africa, 2015). Joint ventures are mainly done for a single project and after the project is done, the venture will collapse. This may work for ASSGM if one party discovers a place with mineral deposits but without adequate machinery, he may form a joint venture with other ASSGM that has enough machinery and equipment. It may also work if a small-scale gold mine enters into a joint venture with a large scale mine that have resources, for example in Bolivia Coeur d'Alene Mine Corporation entered into a joint venture with organized ASSGM cooperatives representing 15,000 local artisanal miners (The International Institute for Sustainable Development, 2017).

When ASSGM forms an association or joint venture, it will be easy for them to obtain funding since funders will have hope that the association will be able to return or use the funds economically, Mandizha (2015) noted that funding from government and NGOs will be easily accessed since these organisations will be communicating with representatives alone rather than giving funding to an individual. For example, Mandizha (2015) reports that the Centre for Natural Resources Governance (CNRG) is working with artisanal miners in Penhalonga, Zimbabwe, by registering claims for them and providing working tools because they are associations. This establishes an easy communication rapport as the NGOs, governments, and international donors consult representatives of the associations who use the funds in the correct manner. Government can offer mining rights to ASSGM associations, which become responsible

for the mining claims allocated to them. Combined effort of the members of each association leads to the responsibility and protection of the mining area given to that particular association. This approach instills a sense of belonging in the miners and safeguards their allocated mining areas, as they know that the mining areas are their source of livelihood (Zvarivadza, 2018). Joint ventures lead to the pooling of resources such that the miners become capable of buying the necessary equipment for their work (Zvarivadza and Neingo, 2015).

2.7.8 Partnership

ASSGM may form partnerships among themselves or with large scale mines which will help them with funding. Zvarivadza (2018) noted that large scale mines can make partnerships with ASSGM cooperatives operating around their premises and fund them. The small scale and large-scale mines may enter into a formal arrangement to manage and operate their mines and share the profits Zvarivadza (2018) revealed that when Zimbabwe introduced the Indigenization Policy, Zimplats mine extended and intensified its partnership with communities (Mhondoro Ngezi, Chegutu and Zvimba) in the area in which it operates. The Zimplats Mine established a Community Share Ownership Trust (CSOT) for the following communities: Zvimba, Chegutu and Mhondoro Ngezi in October 2011 as a vehicle for investment in these communities. The proceeds from the trust together with donations from the mine are invested towards community development projects including health, transport infrastructure, education, sustainable income generation projects, employment creation, construction of schools, provision of clean water and sanitation, food production projects and agriculture among others.

2.7.9 Donor Funding

Donor funding plays an important role in providing funding to ASSGM sector across Africa. A donor fund is a private fund administered by a third party and created for the purpose of managing charitable donations on behalf of an organization, family, or individual (Charities Aid Foundation, 2020). Even though donor funding was helping different countries, there was need for formal funding methods that would help to create a long-term and sustainable solution to financial challenges that continue to affect ASSGM. The ASSGM sector should ensure that donor money should be used economically and they should be able to continue operations beyond the life of the grant. Donor funding helps many institutions to remain financially stable

and prevent corruption which may happen if it is administered by the governments (Charities Aid Foundation, 2020). Donor support is mainly given to ASSGM sector by donor agencies, trust funds, charities and foundations. Intermediate Technology Development Group (ITDG) was the major donor who was providing technical, financial, and other support services to ASSGM sector in Zimbabwe. Its major accomplishment was the establishment of the Shamva Mining Centre, which offers a range of services to small-scale miners in the Shamva area (Dreschler, 2001 cited by Planet Gold Report, 2020). Dreschler (2001) revealed that Intermediate Technology Development Group (ITDG) was the only NGO working with this ASSGMs in 1990s, mainly because other NGOs did not want to identify themselves with the bad publicity associated with artisanal mining, especially with regards to environmental degradation. Other donors who have helped ASSGM in Zimbabwe include EU Micro Projects, Gesellschaft für Technische Zusammenarbeit (GTZ) which has been funding the alluvial Riverbed Mining project initially in Insiza and now about to go national and Stichting Nederlandse Vrijwilligers (SNV) a Netherlands NGO which has committed itself to developing a vibrant small-scale and artisanal mining sector in the Insiza and Umzingwane rural districts (Dreschler, 2001, cited by Planet Gold Report, 2020)

2.7.10 Cooperatives

ZEPARU (2018) defined cooperatives as associations of about 40-50 ASSGM workers from the same village who organise themselves into a formal structure into which the community can invest to develop a project. ZEPARU (2018) discovered that when ASSGM form cooperatives they are easy to fund, Austrian Foundation for Small Mines (AFSM) have provided loan funding mainly to chrome mining cooperatives on the Great Dyke and this facility was later extended to the gold sector. Small-scale miners were organised in cooperatives and mined chromite ore and sold it to Zimasco and ZimAlloys ((ZEPARU, 2018). Freitas *et al*. (2015) defined mining cooperatives as associations created by miners which aim to support the exploitation, industrialisation and commercialisation of mining products. Cooperatives have become a powerful representation voice to communities and also to different economic sectors in many developing countries, generally supporting small producers through a collective approach (Francescone, 2015).

2.7.11 Factoring

Factoring can help companies improve their short-term cash needs by selling their receivables in return for an injection of cash from the factoring company (Barone & James, 2020). Factoring is when a company sells its receivables to a factor or debt company at a lower price(discount). This method helps companies to reduce bad debts. The factor or a debt company will fund the company and collect their money with an interest from the creditors (Barone & James, 2020). There are several names given to this funding method which include: trade receivables funding and debt factoring. This method is not used to fund ASSGM of Zimbabwe since most of them have got a ready market, the Fidelity Printers and Refineries. Those who do not sell to Fidelity Printers and Refineries sell to buyers in the parallel market mainly on cash bases.

2.7.12 Venture capital

Venture Capitalists are investors within the subset of private equity, they raise money from foundations, organisations, rich individuals, pension funds, and other actors that are willing to invest (Makomaski & Johansson, 2013). When the money is raised it is put into a fund with different lifespans that is dependent on exit strategy. Planet Gold report (2020) noted that some ASSGM operators have managed to negotiate partnerships that have yielded direct investment in their activities and those capital investors who invest in the company take partial or full ownership of an entity in exchange for providing capital. Capital investors can exercise some decision-making controls by participating in the entity's governance such as having a seat on its board or voting at annual general meetings (Planet Gold Report, 2020). Venture capital is the provision of investment finance to small companies in the form of equity or quasi-equity instruments not listed in the stock exchange (Makomaski & Johansson, 2013). Venture capitalists bring both funds and expertise.

2.7.13 Business Angel

Lerner (2010) defines a business angel as a wealthy individual who invests in entrepreneurial firms. These are wealthy individuals who invest personal capital in start-up companies in return for an equity stake. Mason and Harrison (2008) opined that business angel investor is a high net worth individual, acting alone or in a formal or informal syndicate, who invests his or her own money directly in an unquoted business in which there is no family connection and who, after

making the investment, generally takes an active involvement in the business, for example, as an advisor or member of the board of directors. The angel investor market tends to be largely informal and less professional than the venture capital market (Mason & Harrison, 2008). Their appeal is that they fund early-stage startups (often without revenue) and serve as mentors and sometimes as outside directors for entrepreneurs. Angel investors boost growth, operating performance, and the long-term survival of the firms they finance (Leaner, 2010). Mason and Harrison (2008) revealed that business angels are private investors that directly invest in private equity.

2.8 Factors affecting type of funding to Artisanal and Small-Scale Gold Mines.

2.8.1 The Potential for Growth of ASSGM Sector

If an ASSGM is showing potential for growth and prospects of making large profits, it will attract more sources of funding than those that show little prospects of growth. Most investors are interested in investing in ventures that guarantee them their return. Most sponsors in the ASSGM want to help where there are signs of money or where they see value (Mkodzodzi & Spiegel, 2019). ASSGM in Zimbabwe is not predictable it can be profitable for one year or for a certain phase and then followed by bad spells. Mkodzongi (2013) noted that a profitable year can be affected by a slump in commodity prices or difficulties in finding the gold just like what happens in farming where a bumper harvest can be followed by a drought leading to crop failure. Mkodzongi and Spiegel (2018) found out that the potential of ASSGM in Zimbabwe is now attracting people from as far as China with the Chinese now involved in the sector as sponsors buying gold and setting up gold milling facilities. The involvement of these Chinese in ASSGM has triggered new dynamics especially in the milling sector where they are now competing with locals who have historically dominated the sector. Mkodzongi and Spiegel (2019) noted that the Chinese have enough capital to provide all the needed equipment and machinery that local people do not have. This is because locals do not have funding models which will also help them to have sufficient machinery thereby affecting their ability to generate more money. Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development [IGF], (2018) opine that to finance ASSGM, they should use geological information as collateral for loans when there is potential.

2.8.2 The Size of ASSGM

The size and experience of ASSGM have an influence on the type of funding available to them. Chukwuma (2017) observed that in United States small businesses represent 99.7% of firms that provide employment and account for over 50% of all private sector employment. Nevertheless, the rationing of small business borrowing is an indicative of acute credit constraints emanating from poverty, lack of collateral, lack of cosigners for bank loans, high administrative fees associated with processing credit loans, and information asymmetry along with other socioeconomic factors (Chukwuma, 2017). Large mines that are old and have experience are likely to obtain funding from formal financial institutions which is not available to young and small ASSGMs. In DRC, the ASSGM sector is dominated by small entities (including mining operators and exporters) that generally lack formalised management and governance structures, and do not have demonstrable financial track records often due to a lack of financial accounting and management capacity. This absence of formalised operators makes it almost impossible for banks to lend money to ASSGM. Additionally, and specifically in the ASSGM sector, the small quantity of legally exported product impedes the potential financial return available, and thus disincentivises financial institutions from investing (Sofala Partners, 2019). Planet Gold Report (2020) noted that many ASSGM operations are too small, and the transaction costs are too high to attract finance from commercial banks or investors. Microfinance, community savings/loan facilities or specialised government mining funds can and have supported smaller operations, but the amounts available are often insufficient for major investments in operations and equipment that can fundamentally transform and professionalise operations (Planet Gold Report, 2020).

2.8.3 The nature of the Sector ASSGM

Several studies have noted that ASSGM sector in different countries is informal. The informality of this sector makes it fail to access funding from other sources like donor funding as was highlighted early that there was only one donor funding in Zimbabwe around 1990s and others were not willing to provide funding due to bad publicity of the sector. There is need for formalisation of the ASSGM sector so that it could obtain funding from different sources. Formalisation helps government and financial institution to monitor and regulate this sector. Planet Gold (2020) argued that legal status of ASSGM operations is a fundamental barrier to access to finance since some are in the informal (and sometimes illegal) sector. Most formal

lenders are unable to enter into finance agreements with operations that lack legal status. In Zimbabwe it was estimated that there were well over 500 000 registered artisanal and small-scale mining claims (Zimbabwe Miners Federation, 2020). MSD (2002) noted that the Intermediate Technology Development Group (ITDG) was the only NGO funding this sector until mid-1990s, mainly because other NGOs did not want to identify themselves with the bad publicity associated with artisanal mining, especially with regards to environmental degradation in Zimbabwe. In DRC, Sofala Partners Limited (2019) noted that artisanal mining had a universally negative image among global financial institutions because global banks had a lack of knowledge of the ASSGM sector and its importance to local economies and global banks often only encounter the subject of ASSGM as a risk factor to be mitigated when financing industrial mines, rather than as an opportunity. Global banks are accustomed to lending to legally incorporated companies with standardised corporate governance frameworks and hard asset collateral, loan decision processes are therefore not configured to assess the financial risk of lending to the less formalised entities typical of most artisanal operators.

2.8.4 ASSGM Preference to Debt/ Equity

According to Planet Gold (2020) some miners simply cannot or do not wish to comply with the myriad financial and operating conditions under which formal finance is offered. As such, they may prefer to continue to rely on family, friends, and well-known trusted local middlemen. Further, from the point of view of the miner, remaining in the informal economy allows them to avoid taxes and royalties that eat into profits. These middlemen have often been branded as unscrupulous taking advantage of their monopolistic positions to broker unfair deals. Many have called for the removal of such financiers, despite the lack of substitute sources of finance (Carstens 2017). From a different perspective, these middlemen can be crucial cogs in ASSGM systems. Miners' continued reliance on them for finance both informal and licenced is perhaps a telling sign of how few financial alternatives exist for miners and how little trust government and formal lending institutions have in these miners.

2.9 Why Financial Institutions Do Not Want to Offer Funding to ASSGM

2.9.1 Collateral.

Most ASSGM are not able to access funding from financial institutions due to lack of assets which are good enough to be used as collateral security when they want to borrow loans from financial institutions. Chukwuma (2017) noted that loans to households and SMEs, with sensitivity to systematic risk, are treated unfavorably and required to pledge more collateral. Planet Gold Report (2020), UNIDO (2018) and Pack and the institute for Sustainability Africa (2018) all noted that access to formal credit is usually not available due to a general reluctance of banks to finance ASSGM due to the risky nature of the sector, lack of assets and collateral, lack of formal mining titles, absence of feasibility studies and adequately explored and proven reserve. Furthermore, financial institutions want all firms that need funding to offer their own equity which is sometimes not available for ASSGM sector which will make it difficult for the sector to access funding. The International Institute for Sustainable Development (2018) found out that Grameen bank had successfully provided microfinance funding for ASSGM in Yale area in the Talensi-Nabdam District, Northern Ghana they recommended social collateralization of funding capital to groups than individuals, they noted that groups were likely to pay. The Grameen Model was also applied in Tanzania and there was relative success (The International Institute for Sustainable Development (2018)). Spiegel (2015) suggest that equipment loans could be a better alternative to cash to ensure that finances dispensed are used to purchase the required technologies.

2.9.2 Financial Institutions may not have financial products that meet specific ASSGM needs.

Planet Gold Report (2020) observed that since ASSGM is perceived as a high-risk sector, this means that there are fewer finance providers willing to engage with the sector in the first place. So, when ASSGM want funding, banks may require hard collateral, high interest rates, strict repayment schedules or other conditions to achieve an acceptable risk-adjusted return. These terms will make the loans more expensive or inaccessible for all but a handful of small-scale miners. ASSGM may not be able to meet these requirements and banks will find it difficult to have a financial product for this sector which is marred by inconsistencies in production levels (seasonal miners, migrant miners and informal miners) and uneven or no cash flows which would undermine their ability to make regular payments (Planet Gold Report, 2020). The report

further argued that to finance high risk sector, requires returns that are many multiples of the initial investment, a requirement that most ASSGM will not meet.

2.9.3 Failure of ASSGM to meet due diligence requirements.

Planet Gold Report (2020) revealed that financial providers evaluated the Environmental, Social and Governance (ESG) risks associated with financed activities and concluded that ASSGM businesses had difficulty complying with the full range of ESG criteria used by finance providers, and/or they did not know how to document their compliance. Similarly, ASSGM operations could not understand how to characterise or quantify their potential positive impacts that would attract impact investors (Planet Gold Report, 2020). Furthermore, they noted that financial providers found out that the returns would be less than the expenses which would be incurred on the due diligence analysis due to the lack of widely available ASSGM due diligence toolkits as well as the lack of reliable local mechanisms to monitor the use of funds (Planet Gold Report, 2020).

2.9.4 Regulations Prohibiting Funding to ASSGM Sector

Mudaliar *et al.* (2019) analysed practical barriers to finance the ASSGM sector. They noted that the barriers depended on the country and type of finance, they gave the following scenarios: Foreign Direct Investments (FDIs) may face barriers from the country's rules on international financing, as well as policy uncertainty on FDIs and taxation, restraining application or analysis of fiduciary duty may also create a barrier for certain investors who may not be able to work in other areas like Democratic Republic of Congo, due to restrictions on financial transactions. They went on to say that countries on sanctions lists could not be extended funding and local banks could be subject to interest rate caps that are too low to compensate for risks from ASSGM. Limited or non-existent reporting regulations would be a barrier for all sources of finance, since the absence of reporting would make it difficult for any financial entities. They further argued that absence of national regulation for impact investing, for example, would limit the appeal of this type of finance. For all sources of finance, the cost of monitoring compliance with rules and regulations, due diligence analysis and continuous monitoring of ASSGM was excessive.

2.9.5 Technical and financial skills.

Zimbabwe Miners Federation (ZMF) (2020) revealed that most Artisanal and Small-Scale Miners operate without any financial track of their mine performance. In most cases, miners dig into their mining revenue fulfilling their personal expenses. ZMF (2020) further argued that non-existent or poor financial management is one of the internal business problems that continue to confront ASSGM sector due to lack of proper management in handling business finance to fulfill financial goals of the mine. ZMF (2020) recommended artisanal and small-scale mine owners to adopt short-term finance concerned with the net working capital, investment, financial reporting, and financial decisions that are in favour of the development and growth of the mine. ASSGM must be equipped with various cash management skills since this is the most important aspect that is considered from ASSGM before being given funding. Traditional ASSGM were mainly dominated by youths and less educated people so giving them finance was very risk since they were perceived as people who did not know how to invest. There was need for training of ASSGM in order for them to achieve optimum gold production. This was supported by Zvarivadza (2018) who said that registered ASSGM should be given necessary training and educative material for miners to acquire knowledge and to undertake their activities safely. Training programs which suit the requirements for ASSGM need to be developed, workshops may be arranged where ASSGMs gather together and share work experiences (Zvarivadza, 2018). The International Institute for Sustainable Development (2018) noted that technical expertise like advising, training and educating miners ensured ASSGM compliance with the country's mining policy and legislation on ASSGM.

It was also noted that although formal and semi-formal training was provided by large mines or government, small scale mine workers were reluctant to leave their work to go and get training, Bansah *et al.* (2016) concluded that there was need for technical services and training through their district centres which would enhance their mining and financial management skills. According to Pact and the Institute for Sustainability Africa (2015), most ASSGM had on the job experience and others had no mining knowledge at all. Fig 2.5 shows miners training skills and experience in gold.

Figure 2. 5: Miners Training Skills and Experience in Gold

Source: Part and the Institute for Sustainability Africa (2015)

It can be noted from Fig 2.5 that most ASSG lacked experience especially from tertiary institutions and they mainly had on the job skills and experience. No investors would be willing to fund miners with low mining skills since it would reduce their chances to repay their loans. The importance of training on financial management skills was also noted in Uganda, World Bank wanted to give artisanal and small-scale miners a grant, The International Institute for Sustainable Development (2018) found out that ASSGM to obtain funding, ASSGM groups had to go for a financial and procurement training. Planet Gold (2020) also said many ASSGM operators were unfamiliar with the formal finance structures and did not have the formal business and management training that would enable them to make their business case to financial entities. They also lacked data, such as geological information to estimate the size of the gold reserve, which could help finance providers evaluate the future profitability of the business.

2.9.6 Unfamiliar with Financial Institutions

In Zimbabwe ASSGM is started mainly in poverty affected rural areas and urban areas. It is started as an informal sector. This sector mainly includes children, man and woman with little financial knowledge. Some of the ASSGM might be aware of banks but are not aware of the necessary paperwork needed for them to be given funding. This was supported by World Bank Global Findex Study (2017) which revealed that even when funding from banks was available, some ASSGM firms were not aware of how to obtain the funding from the formal financial institutions. ASSGM could be helped by third part intermediaries such as social enterprises who may give funding to them and help them in managing payments. ASSGM firms could be aware of financial institutions like banks but have inadequate financial knowledge and their investments requiring little capital which makes them unable to manage large loans. However, the financial capacity and investment needs of viable ASSGM enterprises will evolve as their businesses grow and this capacity gap can, in the interim, be bridged by intermediaries (Planet Gold Report, 2020).

2.10 Funding to ASSGM by Governments

ASSM are important to our economy as was shown in Chapter 1 and from empirical studies on its contribution to GDP, exports, poverty alleviation and employment creation. Several countries have made different initiatives to help ASSGM so that they achieve optimum production. The findings from different countries are showing that ASSGM are failing to pay back loans. This therefore means that government funding to ASSGM is not suitable. Zimbabwe has a lengthy history of assisting small-scale miners. Fidelity Printers and Refiners, which is owned entirely by the government of Zimbabwe through RBZ and is the only authorized buyer and exporter of gold in Zimbabwe, launched the Gold Development Initiative Fund, established in response to small-scale miners' grievances over a lack of support and capital. It was launched specifically to provide lending in support of the acquisition of gold mining plants and equipment by miners and is accessible to any Zimbabwean-owned business (Planet Gold Report, 2020). Gold Development Fund of Zimbabwe (2019) cited by Planet Gold Report (2020) revealed that for one to access funding from Fidelity Printers and Refiners one has to go through an application process which is fairly stringent. It needs the following information, mine management details (organizational structure and labour strength, details of executives and management and the CVs for executives and management); technical information (geological report, mine production

history, mining production plan or forecast, and gold processing production plan including flow sheet diagrams, life of mine plan (applicable to medium and large scale, environmental impact assessment or EIA certificate, site of works plan/surface plans, infrastructure status report, due diligence report, and bankable document and financial information (financial statements of the applicant for the previous two years, latest management accounts such as an income statement and balance sheet, explanatory notes to the financial statement, asset register, tax clearance certificate, cash flow projections to cover the tenure of the loan and assumptions used, debtors and creditors age analysis and quotations) . Planet Gold Report (2020) revealed that FPR has a US$50 million loan facility, and that the intention is to increase this amount to US$100 million, although it is unclear how it is running or if it has been successful so far. The application requirements, along with the size of the loan itself, suggest that this particular scheme, like most, is suited for mainly semi-mechanized small-scale miners. This funding facility may not be accessed by Artisanal and Small-Scale Miners.

Namibia developed Minerals Development Fund which provided financial support directly to ASSGM (UNIDO, 2018). Approximately US$2.96 million of the funds were to be used to support 'Small-Scale Mining Ventures'. A pilot micro lending program initiated under the Minerals Development Fund of Namibia involved 11 miners but only four of whom, following an evaluation, were determined to be in a position to repay their loans (Mineral Development Fund of Namibia Act !9of 1996',2019). The small-scale miners complained that the fund failed to supply the level of finance they required. Zambia gave credit under Mining Sector Diversification Program, which ran from January 2002 to May 2008, and included elements that offered small-scale mining entrepreneurs a combination of credit financing, training and capacity building and the provision of technical expertise (EU, 2015). ASSGM in Zambia were not able to access the €16.5 million credit facility because of the stringent conditions attached. Efforts to 'soften' the criteria did little to improve uptake and as of mid-June 2005, only nine loans amounting to 3.3 million euros had been approved.

In South Africa a National Small Scale Development Framework was developed and its major objective was to provide: financial, technical and managerial support to ASSGM projects, following a funding structure that was 90 per cent of the capital to be given and miners were to

fund the remaining 10 per cent out of their own resources. Funds were made available for equipment purchase, to provide rehabilitation guarantees, and to cover operational costs. There were 197 projects to be done and 173 of the projects were of ASSGM sector 24 were beneficiation projects. A total of 20 ASSGM projects were allocated R15.1 million. The key takeaway, however, is that borrowers were unable to repay their loans, which led to the program's cancellation in 2005 (Mutemeri *et al.*, 2010, Solomons, 2017 & Ledwaba, 2017).

In 2002, Mozambique launched its own (Fundo de Fomento Mineiro – FFM) fund for the purposes of supporting financial and technical skills in the ASSGM sector. The fund was actively financing ASSGM and purchasing gold from 30 percent of the ASSGM operating in Mozambique. But the Fundo de Fomento Mineiro could not be sustained; due to production challenges and inconsistent production levels, miners failed to repay their loans and failed to sell enough gold to the facility, therefore depriving it of the crucial finance which helped to sustain it (Mozambique ASM Profile, 2019). In Ghana, the government experimented extensively with ASSGM equipment-sharing programs in various forms since the early-1990s. In 2000s the government mobilized funds, through its Mineral Development, revenues were taken from the heavily indebted poor countries facility. The beneficiaries were to pay back the loan once production began at an agreed installment. The prospective borrowers were required to share machinery such as crushers, generators and pumps, and maintain meticulous records (Adomako-Kwakye, 2019). The loan proved relatively successful, its borrowers agreed to the terms, shared the equipment procured with the loan relatively incident-free, and complied with the regimented plan for repayment (Adomako Kwakye, 2019).

In Tanzania, the government decentralised its ASSGM licensing process, the Zonal Mining Offices were authorized to make decisions on applications for Primary Mining Licenses (PMLs). This helped them to have a funding of US$22.7 million from the World Bank. The government distributed this funding to the mining sector aiming the loan to provide technical, financial, equipment service and managerial support to PML (World Bank, Tanzania, 2019).

2.11 The Hypotheses

The research analysed the relationship between funding models and optimal gold productivity. The following funding models: personal savings, sell of an asset, RBZ funding, joint ventures, partnerships and government and other agencies support were independent variables and gold productivity was the dependent variable. The dependent variable measured the association of the funding models and gold productivity.

H_1: Personal Savings is associated with optimal gold productivity

ZEPARU (2016) noted that most artisanal and small-scale gold miners usually use owner-worker arrangements in funding their operations. The research noted that mine owners injects their own capital for equipment, catering, and other operational costs, therefore the research wants to assess the association between personal savings and gold productivity.

H_2: Sell of an Asset as a funding model is associated with gold productivity

According to Zimbabwe Mining News Week Magazine (2020), he observed that some of the financial institutions were not funding the ASSGM sector due to nature of risks associated with gold mining which require substantial financial resources that most ASSGM miners do not have. He observed that some people were venturing into mining by selling a few cows, maybe one or two. Therefore, this study wants to analyse the association between sell of an asset as a funding model and gold productivity.

H_3: RBZ funding is associated with gold productivity

An analysis of the ASSGM sector and RBZ funding shows that there is an association that exist between them. Findings from RBZ MPS (2018) that were discussed in the background of the study indicate that there is a statistically significant positive moderate correlation that exist between RBZ and gold output from artisanal and small-scale gold mines. In 2019 when RBZ funded the ASSGM sector, the output from the sector surpassed that from LGMS, therefore they exist an association between the two.

H_4: Joint Venture as a funding model is associated with gold productivity

Chidhakwa (2016) noted that ASSGM generally use basic tools for mining, ore handling and mineral processing, leading to strenuous chores of low productivity. He noted that the joint

ventures of LSGM and ASSGM will help artisanal and small-scale miners on the use of appropriate technological interventions which can enhance their economic sustainability without compromising on their environmental sustainability, this study want to assess the association between joint ventures and gold productivity.

H_5: Partnership as a funding model is associated with gold productivity

Planet Gold Report (2020) noted that there is need to build large scale and small-scale partnerships which will enhance ASSGM capacity and professionalisation. Partnerships will help small scale miners with knowledge of efficient processing methods, safety, value creation, and business skills among others can be transferred from large- and medium-scale operators to small scale miners. Planet Gold Report (2020) noted although this may not be a long-term solution in helping small scale miners, these partnerships could be viewed as a step to transitioning toward a more independent, professional, sustainable licensed small-scale mining sector. Therefore, this research wants to assess the association that exist between partnerships and gold productivity from ASSGM

H_6: Government and other agencies support funding is associated with optimal gold productivity

The background of the study noted that government started funding the ASSGM sector dating back to 1990s. it also revealed that different donor funding was availed to this sector in Shamva, Kadoma and Gwanda area with noted success being of those donors who were working with miners in Shamva areas therefore, this study also assumes that there is an association between government and other agencies funding with gold productivity

2.11.1 Conceptual Framework

Conceptual framework shows the road map on how the researcher is going to solve the research problem. According to Mugenda and Mugenda (2003), conceptual framework is a hypothesised model identifying the concepts under study and their relationship. It is a framework usually developed by the researcher to demonstrate the inter relationships between variables of the study (Mugenda & Mugenda, 2003). This relationship is usually presented graphically or

diagrammatically and is usually supported by an explanation. The purpose of a conceptual framework is to help the reader to quickly see the proposed relationships (Mugenda & Mugenda, 2003). The framework was developed with the help of the problem that was identified from the background of the study. The background of the study highlighted the need for funding of the ASSGM sector and collateral was the major problem that was affecting ASSGM from accessing funding from formal financial institutions. It was also noted that taxes, royalties were affecting performance of the sector and there was need for formalisation in order for ASSGM sector to obtain funding from formal financial institution. Literature also indicated that governments and other agencies support like donor funding helped ASSGM acquire funding. The variables personal savings, sell of assets, RBZ, joint ventures, partnerships technical and government and other agencies' support of ASSGM was tested statistically to see if they had an association with optimum gold production. Fig 2.6 shows a conceptual framework model for independent and dependent variables.

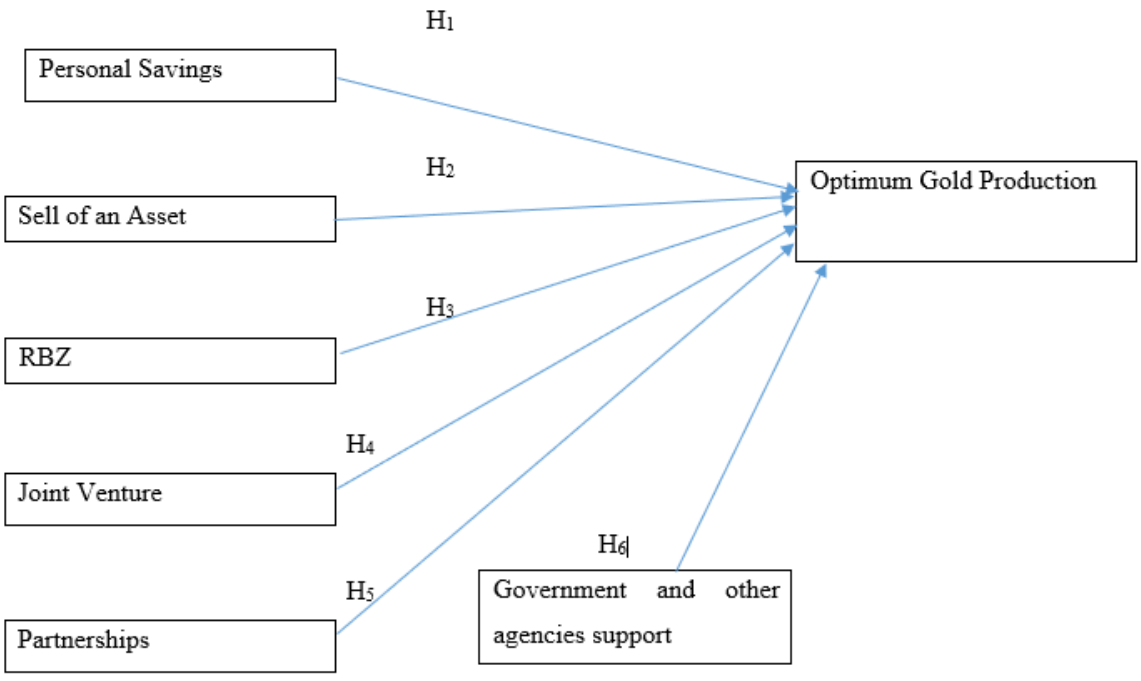

Figure 2. 6: Conceptual Framework

The model has independent variables which were discussed in the background and literature review as the funding models to ASSGMs. Government and agencies support has shown a significant positive link between ASSGM funding and gold production. The government and agencies support effect can either be positive or negative to funding models. So, government and agencies support help to moderate institutional factors and funding models to be used by ASSGM. The study used one dependent variable. The dependent variable is funding models which will lead to optimum gold production.

2.12 Chapter Summary

This chapter reviewed relevant literature on ASSGM, it has discussed empirical studies in Zimbabwe and abroad on ASSG. Areas where artisanal and small-scale gold mining activities are taking place in Zimbabwe were highlighted. Theoretical literature that falls under the study was analysed. The chapter gave an overview of legal framework of ASSGM in Zimbabwe and different approaches done by the government to try and formalise the sector. Different funding mechanisms were also discussed. The literature review has helped the research to develop a conceptual framework to the research problem. The next chapter will focus on research methodology.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

Chapter Two reviewed the literature and outlined funding models for ASSGM sector, funding challenges, funding theories and the conceptual framework. This section focuses on the approach that was applied in carrying out the research on the funding models for ASSGM that could lead to optimal gold productivity The approach that guided the investigator in conducting the research to achieve the set objectives is highlighted. The following areas are highlighted in the chapter: the philosophy, research design, population, data collection methods and sampling procedure. The research strategy appropriate for this study was spelt out in detail and justifications for the strategy adopted are examined. The research design for this study is presented and explained in order to place this research into its appropriate context. Data collection methods that were used in this study are presented together with their merits and demerits. Sampling procedures that were employed in this research are discussed in detail.

3.1 Research Methodology

Sileyew (2019) defines research methodology as the path through which researchers conduct their research. Sileyew (2019) agrees with Goundar (2012) who opined that research methodology explains the methods by which a researcher may proceed with research. Saunders *et al.* (2012) define research methodology as the theoretical analysis of how research should be undertaken, including the philosophical assumptions upon which research is based and the implications of these for the methods adopted. This means that methodology is a guideline on acceptable research practices. Goundar (2012) opined that research methodology is a systematic way to solve a problem. It is a science of studying how research is to be carried out and it lays out the procedures by which researchers go about their work of describing, explaining and predicting phenomena (Goundar, 2012). It is also defined as the study of methods by which knowledge is gained and its aim is to give the work plan for research (Goundar, 2012). The methodology approaches from Goundar's definition are qualitative and quantitative and this study will use them together with secondary sources (documentary data) and primary sources (interviews and questionnaires) in gathering data. Research methodology focuses on the manner in which the research is planned, structured and executed in order to comply with scientific criteria according to (Mouton & Marais, 1996). This chapter begins by presenting the two main ideas on research philosophy: ontology and epistemology

3.1.1 Ontology

Ontology is a branch of metaphysics concerned with the nature and realities of beings (Webster, 2021). Creswell (2009) revealed that ontology is the study of being, that is, what things exist and how they exist, he further went on to say that ontology is the nature of reality that the researcher investigates. Ontology is a branch of philosophy concerned with the assumptions we make in order to believe that something makes sense or is real, or the very nature or essence of the social phenomenon we are investigating (Scotland, 2012). It specifies the form and nature of reality and what can be known about it (Neuman, 2003). This philosophy believes that the world is external Carson *et al*. (2001) and that there is a single objective reality to any research phenomenon or situation regardless of researchers' perspective or belief. The ASSGM sector does not function separately; it is entrenched in social structures and thus affected by the context. ASSGM operates

in the social world that is shaped by set of relations which include historical events, country's economic condition, political situation, and nature of their business as well as their perception. Therefore, to understand the factors which influences the way in which ASSGM sector chose funding methods, there is need to study the history of this sector, nature of their business, the perception that lenders have towards them and the set of relationships that exist between institutional factors and formalization with funding models. In order to understand funding models that will lead to optimum gold production, there is need to understand the set of relations that surround this sector. Understanding these relations is crucial to uncovering the events, as well as the reasons and forces behind lack of funding to ASSGM sector.

3.1.2 Epistemology

Epistemology is the study of knowledge, asking questions such as: "what is knowledge?" and "how do we know something (Couper, 2020)?" Knight *et al.* (2014) defined epistemology as a way of knowing or how we know things about the world. Crotty (2003) defines it as a way of understanding and explaining how we know what we know. Epistemology refers to the nature of relationships between the researcher to the researched and it denotes the nature of human knowledge and understanding that can possibly be acquired through different types of inquiry and alternative methods of investigation (Hirschheim, 2019). Therefore, we can only be certain of what we know after interacting with what is being researched. The ASSGM industry is an economic sector which is influenced by social environment and understanding it is not possible through scrutinising publicly available information alone. To gain such understanding, views, opinions, and experiences, relevant people need to be engaged. The researcher needed to interact with what is being researched, so the researcher interacted with the mine owners. This helped the researcher to have an understanding on how ASSGM owners struggled to obtain funding, how they operate under mining sector requirements, and how their business size, collateral security, financial knowledge and formalization affected their ability to obtain funding, this was understood by getting the information from the mine owners themselves. This information could only be known through interaction with the mine owners. The study focused on funding models that would lead to optimum gold production; hence the interest was on analysis of current funding models available to ASSGM sector, factors that affect ASSGM in using other funding models and coming up with best funding models for ASSGM through interacting with ASSGM

owners by using interview questions and questionnaires. Therefore, this followed a subjectivist view which states that reality results from the interaction between the subject and the object to which it is attributed (Crotty 1998). Cranfield (2011) argued that on subjectivist, the investigator imposes her/his values and interpretations on the object, and the interaction between investigator and object is dependent on the investigator's subjective understandings of the object.

3.2 Research Philosophy

According to Zikmund *et al.* (2011), research philosophy refers to the different ways of seeking knowledge and regards reality as classified to be true or false. Goundar (2012) defines philosophy as the approaches about the way in which data about a phenomenon should be gathered, analysed and used. Saunders *et al.* (2012) revealed that the importance of research philosophy is the way it influences the researcher's thinking about the research process. These philosophies include positivism, post positivism, phenomenology (sometimes loosely equated to interpretivism) and pragmatism. In choosing the research philosophy to adopt when carrying out a study, the researchers should consider the following broader philosophies (i.e., quantitative, qualitative or mixed methods) to justify the choice of their research approach (Creswell, 2014). This study adopted the pragmatism mixed approach which combines together all data collection methods in answering the research questions. The pragmatism rule states that the current meaning or instrumental or provisional truth value of an expression is to be determined by the experiences or practical consequences of belief in or use of the expression in the world (Murphy, 1990 cited in Johnson & Onwuegbuzie, 2004). The pragmatic maxim is translated in mixed research methods as choose the combination or mixture of methods and procedures that works best for answering your research questions (Johnson & Onwuegbuzie, 2004). In pragmatism, the problem is more important than method and researchers use multiple approaches to understand the problem in its social and historical context and multiple relevant forms of data collection are used to answer the research question(s) (Creswell &Plano-Clark, 2007). The logic of inquiry for pragmatism includes the use of induction (discovery of patterns), deduction (testing of theories and hypotheses) and abduction (uncovering and relying on the best of a set of explanations for understanding one's results) (Johnson & Onwuegbuzie, 2004). Under pragmatism, reasoning moves back and forth between induction/deduction and subjectivity/objectivity.

Pragmatism paradigm was suitable for this research because the research gathered empirical data using qualitative by interviews and quantitative questionnaires approach in the ASSGM sector. The research used pragmatism approach which combined quantitative and qualitative data collection to have a balanced analysis since there was no best approach. This choice of research paradigm as referred by Mertens (2010) is characterised by determination, empirical observation, measurement and theory validation. The research wanted to identify the funding models which would help ASSGMs achieve optimum production from a practical viewpoint. The research utilised a quantitative methodology in answering the questions by testing a hypotheses whether independent variables were associated with dependent variable or not. The researcher tested the effects of variables such personal savings, sell of an asset, joint venture, partnership and RBZ with optimum gold production electronically. Funding from government and agencies support would be the moderating variable.

In this study, there was one dependent variable, that is funding models for optimum gold production. Funding Models for optimum gold production was depending on independent variables that were discussed earlier. By doing this, the researcher was able to generate first hand information on factors that influenced ASSGMs to choose a funding model. The research also undertook a qualitative approach, where it engaged ASSGM experts and analysed different funding models available for ASSGM and come up with best funding models which would help them achieve optimum gold production. The data that was gathered from both qualitative and quantitative research was then analysed to come up with an advanced structure that could boost the embracing of the funding models that could be viable to artisanal and small-scale gold sector. Interviews and research questions were issued to ASSGM who were registered under Zimbabwe Ministry of Mines. Since most of the literature highlighted that the challenge of funding of ASSGM from financial institutions was their lack of collateral and the risky nature of the sector, the researcher wanted to come up with other funding models which would help the sector achieve optimum production. The research followed critical realist methods during data gathering and examining. Easton (2010) defines a critical realist case study as one where the research question attempts to solve a research problem, in terms of existing events, and asks what causes them to happen; similarly, the first quantitative study defines the boundaries of the

research by presenting an existing event and using the qualitative studies to ask further question on the existing event.

3.3 Research Strategy

The research used an exploratory sequential mixed research method. The researcher first used qualitative approach where it engaged experts in the ASSGM sector (mine owners, mine officials from district, province and national offices) to discuss other factors that influenced ASSGM in choosing funding models. The study analysed different funding models and came up with best funding models which could be used by ASSGM. The research used qualitative approach because the relationships from quantitative approach could be less obvious to a researcher, this was also supported by Reichardt and Rallis (1994) who argued that quantitative evidence can keep researchers from being carried away by vivid but false impressions. So, to bolster the findings there was need to corroborate qualitative and quantitative findings. This is so because qualitative data was useful for understanding the rationale behind those relationships that were revealed in quantitative data. Qualitative data also suggested directly those theoretical insights to be strengthened by quantitative data (Jick, 1979).

The research used qualitative data to come up with variables that which were analysed numerically using quantitative analysis to measure their popularity among respondents. The research considered a quantitative approach to test if variables had an association with access to funding models that would lead to optimum gold production. In Chapter One, it was mentioned that there existed relations between the variables and funding models that would lead to optimum gold production. To analyse those relationships which were hypothesised in Chapter One, the research used statistical models and tests electronically to see how these variables influenced access to funding models that led to optimum gold production. In order to understand funding models that would lead to optimum gold production, there was a need to understand the set of relationships that existed between funding models and gold production. Understanding these relationships was important since it helped the researcher to have knowledge on funding models that were not suitable for ASSGM which would help the researcher to come up with other funding models which would help this important sector. It helped us to have reason and forces behind formal financial institution's unwillingness to fund ASSGM sector. The researcher used

data from ASSGM that were included in the study. After doing the quantitative work, the research had the first-hand information on the effect of funding models to ASSGM and factors that influenced them in choosing the funding models.

3.4 Research design

Research design represents the general plan or strategy of enquiry pertaining to how the study's research questions will be answered (Saunders *et al.*, 2012). Research design alternatives include case study, experimentation, surveys, grounded theory, ethnography, action research, modelling and operational research (Miles & Huberman, 1994). Given the nature of the research problem and that the researcher used both quantitative and qualitative research questions, the researcher decided to select the survey design as being the most appropriate for this study.

Al Zefeiti1 and Noor Azmi Mohamad (2015) argue that the survey method is usually associated with the deductive approach and is a common strategy used in business and management research. Giddens (2004) points out that a survey uses questionnaires as the main tools for gathering data. Surveys allow the collection of data concerning practices, views and situations at a particular point in time through the use of interviews or questionnaires (Bryman & Bell, 2011). Using the survey method, interviews and semi structured questionnaires were used to collect data that was used to answer the problem that was outlined in the background of the study. This method is mainly used when collecting information for large sectors or government information upon which policy decisions are to be made (Yates, 2004). Since ASSGM sector is growing and becoming one of the most important sectors to the economy of Zimbabwe, the researcher deemed it fit to use this method in ASSGM sector.

Many researchers, Webb *et al.* (1966), Campbell and Fiske 1958 and Tashakkori and Teddlie (2010) agree on the use of different methodologies to study the same phenomena because it brings a balanced analysis by using them together. According to Snow and Thomas (2007), to maximise the contribution to the field research, the field research method should have a balanced research agenda, multifaceted research approaches, innovative data gathering techniques, and an applied futuristic orientation. Research design is a strategy of the study, a plan for obtaining answers to the research questions set and shows linkages of other parts to the research (Sileyew,

2019). It helps the researcher to reduce errors in obtaining empirical evidence on isolated variables of interest. Research design shows the whole study procedure starting with problem identification, literature review, methodology, findings, conclusions and recommendations.

Since there is little literature on funding models that could lead to optimal gold productivity for ASSGM, the desire to understand the relationships that existed between good funding models and optimum gold production and the importance of this sector to the economy of Zimbabwe, motivated the researcher to undertake both qualitative and quantitative approach. The reasons why there is funding challenges to ASSGM is not possibly analysed through the relationships that existed and scrutinising publicly available information only, there is need to gain understanding, views, opinions, and experiences of the relevant actors in the ASSGM sector through qualitative approach using questionnaires and interviews. The research wanted to understand how ASSGM sector struggled to obtain funding, how they operated with less funding and what should be done to enable them get adequate funding.

3.5 The population

According to Sekeran and Bougie (2013), population is defined as the entire group of things, events or people that are of interest to the researcher's investigation. These are all members in a group that is ASSGM owners who the researcher investigated. Welman *et al*. (2010) argues that population is the research object and may consist of individuals, groups, organizations, products, events or conditions to which previously mentioned objects are exposed. The population for this research was drawn from artisanal and small-scale gold mines in Zimbabwe's two main provinces that is Mashonaland West and Midlands provinces, gold hotspots areas were also included that is Shamva, Bindura Mazowe and Shurugwi. The two provinces were chosen because Pact World (2015), UNIDO (2018) and Zimbabwe Mines Federation (2020) argued that the two provinces that has a lot of artisanal and small-scale gold mines are Mashonaland West and Midland provinces as was shown in the literature review. According to Fidelity Printers and Refineries (2020), these are the areas which are contributing more gold to RBZ. Interviews were done in Mashonaland West and Midlands provinces in the following districts: Chegutu, Mhondoro Ngezi, Zvimba, Sanyati, Makonde and Kwekwe. Questionnaires were distributed in the two provinces in the country physically (Mashonaland West and Midlands) provinces. Other

questionnaires were distributed to the following gold hotpots areas in the country (Bindura, Mazowe, Shamva and Shurugwi) so that the results can be a representative of the who country but the interviews were not carried out in these areas. The results of the study were drawn from a certain population as supported by Zikmund (2009) when he says that the results will be drawn from the population under study. In Zimbabwe it is estimated that there were 50 000 registered small-scale mines (Zimbabwe Chamber of Mines, 2020). This research was mainly concerned with mine owners therefore a total of 50 000 mine owners only were included. Selection of these mine owners was based on the acquaintance, expertise and convenience of the sample. ASSGM owners were selected because they are the ones who needed funding.

3.6 Sample Size

According to Cooper and Schindler (2014), a sample is a part of the target population carefully selected to represent that population. Saunders *et al.* (2014) noted that the rationale for selecting a sample as opposed to a census is the lower cost of sampling in contrast to the high cost of a census. Sample involves the selection of elements from a given population of interest on the basis of some designed features (Saunders et at., 2014). Sample of this study was estimated using the Krejcie and Morgan (1970) Model.

3.6.1 Krejcie and Morgan

To estimate the sample size in this study, Krejcie and Morgan (1970) Model and Table was used. Krejcie and Morgan (1970) use the following formula to determine sampling size:

3.6.1.1 Krejcie and Morgan Model

$$s = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1-P)}$$

$$s = \frac{1.96^2 * 50000 * 0.5(1-0.5)}{0.05^2(50000-1) + 1.96^2 * 0.5(1-0.5)}$$

$$s = \frac{48020}{125.9579}$$

$$s = 381.238493$$

$$s = 381$$

Where:

S = required sample size

X^2= the table value of chi-square for one degree of freedom at the desired

Confidence level (0.05=3.841).

N = the population size (50000 in this case)

P = the population proportion (assumed to be .50 since this would Provide the maximum sample size)

d = the degree of accuracy expressed as a proportion (.05)

From a target population of 50000 artisanal and small-scale gold mines, the sample size for this study was approximately $s = 381$ using Krejcie and Morgan Model.

3.6.1.2 Krejcie and Morgan (1970) Table

Table 3.1 Krejcie and Morgan (1970)

Table 3.1 is used to determine the sample size and was put forward by Krejcie and Morgan (1970) where N stands for population size and S stands for sample size. From the Krejcie and Morgan (1970) Table, if N, number of people is 50000 then S, the sample size will be 381.

Table 3. 1: Krejcie and Morgan Table (1970)

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Source: Krejcie and Morgan (1970)

The sample of this research was applied to the ASSGM sector only. Lapin (1988) defined a sample as the party of a population taken into consideration under statistical inquiry. Having some samples is very important because it makes it possible to come up with accurate answers from a given set rather than the whole which is expensive and time consuming. The importance of a sample is supported by Saunders *et al*. (1997) when he says, whatever one's research question or objectives, there will arise a need to collect data to answer the question or objectives but it is often impractical for a researcher to survey the entire population hence the need for samples. Saunders *et al.* (1997) seems to agree on the importance of using samples with Lapin

(1988) when they argue that using sampling enables a higher overall accuracy than does a census. To produce quality findings, the sample must be representative of the group as a whole (Saunders *et al.,* 2014). The sample must allow perfect data collection. Each individual in a sample unit should stand a fair chance of being selected. The researcher chose ASSGM sector. The sample units included were Artisanal and Small-Scale Gold Miners.

3.7 Sampling Procedures

3.7.1 Sampling for quantitative data gathering

Bryman and Bell (2011) noted that quantitative research involves transforming the theoretical concepts of the study into quantitative items through operationalisation. According to Creswell (2014), quantitative research is an inquiry into social or human problems based on testing a theory containing variables measured with numbers. These numbers are analysed with statistical procedures in order to determine whether the predictive generalisations of the theory hold true (Creswell, 1994). The purpose of quantitative research is to develop hypothesis, theories and apply the statistical measures to assess the phenomena (Given, 2008). In collecting the quantitative data, this study used questionnaires. The questionnaires were distributed using random sampling technique. Questionnaires can produce quantifiable data which can be treated and examined using statistical models. It provides the ability to extend the results obtained from a sample of respondents to a larger population when it is not practical and efficient to work with the entire population (Chauvel & Despres, 2002).

3.7.2 Sampling for qualitative data gathering

After choosing Mashonaland West and Midlands Provinces, six districts from the two provinces were chosen using random sampling from the two provinces. The researcher then sampled research participants using qualitative sampling approach for the artisanal and small-scale gold mines. The mines owners' experts were selected using purposive sampling technique in relation to their initial positions in the groups. All the mines were sufficiently sampled and the analyses between artisanal and small-scale segments were easily done.

The researcher used qualitative approach for this research because the research intended to discover mine owners and mine officials from district, province and the nation who dealt with

ASSGMs perceptions on the funding mechanism available to this sector. A qualitative approach helped the researcher to explore opinions and experiences that emerged from the discussions with the participants (Irvine *et al.,* 2013). Qualitative research is an in-depth approach to issues or phenomena to answer *what* and *why* questions (Creswell, 2013). The qualitative sampling method gave the researcher an in-depth appreciation on the funding mechanisms available to ASSGM owners. The researcher was able to identify sources of funding that would allow growth and expansion of the ASSGM sector.

There is no general consensus on the exact figure for qualitative approach, Tashakkori and Teddlie (2010) suggest anything between 6-24 for case studies, and 6-8 participants per group in focus groups. Onwuegbuzie and Collins (2007) suggest 3-5 participants for case studies, 12 participants for interviewing, and a range of 6-12 (quoting from different sources) for focus groups. During this research, the researcher had face to face interviews with artisanal and small-scale gold mine owners from selected groups and selected mine officials from district, province and national. The researcher selected all the artisanal and small-scale gold mine owners and mine officials using his own discretion, significance to the topic, convenience to their work places, presents of ASSGM owners and likeliness of accessing the required information from those artisanal and small-scale gold mine owners and mine officials. The sampling frame had gold miners that came from the same geographical part that is Chegutu, Mhondoro Ngezi, Zvimba, Sanyati, Makonde and Kwekwe although they were in different provinces, they were on the same gold belt and close to one another. This is important since most artisanal and small-scale gold miners in that area faced similar challenges. This made the use of interviews possible; the researcher came up with six groups, one group per district from artisanal and small-scale gold mines and one representative per district from mine officials, one representative from two provinces and one representative from the national. Each group had 3-5 participants, this was consistent with findings of (Onwuegbuzie & Collins, 2007).

3.8 Sampling Techniques

3.8.1 Random Sampling

Random sampling is the purest form of probability sampling. Each member of the population has an equal and known chance of being selected. Where there are very large population, it is often

difficult or impossible to identify every member of the population, so the pool of available subjects becomes biased. Considering that there are several artisanal and small-scale gold miners in Zimbabwe, clearly it was difficult to collect data from all the miners in the country on funding models, taking into consideration also the limited resources available for the researcher, especially the time resource (Blumberg *et al.*, 2008). Therefore, the researcher deployed a random sampling method. This method was used because when there is a large population of 50000 miners, Zimbabwe Chamber of Mines (2020) it was complex to recognize each participant of the whole sample. This is the purest form of probability sampling since it gives every participant of the target group a fair opportunity of being included. The criterion upon which these areas were chosen was based on the number of gold mines and the contribution of gold to national output from the districts (see Pact and the Institute for Sustainability Africa 2015: Planet Gold Report, 2020: & UNIDO, 2018). Random sampling approach was used in this study because the findings from this research in the areas that were chosen could be generalized to other districts and provinces in the country.

3.8.2 Purposive Sampling

Purposive sampling is a non-probability form of sampling (Bryman, 2012). Purposive sampling was used for interviews. Those who were answering researcher questionnaires were not part of the group that participated in the interviews. The interviews were held until saturation. The objective of this method used was to sample ASSGM owners and mine officials in Chegutu, Mhondoro Ngezi, Makonde, Sanyati Zvimba and Kwekwe districts in Mashonaland West and Midlands Provinces and Head Office from all the provinces and districts in Zimbabwe such that those interviewed were of the great importance to the interview questions that were being posed. Kumar (2005) states that the use of purposive sampling is determined by the judgment of the researcher on who can provide information so as to achieve the objectives of the study. This assertion by Kumar (2005) is corroborated by Leedy and Omrod (2010) as well as by O"Sullivan *et al.* (2008) who all expressed the view that the use of purposive sampling depends on the researcher's judgment of who to include in a sample. The sample of artisanal and small-scale gold mines owners only was chosen mainly because of the researcher's appreciation of the target group.

3.9 Hypotheses

3.9.1 Hypotheses Testing

The research also analysed the relationship between institutional factors and access to funding from formal financial institutions. Literature review showed that collateral, size, financial skills mining skills and formalisation had an impact in accessing funding from banks. There is one dependent variable in this study as was discussed earlier (optimum gold production). The dependent variable measured the effect of institutional factors and formalization to funding models to determine their association with funding models that would lead to optimum gold production. This dependent variable was used for testing the association of institutional factors and formalisation and funding models which would lead to optimum gold production which assisted this study to have funding models that are suitable for ASSGM sector. There happened to exist a positive relationship between government funding and ASSGM performance which was shown by RBZ MPS (2018). The funding from RBZ resulted in the increase in gold output to more than 60% and output from small scales surpassing that from large scale mines MPS (2018). Therefore, we considered government funding and agencies support as one of the important moderating variables. These hypotheses were tested statistically.

3.9.2 Analysis of Hypotheses

Based on the literature review and objectives of the present research, six hypotheses were framed. The hypotheses helped in verifying our conceptual framework from literature review which would assist us in answering the following: do personal savings, sell of an asset, joint venture funding, partnership funding, RBZ funding and government and other agencies support associated with optimal gold productivity. The major factors which were affecting the funding models that are used by artisanal and small-scale gold mines are formalisation and institutional factors (collateral security, technical and financial skills and size of ASSGM). The institutional factors and lack of more information as evidenced from a study by Berger and Udell (1998), Growth Cycle shows that the following characteristics: small in size, lack collateral, lack of information and lack of a track record had an influence on the funding models to be used by small firms. The research analysed and outlined a comprehensive summary of the variables

employed in testing the hypotheses. The funding models that were employed by ASSGM could vary from one mine to another. The hypotheses will be tested using the regression model

3.9.3 Regression Model

$$\boldsymbol{y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e}$$

Y is the dependent variable and is represented by optimal gold productivity from artisanal and small-scale gold mines. where, α denotes the constant,β_1 is the slope or coefficient of personal savings (X_1), β_2 is the slope or coefficient of sale of an asset (X_2), β_3 is the slope or coefficient of joint venture funding (X_3), β_4 is the slope or coefficient of RBZ funding (X_4), β_5 is the slope or coefficient of partnership funding (X_5), and e is the error which accounts for the variability in $\hat{\mathbf{y}}$ that can't be explained by the linear effect of the 5 independent variables. The error term for the regression model, stands for the factors which affect optimal gold productivity which were not included in the regression analysis model. Each co-efficient is known as a partial regression co-efficient interpreted as representing the partial effect of the given explanatory variable on the dependent variable after holding constant the effect of all the other explanatory variables. The researcher assumed that the data has no feedback effects. To avoid spurious regression analysis results, multicollinearity test was conducted.

3.9.3.1 Multicollinearity Test

The existence of a linear relationship amongst regressors in an equation indicates multicollinearity. Presence of multicollinearity tends to result in very small **t** statistics and wide confidence intervals for the coefficients. Standard errors will increase with the increasing presence of multicollinearity in the explanatory variables. Against this background, correlation matrix that makes use of correlation of cross independent variables to ascertain the level of independency of explanatory variables to each other was utilized

3.10 Data Analysis Plan

Bryman and Bell (2011) argued that after data is collected, it must be transformed into a more meaningful format so that data analysis can be done. The data was collected using interviews and questionnaires. The qualitative data was analysed using thematic analysis. The data from

questionnaires was analysed quantitatively. The items from the questionnaires were first coded and then posted into the SPSS Excel sheet and was analysed using both descriptive and inferential statistics. The study started by analysing the response rate analysis, normality test and then the demographic data.

3.10.1 Descriptive Statistics

Saunders, et al. (2012) noted that descriptive statistics enable the researcher to describe and make comparisons of the variables of the research. Descriptive was analysed using mean score and standard deviations. The research was analysing how the returns were deviating from the mean. Descriptive data analysis was shown in the tables.

3.10.2 Inferential Statistics

The researcher used Spearman and regression analysis to measure the associations between the variables

3.10.2.1 Spearman's (rho)

Spearman was used to measure the association between government and other agencies support with gold productivity. If there is need to establish the association between two variables, the correlation is used (University of West England, 2015). The correlation coefficient ranges between -1 and +1, with 0 denoting that the variables are not related (Ghauri & Gronhaug, 2005).

3.10.2.2 Regression Analysis

Regression analysis was used to determine the association between dependent and independent variables. The dependent variable was optimal gold productivity and independent variables were funding models. The regression equation that was discussed above was analysed using the regression model.

3.11 Research instruments

Appropriate instruments are required if desired and valid feedback is to be derived which gives consistence and accurate information. The main research instruments which were used in this study are: questionnaires and interviews.

3.12 Sources of data

Chidlow *et al.* (2015) noted that data is collected via secondary and primary sources. Researchers come up with their findings from primary and secondary data.

3.12.1 Primary sources

Primary sources are original works of the researcher or raw data without interpretation or pronouncements that represent an official opinion or position (Abbas *et al.,* 2017). Primary sources include: government data, census, interviews, debates and speeches. This is the data that the researcher originally acquires during the study process. Saunders *et al.* (2014) refer to primary data as the original works of the researcher or raw data without interpretation or pronouncements that represent an official opinion or position. In gathering primary data, the researcher made use of personal interviews and questionnaires.

3.12.1.1 Questionnaires

Most research often rely on questionnaires as the main data collection instrument. Cohen *et al.* (2011) defines a questionnaire as an instrument in which the respondent responds in writing to preconceived printed questions on a document. In conducting the survey on funding models for optimum gold production from artisanal and small-scale gold mines, the researcher used questionnaires to gather information from the mine owners in this sector. It is a document containing questions and other types of items designed to solicit information appropriate for analysis (Babbie, 2011). These questions have to be formulated in the format that makes then simple to understand while enabling important issues to be captured. There are three types of questions that is open ended which allow a wide range of responses, closed ended questions that provide responses on the questionnaire and scaled response questions that utilize a scale developed by the researcher to measure attitude of some construct under study. Questionnaires were circulated to ASSGM by the researcher using internet (emails), hand delivery and by post depending on the available infrastructure surrounding the respondents.

The study used semi structured questionnaires with some measurement scales to examine the relationships and empirically examine funding models that could lead to optimum gold production in Zimbabwe. The need to understand the relationships between variables made the researcher to have measurement scales which would enable results to be quantifiable and analysed statistically (Saunders *et al.,* 2009). Fowler (2002) points out that people who have an interest in the subject matter or the research itself are more likely to return mail questionnaires than those who are less interested. Saleh and Bista (2017) noted that the use of online questionnaires is still low in the African context and may result in very low response rate. Therefore, the researcher sent both electronic and hard copies to respondents to enhance responds rate.

To encourage complete response, the researcher designed a short questionnaire. This assertion is supported by a study in the cabinet-making industry by Galesik and Bosnjak (2009) who found that the longer the stated length, the fewer respondents started and completed the questionnaire. According to Adams and Cox (2008), people's attention spans mean that long questionnaires completed less accurately as people rush to finish them. Adams and Cox (2008) explain that long questions make respondents avoid reading the questions thoroughly and, as a result, the tendency to give inaccurate responses is high. In making the questions for the questionnaire items in this study, the researcher deliberately avoided setting questions that would be unnecessarily long, and the questionnaire itself was short.

3.12.1.2 Interview Guides

The researcher used semi structured questions during interviews. This allowed the researcher the opportunity to probe and expand the interviewee's responses (Fox, 2009). This is an effective and efficient method of data collection since it reduces the chances of failing to get an answer at all as may occur when using questionnaires. The interview is a method for discovering facts and opinions held by potential users of the system being designed (Gervasi *et al.,* 2017). An interview takes place between the interviewer and the interviewee. Interviews are discussions that take place among the interviewer and the respondent or a particular person to elicit certain information. Matthews and Ross (2010) state that there are three broad characteristics or structures of interviews, namely: standardised structure, semi-structured and unstructured

interviews. This study used semi-structured interviews. Semi-structured interviews are used to collect data in a wide variety of research designs, and are mostly associated with the collection of qualitative social data when the researcher is interested in people's experiences, behaviours and understandings and how and why they experience and understand the social world in this way (Matthews & Ross, 2010). The study followed a sequence of issues that were raised in each and every chapter in drafting interview questions. This permitted the respondents to respond to the interview enquiries by making use of their experiences. The research generated interview questions on why there was less funding from government and formal financial institution to artisanal and small-scale gold mines and what could be done to allow more funding to this sector.

Maxwell (1996) said that in an interview, questionnaire questions will generally be far more specific and diverse than the broad, general research questions that define what you seek to understand in conducting the study. Adams and Cox (2008) revealed the following problems of using interviews: bias, poor or inaccurate articulation, and poor recall. However, in controlling researcher bias, face-to-face interviews help because they allow the researcher to get responses to specific questions, rather than trying to speculate on the possible explanations for certain phenomena (Adams and Cox, 2008). Oltman (2016) noted that face-to-face interviews are strong and consistent, dependent upon the physical security precautions taken by the interviewer. Fox (2009) identify the following advantages of interviews: allow people to 'speak for themselves' and thus increase the validity of the data, the use of an informal interview guide will enable the study participants to talk freely about their experience in their own way and the semi-structured interview format allows the researcher to talk to participants in-depth and to explore specific issues related to a study. Cooper and Schindler (2005) noted that interviews help the interviewer to pre-screen respondents to ensure that they filled the population profile. In using interviews, the interviewer could pause for answers, use follow up questions and gather information by observation (Cooper and Schindler, 2005). However, they also noted that one-to-one interviews can be intimidating and make the interviewee uneasy; the interviewer should make the respondents more comfortable and be able to give their whole attention to the interview (Matthew & Ross, 2010).

3.13 Data collection procedures

The data for this research was collected from the 2nd of August 2021 to the 4th of February 2022. The researcher obtained a clearance letter from Chinhoyi University of Technology. After permission was granted, the researcher got a map and addresses of ASSGM in the six districts Chegutu, Mhondoro Ngezi, Sanyati, Makonde Zvimba and Kwekwe and the gold hotspots that is Shamva, Bindura, Mazoe and Shurugwi from Ministry of Mines and Mining Development, Mashonaland West and Midlands Province to distribute the questionnaires. The questionnaires were given out to them in such a way that they were completed and returned back. Where there are some challenges in accessing other areas, the researcher used telephone.

The researcher notified the owners of artisanal and small-scale gold mines and mine officials from district to national level of this research in advance and the researcher had some appointments with selected owners of the mines and mine officials for interview questions. The mine owners organized place and time which the interviewer had interviews with them. The Ministry of Mines, Mashonaland West and Midlands Provincial Officials notified ASSGMs owners and district officials in their districts which interviews were going to be done first to easily acknowledge the researcher since this area is now affected by machete wielding gangs fearfully known as *"Mashurugwis"*. They assured the ASSGM in their districts of the authenticity of the study and that the research had no political effects and would not result in their mines being taken away by government. All the questionnaires were sent together with consent forms to the respondents. All the respondents had to study consent forms before answering the questions. The consent form had voluntary participation, informed consent, anonymity and confidentiality issues (Lokesh *et al.,* 2013).

The researcher asked respondents to read consent form. Edwards (2005) argued that in a research project participants must be aware that their participation in the study is voluntary, that they have the freedom to withdraw from the study at any time without any unfavorable consequences and would not involve penalty or loss of benefits to which the subject is otherwise entitled to as a result of their participation or non-participation in the project. After participants read the consent form, they were not allowed to sign it, if they chose to sign it, they were assured that their identity would be concealed. This was supported by (Remenyi *et al.*, 1998). Those participants

who had challenges in answering or understanding the questions, were afforded the opportunity to ask questions for clarity through researcher's email and telephone. This made the research easy, fast and participants were able to complete and return the questionnaires over a short period. The researcher moved from one district to another until all the respondents on the sampling list were reached.

3.14 Validity of research instruments

Saunders *et al.* (2014) revealed that validity is the ability of a measurement to measure what it is intended for. Researchers classify validity as internal or external (Yin, 2009). External validity relates to the ability of the data to be generalised across times, persons and settings (Blumberg *et al.,* 2013). Internal consistency pertains to how well related, but different, items measure the same thing (Blumberg, *et al.*, 2013)

3.14.1 Construct validity

Rowley (2001) suggests that construct validity establishes correct operational measures for the concepts being studied. It is concerned with exposing and reducing subjectivity, by linking data collection questions and measures to research questions and propositions (Rowley, 2002). This research had framed research objectives which were consistent with the research questions. During the course of the study, the researcher ensured that the data collection instruments being used were working as proposed. To ascertain the extent to which data collection instruments were working as proposed, a pilot study was done using questionnaires and 30 participants chosen from the sample of ASSGMs. Those participants who took part in the pre-test were not involved in the final study. Mugenda and Mugenda (2003) noted that the purpose of the pilot research is to establish face and content validity of the questionnaire alongside the opinion sought from professionals and experts in the field of investigation. The main purpose of the research to explore construct validity is to determine whether the inferences made about the results of the assessment are meaningful and serve the purpose of the assessment (Fraenkel & Wallen, 2003). Construct validity is empirically explored by means of Rasch and as is central to any quality assessment (Creswell, 2005). Whenever a certain attribute has to be measured, construct validity is involved, as it is the most applicable form of validity to assess measurements

(Creswell, 2005). Hernon and Schwartz (2009) point out that construct validity refers to the stage where an instrument measures what it is intended (the construct).

3.15 Reliability of research instruments

According to Saunders *et al.* (2014) reliability relates to the ability of the instrument to produce accurate and consistent findings under different conditions and at different times. Reliability reflects consistency and replicability over time (Fraenkel and Wallen, 2003; & McMillan & Schumacher, 2009). In terms of a measurement instrument, the degree of reliability will be determined by the consistency of the results with specific reference to the stability, equivalence and internal consistency of the instrument (Cooper & Emory, 1995). Reliability is mainly affected by two factors which are poorly formulated questionnaires and sampling procedures which do not incorporate the whole target population. Reliability' means that if we have to redo the same study with the same data collection instruments to the same population in the same environment with same conditions, the finding should be similar or close to the first findings. In this study, reliability was evaluated using Cronbach's Alpha. Cronbach's alpha shows degree of internal consistency (Hajjar, 2018). A value of Cronbach's alpha between 0.6 and 0.8 is acceptable (Wim *et al*, 2008). Therefore, items that had alpha of less than 0.5 were eliminated in this study, Bryman and Bell (2011) revealed that a good scale has alpha greater or equal to 0.70. Reliability regarding quantitative research is designed according to: the degree to which a measurement, given repeatedly, remains the same, the stability of a measurement over time and the similarity of measurements within a given time period (Neuman, 2003).

Brown (1997) says that there are three strategies to assess reliability that is : test-retest reliability (i.e., calculating a reliability estimate by administering a test on two occasions and calculating the correlation between the two sets of scores), equivalent (or parallel) forms reliability (i.e. calculating a reliability estimate by administering two forms of a test and calculating the correlation between the two sets of scores), and internal consistency reliability (i.e. calculating a reliability estimate based on a single form of a test administered on a single occasion using one of the many available internal consistency equations).

3.16 Ethical consideration issues

Research ethics are the set of ethics that govern how scientific and other research is performed at research institutions such as universities, and how it is disseminated (Resnick, 2020). Cohen *et al.* (2011) revealed that ethical issues are crucial and must not be overlooked when it comes to gathering data through questionnaires, since they involve an invasion into the privacy and life of respondents. Ethical issues are crucial in any research, because researchers need to protect their research participants; develop trust with them; promote the integrity of research; guard against misconduct and impropriety that might reflect on their organisations or institutions; and cope with new challenging problems (Israel & Hay, 2006). Cohen *et al* (2011) also observed that ethical issues are crucial and must not be overlooked when it comes to gathering data through questionnaires, since they involve an invasion into the privacy and life of respondents. The researcher obtained a clearance letter from the Ministry of Mines in Mashonaland West and Midlands Province before embarking on the study. The Ministry of Mines is the one that governs ASSGM sector operations.

3.16.1 Informed Consent

In carrying out this research, the researcher first obtained respondents' informed consent. The researcher respected all the rights of the participants. These rights include: withdrawal from participation at any point during the research, the respondents' preference to be part of the research or not, whether to complete the whole questionnaire or refusal to answer certain questions.

3.16.2 Respect of Anonymity and Confidentiality

In drafting the questionnaires, the researcher did not include sensitive information such as respondents' names and name of their companies, this information was deliberately left out as it was not necessary. The researcher had the clearance letter from the Ministry of Mines together with application form and questionnaire so that respondents could easily acknowledge that whatever they shared with the researcher would be of academic use only.

3.16.3 Resect of Privacy

Guidelines were followed in protecting sensitive information such as respondents' records. In conducting this research, human rights like right to privacy and autonomy and rules that apply at the workplace were followed.

3.16.4 Beneficence

The results from this study did not harm anyone and they benefited the researcher and other researchers in the field of ASSGM sector. The researcher analysed and reviewed his work to avoid careless mistakes including information that could harm respondents and other researchers in coming up with results that were credible. The results from this research were shared through publishing the findings which helped others who wanted to do research in artisanal and small-scale gold mines and the researcher was open to criticism and was receptive of new ideas.

3.16.5 Antiplagiarism

The researcher did not plagiarize or take other researcher's ideas as his work. There was acknowledgement of other peoples' work which was used in this research. The researcher reported his research honestly without prejudice in the following aspects: originality, investigations, explanations and assessments of other researchers. This is the first time the researcher has done this study. The information that was gathered was correct at the time of the research and this research is new. In doing this research, the researcher followed all the laws and regulations that govern research and conformed to them.

3. 17 Chapter summary

Chapter Three discussed the following: methodology, research philosophy, design, the population, sample size and the sampling procedures that were employed in this research. It also discussed instruments that were used to gather data. Validity and reliability of the study was also analysed in this chapter. The data gathered was analysed electronically and presented using tables, charts and graphs in the next chapter. The next chapter will deal with data presentation.

CHAPTER FOUR: RESULTS AND DISCUSION

4.0 Introduction

Chapter Three discussed the research methodology that was used to gather data, research philosophy adopted, the research design, data collection methods and how data would be analysed and presented at data analysis level. This chapter presents, analyses and discusses the findings from the survey using quantitative and qualitative techniques. The discussed results from the qualitative study complimented the findings from quantitative findings that helped to identify funding models that could lead to optimum gold production. The study utilised tables, graphs and pie charts to present the findings from the questionnaires and the interviews that were carried out. The study sought to establish the internal and external funding models that were being used by miners, why other miners were failing to access funding from formal financial institutions, the involvement of government support to ASSGM and causes of the informality of the ASSGM sector. The following key objectives were being answered.

1. To determine institutional factors that are considered before funding is given to Artisanal and Small-Scale Gold Mines.
2. To examine funding mechanisms available to Artisanal and Small-scale Gold Mines in Zimbabwe.
3. To evaluate the role of government and its agencies in supporting Artisanal and Small-Scale Gold Mines in Zimbabwe.

The major aim of the survey was to assess funding models that are used by artisanal and small-scale gold mining companies in Zimbabwe and to determine the best funding model(s) that could be useful to Artisanal and Small-Scale Gold Mines in achieving optimum production. The following hypotheses were tested using Regression Model:

H_1: Personal savings as a funding model by Artisanal and Small-Scale Gold Miners is associated with gold productivity.
H_2: Sale of an asset as a funding model by Artisanal and Small-Scale Gold Miners is associated with gold productivity

H_3: Joint Ventures as a funding to Artisanal and Small-Scale Gold Miners is associated with gold productivity.

H_4: Partnerships as a funding model to artisanal and Small-Scale Gold Mines is associated with gold productivity

H_5: RBZ as a funding model to Artisanal and Small-Scale Gold Mines is associated with gold productivity.

H_6: Government and other agencies support to Artisanal and Small-Scale Gold Mines is associated with gold productivity.

4.1 Response Rate Analysis

The study had analysed response rate analysis from qualitative (interviews) and quantitative (questionnaires) data collection techniques.

4.1.1 Response Rate Analysis from the Questionnaires

The response rate shows the total number of valid responses from the questionnaires that were distributed to the following district: Chegutu, Kwekwe, Makonde, Mhondoro Ngezi, Sanyati

Zvimba and gold mining hotspots (Shamva, Bindura, Shurugwi and Mazowe area). Table 4.1 shows the distribution of the questionnaire.

Table 4. 1: Distribution of the questionnaires

District	Distributed	Returned	Percentage of Response Rate
Chegutu	90	76	25
Kwekwe	40	24	7.8
Makonde	36	24	7.8
Mhondoro Ngezi	50	42	13.7
Gold Hotspots areas	45	42	13.7
Sanyati	70	61	19.9
Zvimba	50	37	12.1
Total	381	306	80

Source: Author (2022)

A total of 381 questionnaires were distributed to different districts as hard copies and 306 of them being successfully completed representing an 80 % response rate. Out of 381, 53 of the questionnaires were returned without being fully completed (Spoiled Responses) and 22 respondents never returned the questionnaires. Gold mining hotspots had 42 responses out of 45 distributed (Shurugwi, Shamva, Mazowe and Bindura), Kwekwe had 24 responses out of 40distributed (Sherwood and Battlefields) Mashonaland West Province had 240 responses out of 296 distributed (Chegutu, Zvimba, Sanyati, Mhondoro Ngezi, Makonde). In Mashonaland West

Province, Chegutu district had the highest response rate 76, because that's where most of the questionnaires were distributed, out of 381, 90 were distributed to Chegutu district. The responses were expressed as a percentage of the total questionnaires returned and it shows that the highest response rate came from Chegutu district which returned 76 (25%), followed by Sanyati district 61(19.9%), responses from Makonde district and gold hotspots are similar which is 42 (13.7%), Zvimba follows the two districts with 37 (12.1%) and Kwekwe and Makonde also had the same response rate of response of 24 (7.8%).

4.1.2 Response Rate Analysis from the Interviews

The targeted number of ASSGM to be interviewed per district was five (5). Six (6) districts were selected (Zvimba, Makonde, Chegutu, Sanyati, Mhondoro Ngezi and Kwekwe). The study also targeted Ministry of Mines representative per District (Zvimba, Makonde, Chegutu, Sanyati, and Mhondoro Ngezi and Kwekwe), Ministry of Mines Provincial Mash West and Midlands Province and one representative from Ministry of Mines National. The ministry of mines officials was included because the researcher also wanted confirm funding models that were being availed by the government (RBA/FPR and MILF), their requirements. Since they are the ones who interacts with the miners, the have valuable information for this sector which was important to this research. The total number that was to be interviewed was 38 and a total of 31 people were interviewed representing 82% of the target sample. The interviews were done until saturation. Table 4.2 shows ASSGMs per District and Ministry of Mines Officials Interviewed.

Table 4. 2: ASSGM per District and Ministry of Mines Officials Interviewed

District	Number of people Interviewed
Sanyati	5
Kwekwe	3
Chegutu	5
Zvimba	5
Makonde	4
Mhondoro Ngezi	5
Ministry of Mines Kadoma	1

Ministry of Mines Mashonaland west Province	2
Ministry of Mines Midlands Province	1

Source: Author (2022)

The researcher successfully managed to interview the targeted number of interviewees until saturation point in Sanyati, Chegutu, Zvimba and Mhondoro Ngezi. District officials for Ministry of Mines in Chegutu, Sanyati and Mhondoro Ngezi were all represented by 1 official from Ministry of Mines Kadoma offices. All miners in those districts reported to that office. ASSGM from Makonde, Zvimba and Ministry of Mines Mashonaland West Province were represented by two (2) officials from the provincial offices. Another interview was done with one representative from Midland Province. The interview with Ministry of Mines national was not successful due to Covid 19 issues and other commitments by the officials

4.2 Preliminary Tests

4.2.1.1 Reliability of Quantitative data

For the empirical part of this study, the questionnaire was distributed to seven districts and four gold hotspots physically. The questionnaire was tested for its reliability by using the Cronbach's Alpha. The results of the reliability are summarised in Table 4.2, Cronbach's Alpha is 0.62827273, which is the indication of the reliability of the questionnaire. Table 4.3 shows reliability test results.

Table 4. 3: Reliable tests

Question	Cronbach's Alpha	N of Items
12a	0.346	5
12b	0.431	5
14	0.305	4
15	0.578	6
16	0.620	5
18	0.957	5
19	0.564	5

20	0.517	5
21	0.593	13
22	1	5
23	1	6
Overall	0.62827273	

Source: Author (2022)

The low Cronbach's Alpha may be because of some of the items in the questionnaire which could have been deleted in the Factor analysis. The questionnaire had 306 responses and it covered the following sections: Financial and technical Skills; Size of Artisanal and Small-Scale Gold Mines; Formalization of Artisanal and Small-Scale Gold Mines; Collateral security of Artisanal and Small-Scale Gold Miners; Financial support to Artisanal and Small-Scale Gold Mines from Government and agencies like Donor Community, Fidelity Printers and Refineries and Funding Models for Optimum Gold Production for artisanal and small scale gold mines of Zimbabwe. Wim *et al*. (2008) opined that an overall value of Cronbach's alpha between 0.6 and 0.8 is acceptable.

4.2.1.2 Validity for Quantitative Data

To ascertain validity of quantitative data, the study structured the research objectives that were consistent with the research questions. Prior to the study, the researcher ensured that the data collection instruments being used were working as proposed. To ascertain the extent to which data collection instruments were working as proposed, a pilot study was done using questionnaires, 30 participants were chosen from the sample of ASSGMs. In the final analysis, the researcher did not include the participants who took part in the pre-test in the final study.

4.2.1.3 Reliability for Qualitative Data

Smith and Noble (2015) noted that reliability tests for qualitative research can be established by techniques like: refutational analysis, use of comprehensive data, constant testing and comparison of data, recording data and the use of inclusive of deviant case. Lincoln and Guba (1985) noted that reliability in qualitative data is achieved in terms of credibility, neutrality or confirmability, consistency or dependability and applicability or transferability of the findings. In

making sure that my findings from qualitative data were reliable, the study made use of recordings using an electronic tool (cellphone) and other information was written down so that after the interviews, the researcher could keep reflecting on them when interpreting and analysing the findings making sure that the decisions that were made by the researcher were consistent with the views of the participants. The researcher made comparisons and similarities between different views from the participants to ensure different perspectives were captured which is consistent with the findings of Smith and Noble (2015) who argued that there is need to record data and comparing data between different views. In supporting the findings from the participants, the study made use of verbatim descriptions of participants' thoughts.

4.2.1.4 Validity for Qualitative Data

Tanveer *et al.* (2008) noted that validity in qualitative research means the extent to which the data is plausible, credible and trustworthy; and thus, can be defended when challenged. Long *et al*. (2000) noted that to ensure validity of qualitative data, there is need to invite participants to comment on the interview transcript. To make sure that my findings from qualitative data were valid, the researcher made use of moderates who helped him to structure valid questions specifically for the ASSGM. In demonstrating credibility and trustworthy in terms of thought processes during data analysis and subsequent interpretations, the study engaged other researchers to reduce research bias. The researcher invited the respondents to comment on the interview transcript, analysing the major points that were drafted by the researcher and to see whether the concepts that were drawn by the researcher adequately reflected the phenomena being investigated.

4.2.2 Factor Analysis on Internal Funding Models, External Funding Models and Institutional Factors that affect Funding to ASSGM

Table 4.4: Factor Analysis for Internal Funding Models

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %

PS	1.504	30.084	30.084	1.504	30.084	30.084	1.342	26.831	26.831
S of A	1.107	22.136	52.220	1.107	22.136	52.220	1.269	25.389	52.220
OC	.983	19.662	71.881						
PBP	.815	16.301	88.182						
FF	.591	11.818	100.00						

Source: Author (2022)

Key See Appendix 7: Abbreviations for Components

On factor analysis, a factor should have an eigenvalue which is greater than 1 (one) for it to be significant in explaining a given variable. On internal funding models, only personal savings with the value of 1.504 and sale of an asset with the value of 1.107 are significant, and were used in the analysis

Table 4.5 Factor Analysis for External Funding Models

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
PP	1.204	35.084	35.084	1.504	35.084	35.084	1.342	24.831	24.831
JV	1.117	25.136	60.220	1.107	25.136	60.220	1.269	25.389	60.220
3RBZ	1.017	21.110	81.330	1.107	25.136	81.330	1.269	21.110	81.330
LLB	.783	10.111	91.441						
LRB	.415	6.001	97.442						
L I B	.391	2.558	100.000						
Leasing	.000	.000	100.000						

HP	.000	.000	100.000						
Factoring	.000	.000	100.000						
J V	.000	.000	100.000						
BA	.000	.000	100.000						
VC	.000	.000	100.00						
NGOs	.000	.000	100.000						
Gvt	.000	.000	100.000						

Source: Author 2022

Key See Appendix 7: Abbreviations for Components

On external funding models, only three factors had initial eigenvalues which are greater than 1 (one) and these are partnerships with an eigenvalue of 1.204, joint venture with an eigenvalue of 1.117 and RBZ (Loans) with an eigen value of 1.070, and were used in the analysis

Table 4.6: Factor Analysis on Institutional Factors that affect funding to ASSGM

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
FS	4.594	21.876	21.876	4.594	21.876	21.876
FDVP	2.630	12.525	34.401	2.630	12.525	34.401
BF	1.624	7.733	42.134	1.624	7.733	42.134
K of B	1.529	7.279	49.413	1.529	7.279	49.413
ES	1.288	6.135	55.547	1.288	6.135	55.547
MS	1.193	5.680	61.227	1.193	5.680	61.227
SM	1.046	4.981	66.208	1.046	4.981	66.208

GO	1.009	4.806	71.014	1.009	4.806	71.014
ME	.908	4.325	75.339			
MMS	.819	3.900	79.239			
GS	.765	3.643	82.882			
GW	.672	3.201	86.083			
SO	.630	3.000	89.083			
SPG	.576	2.743	91.826			
IP	.476	2.266	94.092			
BP	.452	2.152	96.244			
MPS	.428	2.038	98.282			
OSMS	.361	1.718	100.000			
EP	.000	.000	100.000			
DDR	.000	.000	100.000			
FP	.000	.000	100.000			

Source: Author 2022

Key See Appendix 6: Abbreviations for Components

In the analysing of institutional factors that affect funding from financial institutions to ASSGM, 8 (eight) initial eigenvalues were greater than 1 (one). The institutional factors that were analysed include: collateral, financial skills, technical skills and size of the firm. The following variables were considered because they had eigenvalue greater than 1 (one): adequate education and training on financial skills which has an eigenvalue of 4.594, financial data for performance evaluation purposes that had an eigenvalue of 2.624, availability of books of finance that had an eigenvalue of 1.624, knowledge by other ASSGM owners on banks loans with an eigenvalue of 1.529, adequate entrepreneurial skills that had an eigenvalue of 1.288, adequate education and training on mining skills that had an eigenvalue of 1.198, size of the mine that had an eigenvalue of 1.046 and the amount of gold output from the mine to FPR that had an eigenvalue of 1.009, so they were used in the analysis.

4.2.3 Tests of Normality

Table 4.7: Normality Tests

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Gold Production	.520	306	.000	.031	306	.000
Survival & Growth	.520	306	.000	.031	306	.000
Mining Capacity	.520	306	.000	.031	306	.000
Gold Exports	.520	306	.000	.031	306	.000
Gold to FPR	.520	306	.000	.031	306	.000
Performance of Mines	.520	306	.000	.031	306	.000
Personal Savings	.462	306	.000	.548	306	.000
Sale of an Asset	.508	306	.000	.440	306	.000
Joint Venture	.489	306	.000	.496	306	.000
Partnership	.525	306	.000	.375	306	.000
Sales Growth	.413	306	.000	.607	306	.000
Growth in Profit	.354	306	.000	.635	306	.000
After Tax Returns	.535	306	.000	.311	306	.000

Total Sales to Total Assets Ratio	.539	306	.000	.257	306	.000
Total Gold output to FPR	.459	306	.000	.553	306	.000
Return on Assets	.541	306	.000	.221	306	.000

Source: Author 2022

In testing data normality, the Shapiro-Wilks and Kolmogorov-Smirnov test for normality are generally used methods which are designed to detect all departures from normality. Shapiro Wilks normality test is generally comparable in power to the other tests. The Shapiro Wilks test rejects the hypothesis of normality when the significant value (the P value) is less than or equal to 0.05. From the Table 4.6, all the significant values are less than 0.05 it therefore means that the data is not normal. Therefore, the data does not fit the normal distribution. The results were confirmed by the histogram visualisation in the Appendix 8; therefore, non-parametric tests have been used to infer associations between the research constructs.

4.3 Analysis of Demographic Data

Table 4.8a and 4.8b shows demographic data for the artisanal and small-scale gold miners that answered the questionnaires. Fig 4.8a and 4.8b show demographic data

Table 4.8a: Demographic Data

Age of the Miner	1 to 5 years	114	37.3
	6 to 10 years	150	49.0
	11 to 15 years	35	11.4
	16 to 20 years	6	2.0
	21 years and above	1	.3

	Total	306	100.0
Number of Employees	1 to 10	204	66.7
	11 to 20	80	26.1
	21 to 30	12	3.9
	31 to 40	7	2.3
	Above 41	3	1.0
	Total	306	100.0

Source: Author (2022)

Table 4.8b Demographic Data

Variables	Frequency	Frequency	Percentage%
Gender	Male	261	85
	Female	45	15
	Total3	306	100
Educational Level	"O" Level	157	51.3
	"A" Level	27	8.8
	Diploma/Professional Mining Course	26	8.5
	First/Undergraduate Degree	15	4.9
	Post Graduate Degree	13	4.2
	Other Specify	68	22.2
	Total	306	100.0
Length of Service	1 to 5 years	122	39.9
	6 to 10 years	135	44.1
	11 to 15 years	33	10.8

	16 to 20 years	12	3.9
	21 years and above	4	1.3
	Total	306	100.0
Age of the Miners	Below 25 years	86	28.1
	26 to 35 years	155	50.7
	36 to 45 years	51	16.7
	46 to 55 years	12	3.9
	Above 55 years	2	.7
	Total	306	100.0

Source: Author (2022)

Results from Fig 4.8 show that 261 (85%) of the respondents were male miners. The findings are showing that this sector is mostly dominated by male players, but it is important to note that women were also involved in the ASSGM sector and they constituted 45 (15%) of the respondents. The mining sector needs a lot of funding and traditionally women do not have chances of having assets for collateral which makes it difficult to acquire funding, the literature on gender and entrepreneur revealed that women were likely to face significantly more difficulty in obtaining finance than men. They faced higher probability of being credit rationed Calcagnini *et al.* (2014). On the level of education, the findings also shows that 157 (51.3%) of the ASSGM did not proceed beyond Advanced Level certificate. Those with 'A' level certificates constituted 27 (8.8%). The results also show that only 13 (4.2%) of the respondents had acquired post Graduate certificate. Out of 306, 26(8.5%) of the respondents had reached Diploma/Professional Mining Course and 15 (4.9%) were First/Undergraduate Degree holders. Other specified that they were below 'O' level and others were foreigners which made it difficult for the researcher to ascertain their exact level of education. Education and experience have a great impact on the performance of the firm and the chances for growth and expansion. Nofsinger and Wang (2011) noted that firm owner's education and experience enhances firm credit access positively but the finding of Nguyen *et al.* (2015) revealed that the firm owner with a bachelor degree or higher had 12.8% lower chance of borrowing a loan than he/she would otherwise have with lower educational level. Most small scale and artisanal miners are within the range of 26 to 35 years which had 155 (50.7%) respondents. Another age group that had more miners is below the age of

25 which is indicated by 86(28.1%) respondents. The range of 55 years and above has less miners which is indicated by 2 (0.7%) miners. Another age group with less miners is the range of 46 to 55 years that had 12(3.9%) of respondents. There is a relatively big number of miners in the range of 36 to 45 years 51(16.7) which is relatively bigger than miners who are over 46 years 14(4.6%) cumulatively. Age was analysed because young people were willing to have loans as compared to the old aged and this was supported by Vos *et al.* (2007) who noted that in terms of the firm owner's age, younger owners were considered less risk averse so they were more willing to borrow externally. The Table 4.8 is indicating that the range that has most miners is between 6 to 10 years which is shown by 135 (44.1%) of the respondents. The 1 to 5 years category 122(39.9%) respondents also have more miners. The general picture from the Table 4.8 is that most miners had 1 to 10 years working experience in the sector. This range of 1 to 10 years has a cumulative number of 257 (84%). The ranges that have less responses include 11 to 15 years which had 33(10.8%), followed by 16 to 20 years 12 (3.9%) and finally 21 years and above that had 4 (1.3%). About 150 (49%) of the artisanal and small-scale mines in Zimbabwe are between 6 to 10 years old, while 114 (37.3%) of the mines have less than 5 years of operation as shown in Table 4.12. The majority of the small-scale mines have been in operation for the period between 1 to 10 years and they constitute 264 (86.3%) cumulatively. There were only 35 (11.4%) of the mines in the range of 11 to 15 years and 6 (2%) in the range of 16 to 20 years. Few ASSGMs had been in operation for 21 years and above and there was only 1(0.3%) mine in that range. Firms at growth and maturing level tended to have more assets which would enhance their chances of accessing funding. Kira and He (2012) revealed that firm size and firm age are widely recognized as a significant determinant of accessibility to financing, they argued that young firms often faced difficulties in obtaining external finance because of informational disparities. Many of the surveyed mines had between 1 to 10 employees 204(66.7%), this is consistent with the findings of Zimbabwe Mining Sector Situational Report (2020) which opined that those artisanal and small-scale miners who were registered by the body Zimbabwe Chamber of Mines employs at least ten workers. Most mine workers were not exceeding 10 followed by 11 to 20 category that have 80 (26.1%) respondents. The category of 21 to 30 had 12 (3.9) respondents. They are few mines that had employees that were in the range of 31 to 40 as indicated by 7 (2.3%) respondents. The final range of 41 and above had only 3(1%) respondents. The results from the demographic data show that the researcher targeted the correct group. Most mines had

been in operation for five years and above meaning that the miners now had the experience in the sector and some miners had been in the sector for more than five years, this was of great importance to the researcher since most of them would now be aware of some of the funding models that were availed to the sector. The level of education helped the researcher to draw conclusions on the financial skills that miners possessed.

4.4 Institutional Factors that affect Funding to ASSGM

In carrying out the research, I adopted the exploratory sequential mixed method research design, I started with interviews on the institutional factors that affected funding to ASSGM and the results from interviews that were captured show technical and financial skills as factors that were affecting ASSGM to acquire funding from banks. Interviewee 1 in Chegutu district had this to say which reinforces this factor "*Financial skills are important because they help miners on how to apply for funding, have knowledge on all the paperwork that is required by financial institutions and have an appreciation of merits and demerits of funding from the banks"* [Interviewee, 1]. Artisanal and small-scale gold mining is not a cheap adventure, it requires mining skills and experience in financial management in order for one to be able to repay the loan. The interviews that were carried out also revealed that though technical and financial skills are important, there are other factors that needed to be considered. Out of 31 participants, not every participant concluded that technical and financial skills are important. This was reinforced by a miner from Artisanal and Small-Scale Gold Miners association in Chinhoyi who had this to say:

> *Financial skills are of less importance, in the event that I accessed funding from banks without financial skills, I now know how to use it wisely in the mining side: buying equipment, investing in better mining methods which will result in increased output so the financial skills are of less importance in repaying back the loan and increase in the output, but the emphasis should be on easy access of funding from banks for ASSGM and lower interest rates from banks* [Artisanal and Small Scale Gold Miners Association Chinhoyi Official].

However, According to Kadoma Ministry of Mines Official, there was need for training on financial skills. The official emphasised the importance of financial training due to currency changes, interest rates movements which was affecting deposits in the bank accounts, instead of it accumulating interest, it was losing its value. The district mine official noted the significance of education on financial skills before ASSGM were being granted these loans so that they would not fail to pay back them.

An interviewee 3 in Sanyati District who was operating near Vinice Mine area adds a new dimension on institutional factors from financial and technical skills as captured by the following statements:

> *Although training on financial and technical skills is important, it may not affect to the same level as collateral in accessing funding from banks, I think most miners now have on the job experience and they are now able to produce enough ore to repay their loans but they are still finding it difficult to access the funding due to collateral issues*. [Interviewee, 3]

These sentiments were also reinforced by Interviewee 1 mining in Zvimba district near Pindi Park area who noted that financial institutions first look at your ability to pay back the loan and the assets to use as collateral in the event you have failed to pay back the loan and they do not consider financial and technical skills. Another dimension that was added by Interviewee 2 mining in Zvimba district near Hunyani river is that "*Even though training on mining and financial skills remains important, this sector is still not yet full recognised by banks for funding, the banking sector still view the ASSGM as being too risky"* [Interviewee, 2]. One of the miners, Interviewee 3 near Hunyani river in Zvimba district also revealed that it was difficult to offer on the job training in the mining skills especially to artisanal miners because they migrated from one place to another especially during gold rush periods.

Another dimension that was highlighted by the interviewees is lack of books of accounts and financial data for valuation purposes. The interviews revealed that most miners did not have all the required financial books which included statement of changes in equity, statement of income (comprehensive income statement) statement of financial position (balance sheet) and cashflow statements. Lack of books of accounts could be due to lack of knowledge to complete them due to lower levels of education as was noted on the level of education, most miners 53.1% of the participants had attained only 'O' level qualifications. According to a Mhondoro Ngezi Miner, Interviewee 3, most miners used the expense books to maintain their accounting information. Interviewee 2 in Chegutu Blue Rock Mine noted that most of the books of accounts were mainly done by mine owners due to lack of funding to hire private accountants. The Mhondoro Ngezi Miner, Interviewee 3 further noted that some of the miners did not even maintain the books of accounts and the books of accounting that were being used by most ASSGM in maintaining their accounting information was through use of primary books of accounting and they named this primary book of accounting the Expense Book. According to the miners that were interviewed, they mainly used this expense book to keep all the expenses they incurred during production, these expenses included (food; money to hire machinery like generator, compressors and jackhammers and acquisition of simple mining tools) and the income they got after milling their ore. However, Interviewee 3 in Zvimba district stated that he maintained the following books of accounts: Statement of Cash Flows, Statement of Financial Position, Statement of Comprehensive Income and the Expense Book. Some of the participants in Chegutu New Found cooperate revealed that that they did not have any books of accounts. One of them Interviewee 4 cited lack of knowledge to complete these books of accounts, the participant further revealed that even if he had them, he lacked capital to hire an expert to help him to maintain them. The use of primary book keeping by most ASSGM was reinforced by Ministry of Mines Mashonaland West Province Official as captured by the following statement:

> *In the ASSGM sector, the Expense Books are very common and most ASSGM mainly use them because they are easy to maintain since miners normally do not have to higher other personnel to help in completing and maintaining them. The official further noted that most miners are not aware of the importance of the books of accounts, so they are*

not interested in maintaining them [Ministry of Mines Official Mashonaland West Province Official].

The study noted that there was need for outreach programmes by the ministry of mines to ASSGM areas to educate them on the need to have books of accounts and their importance. The interviews further probed for the availability and knowledge of paperwork that banks required from ASSGM.

Some of the participants who spoke to the researcher said they lacked knowledge on all the paperwork that banks required. According to a Vinice miner, Interviewee 1, Geological Survey Reports were of importance in accessing funding from banks. Interviewee 1 in Mhondoro Ngezi district emphasised the need for geological survey reports as captured by the following statement:

I now have all the books of accounts that banks require but I am failing to acquire funding because I do not have a Geological Survey Report. The participant further revealed that most Geological Survey Reports are mainly done by private institutions and most miners do not have enough capital to hire a private person or institution for Geological Survey Report which is needed by banks when giving out loans because it's too expensive for them [Interviewee, 1].

However, another participant Interviewee 4 acknowledged that he knew all the paper work and their importance but he did not know how to complete them. The participant further revealed that most miners tented to ignore them and operate without them because most of the miners could not afford to hire experts to do all the paper work that was needed by the banks. According to a small-scale miner in Chegutu Berks Mine, Interviewee 1, banks are reluctant to offer funding to the artisanal and small-scale gold miners. The miner argued that he had all the paperwork, had the correct personal to maintain books of accounts but he had failed to access funding from two

(2) banks he had applied for. Another participant in Mhondoro Ngezi Interviewee 2, revealed that he was asked to bring Title Deeds of the area he is operating in, this had affected him to access funding since he was operating in a cooperative at Tix Mine.

One of the participants, Interviewee 2 in Makonde argued that although collateral is an important factor that banks consider before issuing capital, there are other factors which also affect ASSGM in accessing funding from banks. The study revealed that most ASSGM do not have assets and required paper work to be granted loans, the interviewee noted that other miners are using a prospecting licence which is not a mining licence so even if they go to financial institutions, they are bound to fail to acquire the funding. Another dimension that was highlighted by a Mhangura miner Interviewee 2 in Makonde district is that other ASSGM were not visiting banks for funding. The miner further revealed that these miners were using personal savings, plough back profits, and funding from sponsors because that's what they could afford, they thought funding from banks was mainly for well to do mines and not for small scale miners. Another reason that was cited for not visiting banks by a Chegutu miner Interviewee 3 is that some miners were being helped by Tribute System which was providing transport facilities, milling place and providing mining equipment on hiring bases in Chegutu, Blue Rock Mine, so some miners did not go to banks looking for funding. The Chegutu miner further noted that even if miners went to banks, they were being given the loans in RTGS (ZWL) but the funding requirements were priced in United States of American Dollar (US$) so they preferred sponsors, tribute system and private funding because suppliers of mining equipment did not accept RTGS.

The research gathered that; some miners were aware that banks gave funding but they were not aware of paperwork that was required for them to be given loans. Interviewee 4 in Makonde district revealed that there was need for people with financial knowledge to manage their books of finance, help miners to make informed investment decisions about their money which would minimise the rate of failure. This is consistent with the findings of World Bank Global Findex Study (2017) which revealed that other small-scale businesses were not familiar with requirements from financial institutions. According to a Mhondoro Ngezi Miner, Interviewee number 4 who was mining at Tix Mine, revealed that he approached banks looking for funding but was not successful and was told to come with all the paper work that he was not in

possession of, the paper work included: Statement of Financial Position (Balance Sheet), Profit and Loss Statement (Statement of Comprehensive Income and Expenditure), Cash Flow, Geological Survey Report, Title Deeds and Business Plan (though this was said it's not that important). The reason that was revealed for failure of some of the miners to acquire required paperwork included changing the purpose of the land they owned. One of the miners in Zvimba, Shanguru area Interviewee 5 revealed that they had acquired their land for farming purposes but later, they noted it had gold deposits so the Ministry of Mines was yet to change the purpose of the land from farming to mining.

Interviewee 5 in Chakari area believed that ASSGM were not acquiring funding from banks because their businesses were still small and their capital was still sufficient for their financial needs and they obtained the area they were mining in through cooperatives. This was further reinforced during an interview with one artisanal gold miner from Tix Mine Mhondoro Ngezi area Interviewee 2, who argued that he was still using his own funding, he never visited banks and he had acquired the land he was mining through cooperatives. The study believes that these miners still preferred personal savings, returned profits and own capital for all their financial requirements they needed. This is consistent with findings from literature review (Planet Gold Report, 2020). The research gathered that even if a bank can visit ASSGMs workplaces for assessment, they only had land as collateral without tittle deeds for that land. Miners revealed that after being granted permission to mine and meeting all the requirements from Ministry of Mines, EMA and ZESA requirements, they were left with no money to buy machinery and other assets to use as collateral. Although collateral was cited as important by most miners and ministry of mines representatives, there are other issues that were revealed during the interviews which were affecting funding from banks.

Interviewee 1 in Makonde district acknowledged that Artisanal and small-scale gold mining sector was still new to financial sector, even though ASSGM had been taking place for a long period of time, this area was still new to financial institutions, banks were not well versed with it hence they did not visit them. Another miner in Chinhoyi Interviewee number 2 in Makonde district added a new dimension as captured by the following statement, "*The only financial institutions that sometimes provide funding to small scale miners are the Microfinances but their*

interest rates are too high" [Interviewee, 2]. The study noted that some Microfinances were funding small scale miners and not artisanal miners because artisanal miners were seeking loans that were too high as compared to the physical assets that they had on the ground.

Another participant, Interviewee 4 in Chakari area agreed that he had never seen banks visiting small scale mines advertising their financial products to the miners. He noted that banks needed to have confidence and an appreciation of the sector first and also artisanal miners needed to have collateral of higher value in order for them to lure banks. The researcher also noted that the Ministry of Mines could help to advertise this sector to different financial institutions in order for them to access funding easily.

The study probed on the reasons why ASSGM firms remain small despite them operating for long periods of time. From demographic data it was noted that other mines had been in existence for over six (6) year so the study analysed the reasons why they remained small for over a long period of time. The major factor that caused ASSGMs firms to remain small were clearly listed by Chinhoyi Artisanal and Small-Scale Gold Mining Association Official as captured by the following statements:

> *There is lack of internal funding, some of the government policies do not favour growth of ASSGM, the nature of the business prohibits them from accessing external funding, lack of experience in the mining sector is also impacting the growth of ASSGM and the emergency of gold rushes is mainly causing artisanal miners rush to leaving their claims* [Artisanal and Small-Scale Gold Mines Association Chinhoyi Official].

Other studies also highlighted lack of funding as the major causes of the ASSGM sector to remain small. The findings of Yoshino and Hesary (2016) reveals that small firms face challenges from limited access to finance, lack of databases, low research and development expenditures, undeveloped sales channels, and low levels of financial inclusion, which are some of the reasons behind the slow growth of SMEs.

One of the miners in Chakari area Interviewee 4 revealed that the major causes for his mine to remain small was due to lack of funding despite his mine operating for more than seven (7) years. The miner revealed that she inherited the mine from her late parents but she was failing to acquire state of the art machinery which would enable her to produce more. Another miner in Chegutu, Halfway area, Interviewee 4, argued that funding from RBZ and MILF is not easily accessed by every miner**.** He further revealed that even NGOs were not funding the ASSGM in their area. The study noted that some of the miners were aware of funding from NGOs but they had never seen them, they simply heard about them. One of the miners near Mhangura Interviewee 2 acknowledged that they did not have capital to buy modern mining equipment and machinery for growth and expansion purposes. Another miner in Chegutu New Found Cooperative area, Interviewee 4 noted that there was continuous conflict of ownership of the area, miners were being moved from one place to another in that area and sometimes were being forced to stop their operations due to ownership crises, sometimes there were battles between artisanal miners and the police, this was affecting their planning, growth and expansion. This is consistent with findings in the literature review where the government made several policies that affected miners for a long period of time, Operation end the illegal Mining (*Operation Chikorokoza Chapera*) (UNIDO, 2018). The miner at New Found highlighted the use of simple mining tools as one of the reasons why ASSGM continued to remain small. The miner noted that simple mining tools would cause miners to produce poor quality ore. The miner further argued that simple mining tools resulted in the use of traditional mining methods especially artisanal miners who produced low output. However, another small-scale miner in Chakari, Interviewee 2 revealed that they had improved by the required modern mining machinery and now had the expertise in the mining field, but the land they were given was the limiting factor for expansion.

The study probed the challenges that were affecting availability of funding to ASSGM from banks due to collateral issues during the interviews. The discussions between the researcher and the participants during the interviews revealed that artisanal miners who were interviewed there were using simple mining tools which included chisels, picks, shaves and manual (traditional) mining methods. The miners were using ropes and 5 litre iron buckets to go underground, they

were also using 50 kg sacks to transport their ore from underground. On small scale miners that were interviewed, the researcher noted an improvement on the availability of physical assets. The researcher observed the presence of jack hammers, compressors, generators and milling machines. On the issue of collateral, the Ministry of Mines Official in Midlands province revealed that although it was a major issue that affected access of funding but the major problem was the reluctance of miners to visit banks for funding. The official further revealed that there were few banks which could consider funding small scale mining sector, but most of the miners were not submitting their paperwork for assessment by banks.

In probing the causes of lack of visiting banks by small-scale miners, one of the miners in Mhondoro Ngezi, Interviewee 3 argued that he was still satisfied with his own internal funding because his capital was still enough for his operations. Another miner in the same area cited lack of knowledge, he thought funding was only for big mines. A miner in Kwekwe, Interviewee 1 cited lack of knowledge on all the paperwork and how to complete them as the major reason for him not to visit banks. A small-scale miner in Makonde, Interviewee 1 revealed that the paperwork that banks demand made him use sponsors rather than visiting banks. According to Midlands Ministry of Mines Official, the other major reason which was affecting funding to ASSGM was lack of proper registration processes, the official argued that some of the miners did not have enough paperwork which banks could use as evidence that they were legal miners whom they could track and find on the addresses that they had used when their mines were being registered. According to a miner mining in Druwel area Chakari, Interviewee 4, the major reason why some of the miners were failing to access funding was due to lack of banks near areas where most artisanal and small-scale miners worked. The miner noted that banks were far away from the areas which most miners operated, miners had to move all the way from Chakari to Kadoma or Chegutu for banking services. The miner further revealed that most miners in Chakari area used locally available mechanisms for funding like sponsors and some of the artisanal miners did not have bank accounts with any bank in Zimbabwe. Another miner, Interviewee 2 in Kwekwe district revealed that the biggest challenges that affected ASSGMs in accessing external funding were small outputs and small profits generated, inaccessibility of other ASSGM premises for assessment by financial institution and lack of proper goodwill of the company for most of the ASSGM

The Kwekwe miner further argued that others were failing to access funding from banks due to the following reasons: low expected profit margins, information (information asymmetry) of this sector by banks, risky nature of the sector. According to Ministry of Mines Official representing Makonde and Zvimba Districts, the size of the mine and amount of output produced are of great importance. The official acknowledged that at some of the sites that artisanal miners operate there were plastic houses, ropes, picks, shovels and chisels which would make it difficult for artisanal miners to produce ore of high quality in large quantities. The official further argued that even if the financial institutions were to visit the areas that artisanal miners are operating in, the miners were likely to fail to access funding because their mine sites were unattractive with little hope of paying back the funding. However according to a small-scale miner in Druwel, Chakari area, Interviewee 4, the miner noted that some of the small-scale miners though still small in size but their output had already increased and they were now able to hire machines which helped them operate in other areas where manual labour was unsuitable. The miner revealed that other miners were now producing output of higher quality but they were only missing the targets set by RBZ which made them fail to access funding.

Another dimension that was highlighted by the ministry of mines official in Kadoma which was affecting funding from banks to ASSGM is lack of formalisation:

> *Causes of lack of formalisation were captured by the following statements, informality of the ASSGM is mainly caused by high registration costs, the availability of informal market to sell gold, long licensing process, involvement of politicians, bureaucracy in issuing mining licences and delays in paying gold producers* [Ministry of Mines Official Kadoma].

One of the respondents in Chegutu district Interviewee 5 strongly agreed that lack of track records was one of the formalisation barriers which affected ASSGM from accessing funding from formal financial institutions. Another participant, Interviewee 4 in Makonde area noted that

the other issue acting as a barrier to formalisation which affecting ASSGMs from accessing funding from banks was lack of information on ASSGMs sector by banks. The causes of the ASSGM to remain informal were discussed in the literature review by several researchers (Dzimunya *et al.,* 2018, Spiegel 2015, Planet Gold 2020 and UNIDO 2018). This study analysed causes of this sector to remain informal, the ministry of mines officials in Gweru, Kadoma and Chinhoyi offices highlighted that lack of formal recognition of the ASSGM sector by the government and the ministry of mines was the major cause of this sector to remain informal. The official from Kadoma further noted that this sector was facing formalisation challenges due to the involvement of politicians in the sector. Politicians in this sector were not willing to have this sector formalised. One participant in Chegutu area noted that other protected areas like ZMDC Chegutu Mine, the area was being mined illegally at night and these miners were not being sued because they were using names of politicians. The participant further noted that delays in formalisation in the ASSGM were being fuelled by corruption, parallel markets and smuggling of gold in the sector, some were paying bribes to ZRP officers. One participant who was interviewed in Sanyati district Interviewee 2 revealed that Zanu PF Chegutu West MP Mr Nduna had a Court case with a small-scale miner in 2021, when he sent his team for prospecting gold in the mining block that belonged to a registered small-scale miner.

Another participant Interviewee 5 in Chegutu area noted that Ministry of Mines officials, ZRP officers and politicians were involved in the corrupt activities in the sector for mining without licences. The participant highlighted the case of a Chegutu MP who connived with Mashonaland West Zanu PF Provincial Chair and ZRP Member in Charge Chegutu police to collect gold Ore at David Whitehead to a milling place in Kadoma. The issues of corruption and gold smuggling in the ASSGM were also highlighted by the Gold Looting Cases of a Zimbabwe Miners Federation Executive at the Robert Gabriel Mugabe International Airport (RGMIA). The executive tried to smuggle fourteen bars of gold weighing 6.9kg (valued at £294,100 or about $417,600 at today's price and on 9 May 2021 (Dembedza, 2021). Another Zimbabwean man, tried to smuggle 23 bars of gold worth £555,000 or US$783,000 at O.R Tambo International Airport (Kairiza & Mangudhla, 2021). Furthermore, the ministry of mines official, Kadoma office noted that sometimes Fidelity could fail to pay miners immediately after selling their gold to FPR. Most workers in artisanal mining are not paid formally, they demand their payment soon

after selling of gold in US dollars, so they prefer parallel markets where they are being paid soon after their transactions. Parallel markets offer higher prices and payments are in hard currency.

A Ministry of Mines Official Gweru noted that another factor which was affecting formalisation of ASSGM was the lack of registration offices in several parts of the country. The study noted the need to decentralise registration to district level in the country. The mine official noted that most of the registration processes are at provincial level. The official recommended decentralisation of registration offices in areas like Mashonaland West, Central and East and Midlands provinces where there were a lot of gold mining activities to district level. All districts should have mining offices. Another miner in Zvimba district cited high registration costs as the major reason that was affecting formalisation. The miner argued that some of the requirements by EMA, ZESA and Ministry of Mines were difficult to be achieved by small scale gold miners. Other reasons that were noted by Kwekwe miner, Interviewee 3 causing lack of registration were that: some miners were ignorant; they were afraid to visit mine offices; they were not aware of the requirements and they did not know where to register their mines**.** A miner from Vinice Interviewee 1 in Sanyati district cited the involvement of a lot of chancers in the ASSGM industry. He argued that this sector was not being taken as a profession but small village boys, women and youths took this area as a source of short-term income, there was no artisanal miner who wanted to remain in this field for long periods of time unless if one was a small-scale miner. The participant noted that the field was full of chancers/ opportunists but not professionals.

The most cited methods to encourage formalisation were through outreach programmes to all the ASSGM as well as reduction in registration costs. Few participants recommended incentivising the registered miners so that others would be motivated to formalise. One of the participants, Interviewee 1 in Chegutu district agreed that there was need for outreach programmes to educate miners on the importance of formilisation of the ASSGM sector. The interviewee argued that the miners should be well versed with where the offices were located, the benefits that would be enjoyed if one was operating formally and the paper work needed for one to be a registered miner. Another participant Interviewee 3 in Makonde district advocated for the need to reduce registration fees and making the process of obtaining mining permits easy. The interviewee further revealed that a miner can spend a long period of time waiting for mining papers. One of

the miners in Chegutu district Interviewee 1 believed that government should sue all illegal miners and gold panners arguing that illegal miners brought (Machete Wielding Gangs) "*Mashurugwis"* in the small-scale mining sector. The ministry of Mines Official Zvimba representative believed that government should come up with policies/ incentives that attract registration. The official noted that registration would increase if it came with benefits like reduction in royalty and taxes payments for registered artisanal miners.

One of participant in Chegutu district Interviewee 1 who was a small-scale miner proffered his willingness to formalise and the miner was aware of the benefits they would enjoy on the financial side, if there was formalisation. The miner argued that formalisation would bring sanity in the sector which would help to: reduces fatalities; reduce child labour and encourage health mining practices which protect the environment. According to a Mhondoro Ngezi miner, Interviewee 1 formalisation helps to turn the sector into a well trusted industry by financial sector and would improve professionalism in the sector, he recommended for the registration process to be easy and faster. Another participant at Gadzema area, Interviewee 2 Chegutu district revealed that miners were willing to formalise but the process was expensive. One participant from ministry of mines Kadoma offices noted that those who refused to formalise had the following intentions: they wanted to take advantage of loopholes like looting, corruption and paying bribes to mine officials in mineral rich areas so they wanted to remain unregistered and others wanted to take advantage of gold rush which could not be enjoyed if there was formalisation.

The other reason why miners were not willing to register was lack of benefits from ministry of mines even if miners became registered. The miners noted that even though they become registered, it would remain difficulty to obtain loan facilities from ministry of mines and RBZ. They argued that for artisanal and small-scale miners to be willing to register, RBZ and MILF should revise their loan requirements.

According to Ministry of Mines Mashonaland West Province, miners could have all the paperwork but access to Geological Survey Report and Tittle Deeds remained a big challenge to them since it was beyond their control. It is the government which should issue title deeds and

the survey reports so it would be difficult for miners to have them if banks wanted miners to produce them. The provincial official noted that most of the small-scale miners were operating without the two documents. The study noted that both small scale and large-scale miners were not well versed with the local financial systems. This is because one of the small-scale miners who was operating at Blue Rock area Interviewee 1 had revealed that he had all the paperwork including Geological Survey Report but he was not sure which banks offered loans specifically to small scale mining sector and he was resorting to private funding.

The reasons that were causing ASSGM to fail to access funding were clearly captured by Ministry of Mines official Chinhoyi province in the following statements:

> *They are clearly defined and measurable performance standards from banks which ASSGM sector do not meet to be given loans; banks have an organised system for monitoring assets of the company and its ability to pay back the loan; other than collateral; banks also consider economic potential of the business before giving out loans; failure of ASSGM to meet due diligence requirements affects their ability to access loans and that financial Institutions do not have financial products that meet specific ASSGM needs affects the availability of funding to their sector* [Ministry of Mines Official Mashonaland West Province].

According to the Ministry of Mines officials from Chinhoyi, Kadoma and Gweru there are specific loans for ASSGM only that were being offered by RBZ and MILF. The Gweru mine official further revealed that Empower Bank and Med Bank were offering loans to small business though they were not specifically for small scale miners but they were for everyone. The official noted that the challenge could be that the two banks were not widely available in several parts of the country and they also considered collateral before availing funding to these small firms which most of the miners did not have. One of the participants, Interviewee 3 from Makonde

district revealed that he was not aware of any loan facilities from the government or any other banks, he cited the Microfinances sector as the only financial institution which offered funding to ASSGM. The participants revealed that they could access funding from local Microfinances but he noted that the Microfinances were charging higher interest rates. According to miners who were in the ASSGM Association in Chinhoyi, the miners revealed that they were aware of the funding from RBZ and Fidelity Printers and Refineries but cited inability to meet their requirements as the major factor which was affecting them to access those funds. They revealed that they were aware of Loans for small scale miners from RBZ and fidelity Printers and refineries but they failed to meet their stringent requirements, such as that they must sell gold which is 5gramms and above to Fidelity and maintains monthly labour returns. Ministry of Mines Chinhoyi Province cited that lack of knowledge by most of the ASSGM on procedures that should be done do acquire this funding from RBZ and MILF. The official argued that there were few miners who understood the requirements that should be met for one to qualify for this funding and he noted that this was depriving other small-scale miners who can qualified for this loan facility but did not have knowledge to access it. The research revealed that several artisanal miners did not know anything about this loan facility.

The findings from interviews show some agreements between miners and ministry of mines officials on the availability of funding from RBZ, Microfinances and banks, a few acknowledged having heard of banks that were offering funding to ASSGM although other miners had never visited banks. The qualitative data helped me to develop the following quantitative information to analyse these factors popularity among respondents as presented in the following table in the form of descriptive statistics. The data is presented in the form of mean score and standard deviation. Table 4.9 shows descriptive statistics on institutional factors affecting funding to ASSGM.

Table 4.9: Descriptive Statistics on Institutional Factors Affecting Funding to ASSGM

	N	Minimum	Maximum	Mean	Std. Deviation
Adequate Education and Training on financial Skills	306	1	5	3.77	1.241

Financial Data for Performance Evaluation Purposes	306	1	5	3.79	1.312
3Availibility of Books of Finance	306	1	5	3.95	1.269
Knowledge by other ASSGM owners on the loans from banks	306	1	5	3.86	1.338
Adequate Entrepreneurial Skills	306	1	5	3.10	1.563
Adequate Education and Training on mining skills	306	1	5	3.57	1.418
Size of Mine	306	1	5	4.41	.941
Amount of Gold Output from Mine to FPR	306	1	5	4.41	1.024
Valid N (listwise)	306				

Source: Author 2022

Table 4.9 shows that miners felt that they did not have adequate education and training on financial skills. If they, had it, it was going to be easy for them to access funding from banks. However, the standard deviation of 1.241 which was non zero implies that the respondents were widely dispersed around the mean of 4 (four) (disagree), that's some of the respondents could have passed adequate education on financial skills. This is further reinforced by Gaussian Standardisation at 68%, a plus one standard deviation (+1SD) with a mean of 3.77 and standard deviation of 1.241 would result in 68% chance that the returns of 5.011 strongly agreed that financial skills would help miners in accessing funding from banks. However, at (-1SD) with a mean of 3.77 and standard deviation of 1.241, there was a 68% chance that the returns of 2.529 were neutral that financial skills helped miners to access funding from banks. At 95% with mean of 3.77 and standard deviation of 1. 241 (+2SD) there is 95% chance that the returns of 6.252 strongly agreed that financial skills would help miners in accessing funding from banks whilst a

(-2SD) with a mean of 3.77 and standard deviation of 1.241, there is 95% chance that the returns of 1.288 strongly disagreed that financial skills helped miners to access funding from banks. At (+/- 3SD), the results would be out of range. Miners also showed that they did not have financial data for performance evaluation. If they, had it, it was going to be easy for them to access funding from banks. However, the standard deviation of 1.312 which is non zero implies that the respondents were widely dispersed around the mean of 4 (four) (disagree), that's some of the respondents could have financial data for performance valuation purposes. Using Gaussian Standardisation at 68%, a plus one standard deviation (+1SD) with a mean of 3.79 and standard deviation of 1.312, there is 68% chance that the returns of 5.102 strongly agrees that financial data for valuation purposes would help miners in accessing funding from banks. However, at (-1SD) with a mean of 3.79 and standard deviation of 1312, there is 68% chance that the returns of 2.478 disagrees that financial data for valuation purposes helped miners to access funding from banks. At 95% with mean of 3.79 and standard deviation of 1. 312 (+2SD) there is 95% chance that returns of 6.414 strongly agrees that financial data for valuation purposes will help miners in accessing funding from banks whilst a (-2SD) with a mean of 3.79 and standard deviation of 1.312, there is 95% chance that the returns of 1.166 strongly disagreed that financial data for valuation purposes helped miners to access funding from banks. At (+/- 3SD), the results will be out of range. Artisanal and small-scale gold miners also felt that they did not have adequate books of finance and if they had them, it was going to be easy for them to access funding from banks. However, the standard deviation of 1.269 which is non zero implies that the respondents were widely dispersed around the mean of 4 (four) (disagree), that's some of the respondents had adequate books of finance. By Gaussian Standardisation, at 68% a plus one standard deviation (+1SD) with a mean of 3.95 and standard deviation of 1.269, there is 68% chance that the returns of 5.219 strongly agreed that books of accounts would help miners in accessing funding from banks. However, at (-1SD) with a mean of 3.95 and standard deviation of 1.269, there is 68% chance that the returns of 2.681 were neutral on the importance of books of accounts in accessing funding from banks. At 95% with mean of 3.95 and standard deviation of 1. 269 (+2SD) there is 95% chance that returns of 6.488 strongly agreed that books of account would help miners to access funding from banks whilst a (-2SD) with a mean of 3.95 and standard deviation of 1.269 would result in the returns of 1.412 who strongly disagreed that books of accounts would help miners to access funding. At (+/- 3SD), the results will be out of range.

There is lack of knowledge by other ASSMG owners on availability of loans from banks, if they had it, it was going to be easy for them to access funding from banks. However, the standard deviation of 1.338 which is non-zero implies that the respondents were widely dispersed around the mean of 4 (disagree) that's some of the respondents had the knowledge on the availability of loans from banks. The Gaussian Standardisation at 68% means that a plus one standard deviation (+1SD) with a mean of 3.86 and standard deviation of 1.338, there is 68% chance that the returns of 5. 198 strongly agreed that knowledge of the availability of loans from banks would help miners in accessing funding from banks. However, at (-1SD) with a mean of 3.86 and standard deviation of 1.338, there is 68% chance that the returns of 2.522 were neutral on the importance of knowledge of loans from banks. At 95% with mean of 3.86 and standard deviation of 1. 338 (+2SD) the results will be out of range whilst a (-2SD) with a mean of 3.86 and standard deviation of 1.338, there is 95% chance that the returns of 1.184 strongly disagreed that knowledge of loans from banks helped miners to access funding from banks. At (+/- 3SD), the results will be out of range.

On adequate entrepreneurship skills, the mean of 3.10 means that respondents were neither agreeing nor disagreeing, implying that some could have the adequate entrepreneurship skills whilst some did not have. Using the Gaussian Standardisation at 68% means of 3.10 and the standard deviation of 1.563 (+1SD), there is 68% chance that the returns of 4.663 strongly agreed that entrepreneurship skills were of importance in accessing funding from banks whilst a (-1SD) with a mean of 3.10 and standard deviation of 1.563 would result in 68% chance that the returns of 1.537 strongly disagreed that entrepreneurship skills would help miners in accessing funding from banks. At 95% with mean of 3.10 and standard deviation of 1. 563 (2SD) there is a chance that the returns of 6.226 strongly agreed that entrepreneurship skills would help miners in accessing funding at 95% whilst a (-2SD) the results will be out of range. On adequate education and training on mining skill, miners felt that if they had it, it was going to be easy for them to access funding from banks. However, the standard deviation of 1.418 which is non-zero implies that the respondents were widely dispersed around the mean of 4 (disagree) that's some of the respondents had the knowledge skills required in the ASSGM. The Gaussian Standardisation at 68% means that a plus one standard deviation (+1SD) with a mean of 3.57 and standard

deviation of 1.418, there is 68% chance that the returns of 4.988 strongly agreed that mining skills would help miners in accessing funding from banks. However, at (-1SD) with a mean of 3.57 and standard deviation of 1.418, there is 68% chance that the returns of 2.152 were disagreeing that mining skills are of importance in accessing funding. At 95% with mean of 3.57 and standard deviation of 1.418, there is 95% chance that the returns of 6.406 strongly agreed that mining skills would help miners in accessing funding whilst a (-2SD) with a mean of 3.57 and standard deviation of 1.418, there is 95% chance that the returns of 0.734 strongly disagreed that mining skills helped miners to access funding from banks. At (+/- 3SD), the results will be out of range.

Size of the mine also had an effect on accessing funding from banks, if their mines were big, they were going to access funding easily from banks but however, the standard deviation which is 0.941 a non-zero implies that the respondents were widely dispersed around the mean of 4(four) (disagreed), that's some of the respondents could have big mines. Using the Gaussian Standardisation to analyse the effects of firm size, at 68% with a mean of 4.41 and a plus one standard deviation (+1SD) 0.941, there is 68% chance that the returns of 5.351 strongly agreed that size of the firm would help miners in accessing funding from banks. However, at (-1SD) with a mean of 4.41 and standard deviation of 0.9941, there is 68% chance that the returns of 3.469 were neutral on the importance of firm size and access to funding. At 95% with mean of 4.41 and standard deviation of 0.941 (2SD), there is 95% chance that the returns of 6.292 would strongly agree that firm size had an impact in accessing funding from banks whilst a (-2SD) with a mean of 4.41 and standard deviation of 0.941, will result in 95% chance that the returns of 2.528 would be neutral about the firm size and access of funding from banks. At (- 3SD), there is 99.9% chance that the returns of 1.587 strongly disagreed that firm size affected funding from banks and at (+3SD) the results will be out of range. On output from their mines to FPF, miners felt that if they were affording to deliver gold to FPF, it would be easy for them to access funding from banks. However, the standard deviation which is 1.024 a non-zero implies that the respondents were widely dispersed around the mean of 4 (disagreed) that's some of the respondents were sending their gold to FPR. Using the Gaussian Standardisation, at 68%, it means that a plus one standard deviation (+1SD) with a mean of 4.41 and standard deviation of 1.024, there is 68% chance that the returns of 5. 434 strongly agreed that gold output to FPR

would help miners in accessing funding from banks. However, at (-1SD) with a mean of 4.41 and standard deviation of 1.024, there is 68% chance that the returns of 3.386 are neutral on the importance of gold output to FPR and access to funding. At 95% with mean of 4.41 and standard deviation of 1.024 (2SD) there is a chance that the returns of 6.458 would strongly agree that output of gold to FPR would help miners to access funding whilst a (-2SD) with a mean of 4.41 and standard deviation of 1.024 will result to 95% chance that the returns of 2.363 disagreed that gold output to fidelity helped miners to access funding from banks. At (-3SD) there is 99.9% chance that the returns of 1.339 strongly disagreed that output of gold to fidelity did not help miners to access funding and at (3SD) the results will be out of range.

Ferri and Murro (2015) found out that financial statements could minimise information asymmetry and influence easy access to finance from financial institutions. However, Lyons and Hanna (2018) revealed that increase in one level of network with bank officials increased the probability to obtain a loan by 7% and was statistically significant at 1%. Lack of all books of accounts was also confirmed by the findings of Smirat (2013) who noted that in Jordan only about 31 percent of the small firms prepared income statement, 40 percent prepared cash flows, and 15 percent prepared balance sheet. Leon (2015) studied sixty-nine (69) developing countries and found out that firms that had audited financial statements were more transparent and it was easier for them to access loans from external Lenders. Rahman *et al*. (2017) noted that only 15% of SMEs firms in Poland had audited financial statements and maintained all their books of finance. The use of private accountants was consistent with the findings of Smirat (2013) who revealed that in Jordan, about half of the small firms sought advice from accounting firms, more than 60 percent of them visited accounting firms only once a year and only 14 percent of small firms prepared accounting information internally using accounting software. The researcher agrees with the findings from questionnaires and interviews on the importance of technical and financial skills in accessing funding. The funding to the ASSGM sector was not mainly influenced by technical and financial skills. This is because most funding that ASSGM sector was receiving was not from formal financial institutions. The investors were mainly interested in their returns which could be observed by the amount of gold produced and the size of the mine.

4.4.1 Non-Institutional Factors that were Affecting Funding To ASSGM

4.4.1.1 The Impact of Violence in Funding the ASSGM Sector

One of the small-scale mining companies in Chakari near Falcon Gold Mine, Interviewee 5 in Sanyati district noted that politicians mainly came into this sector without following rules and regulations and other funders like sponsors sometimes failed to provide funding in areas that politicians dominated. According to a miner in Makonde, Interviewee 3, the ASSGM is failing to access funding from other investors due to lack of protection by government especially the ministry of home affairs. The respondents cited lack of security from ZRP as the major factor affecting funding to ASSGM. According to a miner in Chegutu, Gadzema area Interviewee 2 has this to say:

> *There is lack of rule of law in the ASSGM which has resulted in the emergence of Machete Wielding Gangs: "Mashurugwis", in Mazowe, Kadoma Vinice, Embress and Chakari area; "Al Shabaab" in Kwekwe and "Team Barca" in Chegutu around Gadzema area this is making the sector unfavourable for funding* [Interviewee, 2].

The study revealed that the existence of politicians and the emergence of Machete Wielding Gangs "*Mashurugwi"* was making the sector unattractive to fund since they are the ones who follow gold rush and illegally confiscate claims and the ores from the owners leaving both mine owners and funders without anything and they are not being prosecuted by ZRP. The findings from the interviews revealed that mining has become the backbone of most youths in Kwekwe, Chegutu, Sanyati and Mhondoro Ngezi districts, but the artisanal and small-scale gold mining was now associated with violence in the mining claims which was resulting in deaths, scrambling of Ores by violent youths and politicians. This made the areas that artisanal mining is being practised to be shunned by sponsors and private funders because of the involvement of politicians and violent gangs who grab the ore resulting in mine owners and funders having big loses since violent youths are not being arrested and were believed to be backed by highly ranked officials from Zanu PF party.

According to a miner in Mhondoro Ngezi mining near Muzvezve River, Interviewee 5 the other cause that is affecting ASSGM not to access funding from banks was ignorance. The miner

argued that others artisanal and small-scale gold miners were not aware of funding programmes from government, RBZ due to ignorance. The miner noted that banks such as Med Bank and Empower Bank were providing funding to small scale to medium but few miners were aware of the funding mechanisms available from those banks. Another miner in Makonde district Interviewee 3 also revealed Microfinances were funding small scale industries but most of small-scale miners had never visited them**.** The study concluded that the major factors which were affecting funding to ASSGM were involvement of politicians, lack of protection from government and ignorance (lack of knowledge) by other miners.

4.4.1.2 Lack of Growth of ASSGM

According to ministry of mines official from Midlands's province, the ASSGM are not attractive to fund because even if you fund them, they remain small and they are no major developments they have noted from those mines that have accessed funding from RBZ and MILF. The official noted that there is need for government to improve on monitoring and evaluation to those miners that have benefited from accessing funding from the RBZ. Interviewee 1 in Kwekwe Sherwood area noted that despite them receiving funding, their profits and output remained small because some of the areas they were mining may have poor ore grades and they mined in those areas because it was near where large mines were operating or the area had history of gold rushes in the past. The miner called for the need to have geological survey reports together with funding for ASSGM to grow and expand. This prompted the researcher to design a quantitative information to quantify the mechanisms that ASSGM used to measure their growth. Table 4. 10 shows descriptive statistics on mechanism that ASSGMs use to measure firm performance

Table 4. 10: Descriptive Statistics on mechanism that ASSGMs use to measure firm performance

	N	Minimum	Maximum	Mean	Std. Deviation
	306	1	306	153.50	88.479
Sales Growth	306	1	2	1.36	.481

Growth in Profit	306	1	2	1.47	.500
After Tax Returns	306	1	2	1.92	.279
Total Sales to Total Assets Ratio	306	1	2	1.94	.242
Total Gold output to FPR	306	1	2	1.73	.444
Return on Assets	306	1	2	1.95	.216
Valid N (listwise)	306				

Source: Author (2022)

Table 4.10 shows that ASSGMs mainly use sales growth to measure their firm performance which is shown by the mean which is closer to one (1.36). However, the standard deviation of 0.481 explains that other miners were using other mechanisms to measure firm performance. Another method which was used by ASSGMs to measure their performance was growth in profit as shown by the mean which is closer to one (1.47). However, the standard deviation of 0.500 explains that other miners were using other mechanisms to measure their performance. sources of funding to fund their claims. The after-tax returns had a mean which was closer to 2 which meant it was not in use. However, the standard deviation of 0.279 which is non-zero reveals that other miners were using after tax returns to measure their performance. The total sales to total assets ratio had a mean which was closer to 2 which meant it was not in use. However, the standard deviation of 0.242 which is non-zero reveals that other miners were using total sales to total assets ratio to measure their performance. Total gold output to FPR had a mean which was closer to 2 which meant it was not in use. However, the standard deviation of 0.444 which is non-zero reveals that other miners were using total gold output to FPR to measure their performance. The return on assets had a mean which was closer to 2 which meant it was not in use. However, the standard deviation of 0.216 which is non-zero reveals that other miners were using return on assets to measure their performance. Other specified methods that were used by ASSGMs included total gold output and total ore produced. The findings of my study are similar with the findings of Maduekwe (2016) who noted that the financial performance measures that were most popular for small scale firms were sales growth, cash flows, operating income and net profit margin.

4.4.1.3 Stage of ASSGMs in the Business Cycle

According to a miner in Kwekwe, Interviewee 3, most ASSGM were failing to acquire funding from banks because most of the mines especially those of small scale were still small. The miner noted that due to lack of mining equipment, if an artisanal miner found it difficult to drill in an area due to rocks underground or failure to reach good ore samples, the miner moved to another place and sinks a claim there. This will result in the mine being new despite the fact that the miner could have been in the area for some time. The miner in Kwekwe further noted that it was risky to expand our mines since we had acquired them through political influence so anytime we could lose them. The interviewee further argued that they only had prospecting papers and they were finding it difficult to obtain mining licences for the area. Another participant in Zvimba district, Interviewee 2 noted that his mine was at growth stage but he was still finding it difficult to access funding from banks. The results from qualitative findings helped me to develop the quantitative information to assess the stage of growth for ASSGM firm in Zimbabwe. Table 4.11 shows descriptive statistics on stage of the ASSGMs in the business cycle

Table 4. 11: Descriptive Statistics on the stage of ASSGMs in the Business Cycle

	N	Minimum	Maximum	Mean	Std. Deviation
Start Up	306	1	2	1.56	.498
Growth	306	1	2	1.54	.499
Maturity	306	1	2	1.92	.279
Decline	306	1	2	1.99	.099
Resuscitation	306	1	2	1.99	.114
Valid N (listwise)	306				

Source: Author (2022)

Most of the ASSGM are not at the start up stage which is shown by the mean which is closer to two (1.56). However, the standard deviation of 0.498 which is non-zero reveals that other miners might be at this stage in the business cycle. The growth stage has a mean which is closer to two (1.54) which means that other firms are not in this stage, however, the standard deviation of non-zero (0.499) reveals that other firms might be at this stage in the business cycle. Few ASSGM firms were found at the maturity stage which is shown by the mean of two (1.92). The sale of an asset had a mean which was closer to 2 which meant it was not in use. However, the standard deviation of 0.279 which is non-zero reveals that other mines are at this stage in the business cycle. The decline stage had a mean which was closer to 2 which meant there are no

ASSGM firms at that stage. However, the standard deviation of 0.099 which is non-zero reveals that other mines might be at this stage in the business cycle. The resuscitation stage had a mean which was closer to 2 which meant they are no artisanal and small-scale gold mining firms at that stage. However, the standard deviation of 0.114 which is non-zero reveals that other mines were at this stage in the business cycle. Since most participants highlighted that miners were failing to acquire funding from banks to do collateral issues, the researcher developed the following quantitative information to assess their value at ASSGM premises. Table 4.12 shows descriptive statistics on the assets that ASSGM had at their workplace

Table 4.12: Descriptive Statistics on Assets that ASSGM have at their workplace

	N	Minimum	Maximum	Mean	Std. Deviation
Land	306	1	2	1.08	.269
Plant and Machinery	306	1	2	1.86	.351
Motor Vehicles	306	1	2	1.87	.338
Buildings	306	1	2	1.81	.393
Simple Mining Tools	306	1	2	1.18	.387
Valid N (listwise)	306				

Source: Author (2022)

From Table 4.12, land with the mean of 1.08 was one of the assets that most ASSGMs have. However, the standard deviation of 0.269 explains that other miners were having other assets other than land. Plant and machinery had a mean which was closer to 2 which meant miners do not have this asset. However, the standard deviation of 0.351 which is non-zero reveals that other mines had this asset and they are using it as collateral to acquire funding. Buildings as an asset had a mean which was closer to 2 which meant miners do not have this asset. However, the standard deviation of 0.338 which is non-zero reveals that other mines had this asset and they are using motor vehicles as collateral to acquire funding. Plant and machinery had a mean which was closer to 2 which meant miners do not have this asset. However, the standard deviation of 0.393 which is non-zero reveals that other mines had this asset and they are using it as collateral to acquire funding. Simple mining tools had a mean which was closer to one (1.18) which meant miners have this asset. However, the standard deviation of 0.387 which is non-zero reveals that other mines had other assets they are using as collateral to acquire funding. Other specified that

they only had a milling machine and not a complete plant and machinery. The researcher further investigated the value of assets that ASSGM had in monetary terms. Table 4.13 shows descriptive statistics on total assets that ASSGM had in monetary value.

Table 4. 13: The Descriptive Statistics on total assets which ASSGM have in monetary value

	N	Minimum	Maximum	Mean	Std. Deviation
Less than USD1000	306	1	2	1.52	.501
USD1000 - USD5000	306	1	2	1.72	.452
USD6000 - USD10000	306	1	2	1.94	.242
USD11 000 - USD15 000	306	1	2	1.92	.269
USD16 000 and above	306	1	2	1.91	.293
Valid N (listwise)	306				

Source: Author (2022)

The findings from Table 4.13 shows that assets that were worth less than US$ 1000 had a mean which is closer to two (1.57) which means that miners do not have assets with that monetary value. However, the standard deviation of 0.501 which is non-zero reveals that other miners have assets that have monetary value which is worth less than US$ 1000. Assets that have monetary value between US$ 1000- US$ 5000 had a mean which was closer to 2 which meant miners do not have these assets that have such monetary value. However, the standard deviation of 0.452 which is non-zero reveals that other mines have assets that have monetary value between US$ 1000- US$5000. Assets that have monetary value between US$ 6000- US$ 10 000 had a mean which was closer to 2 which meant miners do not have these assets that have such monetary value. However, the standard deviation of 0. 242 which is non-zero reveals that other mines have asset that have monetary value between US$ 6000- US$ 10 000. Assets that have monetary value between US$ 11 000 – US$ 15 000 had a mean which was closer to 2 which meant miners do not have these assets that have such monetary value. However, the standard deviation of 0.269 which is non-zero reveals that other mines have assets that have monetary value between US$ 11 000- US$ 15 000. Assets that have monetary value of more than US$ 16 000 had a mean which was closer to 2 which meant miners do not have assets with that monetary value. However, the standard deviation of 0.293 which is non-zero reveals that other mines have asset

that have monetary value which is more than US$ 16 000.and they are using it as collateral to acquire funding. they are using it as collateral to acquire funding.

4.5 Funding Mechanisms for Artisanal and Small-Scale Gold Mines

The study noted that ASSGM sector is funded by internal and external funding models

4.5.1 Examination of internal funding mechanisms available to Artisanal and Small-Scale Gold Mines in Zimbabwe.

The researcher interviewed both artisanal and small-scale gold miners on internal sources of funding available to them. The miners were allowed to give more than one answer. Most miners used personal savings, owner capital to fund their operations. There was also use of plough back profits in the ASSGM sector. The findings from this research also revealed that some miners were helped by retirement packages and inheritance to venture into the mining sector. Fig 4.1 shows internal sources of funding available for ASSGM.

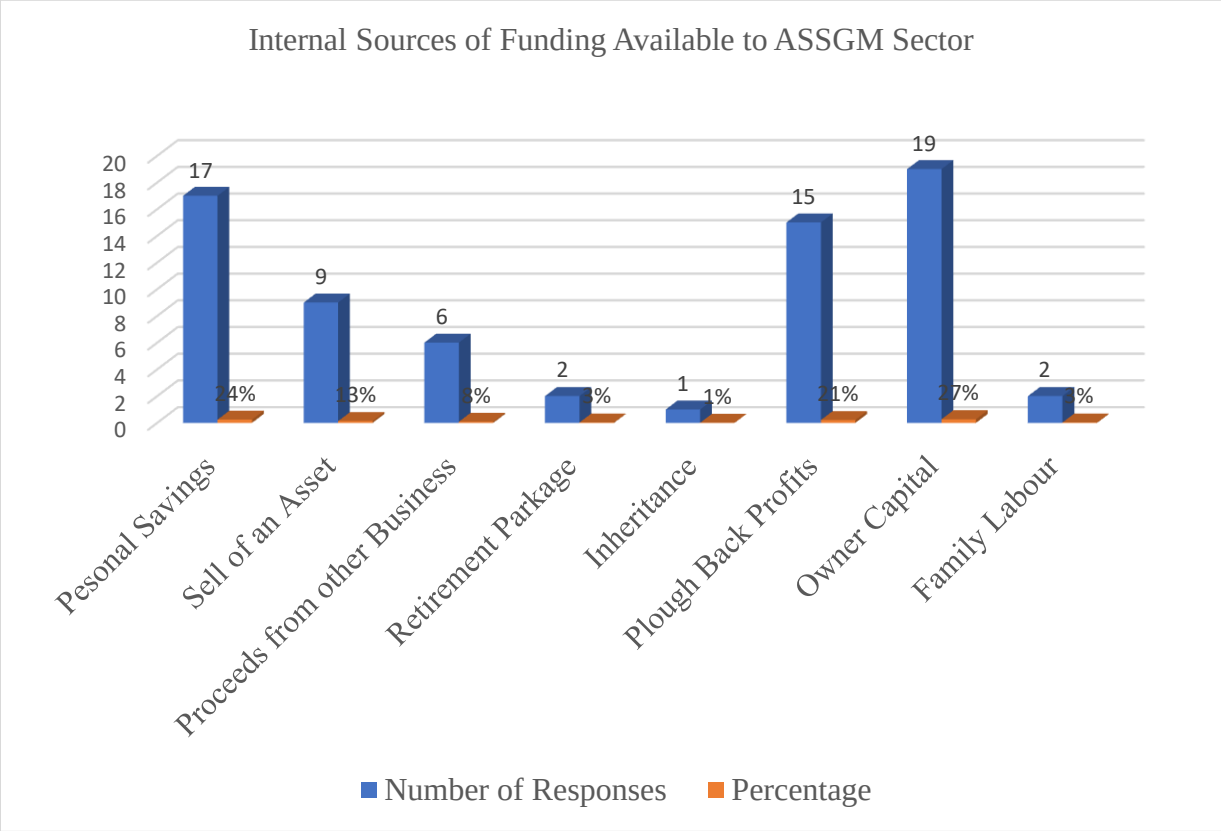

Figure 4. 1: Internal Sources of Funding Available to ASSGM

Source: Author (2022)

Out of 31 participants, the researcher obtained 71 responses. The general overview from Fig 4.1 is showing that personal savings and owner capital were the most used internal sources of funding which is being indicated by 24% and 27% respectively. Another dominant source of internal funding is plough back profits which were indicated by 21%. The study also noted that other sources of funding that were available in the ASSGM are: retirement package 3%; inheritance 1% and use of family labour 3%, even though these sources of funding were available to the ASSGM sector, they were not frequently used. Other participants revealed that they sold their assets to enter into the mining sector and this was indicated by 13%. One of the miners revealed that he sold his assets (cars) and his livestock to venture in to the gold mining sector. Other artisanal and small-scale gold miners were funding their operations with proceeds from other businesses. Eight percent (8%) of the responses acknowledged that they were using capital they generated from their shops and farming activities to help sustain their gold mining activities.

The researcher also interviewed miners on the external sources of funding that were available to them. Similarly, from the interviews that were done, sponsors, private funding and tribute system were the most cited funding mechanisms available to ASSGMs. The study interviewed participants on all the external sources of funding available to their organisations. Participants had a chance to give more than one response. None of the participants highlighted the involvement of banks to ASSGM sector except the Central Bank. The responses from the participants were expressed as a percentage of their total responses. Fig 4.2 shows external sources of funding available to ASSGM sector.

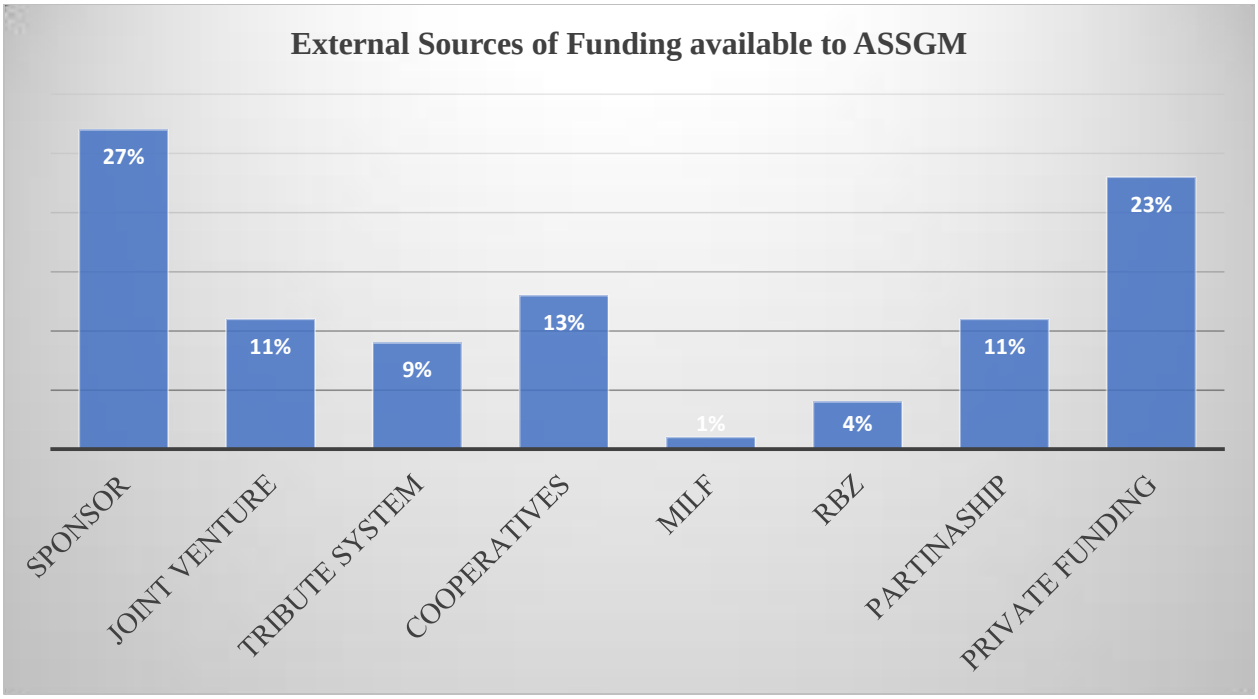

Figure 4.2: Internal sources of funding available to your organization.

Source: Author (2022)

A general overview from Fig 4.2 is indicating that Sponsorships and Private Funding featured strongly among responses that were obtained on the external sources of funding available to ASSGM sector. Sponsorships were widely used and was indicated by 27% followed by private funding which had 23%. Few miners had access to funding from RBZ which is indicated by 4% and MILF which is also indicated by 1%. According to Ministry of Mines Mashonaland West Province (2020), only one miner had managed to acquire this MILF funding. Some of the mechanisms that were helping ASSGM to venture into their business are: joint ventures and partnerships which were all indicated by 11%, private funding 9% and cooperatives which is indicated by 13%. Even though sponsorship was a widely available source of funding in the ASSGM sector, the study noted that this source of funding now involved a lot of bogus sponsors. Participants identified these two major reasons for continuous use of sponsorship funding: widely available and few legal formalities are required. The study further noted that most sponsors were willing to sponsor miners when the Ore grades had high potential of returning high rewards. The findings from qualitative and quantitative data are agreeing on the low involvement of government, banks, RBZ/FPL and MILF in funding the ASSGM sector. The

discussions from interviews went further to explore funding mechanisms that were useful to the ASSGM sector of Zimbabwe.

4.5.2 Which funding models are useful to ASSGM Sector

The researcher wanted to get an insight on the preference of miners on funding models that were useful to the ASSGM sector. The miners were given the chance to choose which funding models they felt were good from both internal and external funding sources. The intention was to come up with the funding models that would lead to optimum gold production. There were seventy-one responses; the participants were allowed to give more than one response on choosing the best funding model for the ASSGM from both internal and external sources. On internal sources, participants were willing to use personal savings and owner capital and on external sources, participants preferred tribute system and private funding. Table 4.14 show sources of funding that were useful to the ASSGM Sector

Table 4. 14: Sources of funding that are useful to ASSGM Sector

Sources of Funding that are useful to ASSGM Sector	Number of Responses	Percentage
Personal Savings	14	18%
RBZ/Fidelity	2	3%

Cooperatives	7	9%
Tribute System	12	16%
Sponsors	2	3%
MILF	1	1%
Owner Capital	13	17%
Private Funding	10	13%
Plough Back Profits	3	4%
Joint Venture	7	9%
Partnerships	5	7%

Source: Author (2022)

As shown in the Table 4.14 the only internal sources of funding that were useful to the ASSGM sector are personal saving 18% and owner capital 17% including family capital and sales of an asset. These were the most preferred internal mechanisms in the ASSGM sector. The study noted that these sources of funding were helpful to miners at start up stage where new miners had no experience and to the youths who had less assets to use when they wanted to borrow funding from banks. The study also went on to establish that these two sources of funding were also used by children and women who were venturing into the mining sector looking for a source of income. The study also revealed that these two sources of funding were ideal to the miners who had less experience in the mining sector with less likelihood of paying back loans from banks. Although this funding was not adequate, the findings reveal that it was of great importance to this sector.

On external sources of funding, one of the participants argued that sources that were relatively cheap and easy for starters were cooperatives, joint ventures and partnerships. These sources of funding had: partnerships 7%, joint venture 9% and cooperatives 9% preferences. According to the chairperson of New Found Cooperative, these sources of funding were useful and they could be led by leaders who had experience in the artisanal and small-scale mining sector. The research revealed that cooperatives and partnerships should be free from political involvement, during the interviews, the researcher noted that New Found Mining Cooperative was led by Zanu PF youths and the whole Leadership on that cooperative. One participant from that cooperative revealed that although it was simple to acquire mining space and receiving funding in the form of

machines like generators, compressors and jackhammers for payment by five (5) wheelbarrows of ore whenever he was going to mill, he had to contribute a certain percent of money which was undisclosed to other members to fund the ruling part events (Zanu PF). Few miners were willing to be funded by sponsors as is shown by only 3% of the responses although this was the source of funding that is widely available to the ASSGM sector. One of the miners in Chegutu district, interviewee number five (5) revealed that funding from sponsors normally starts when the mine owner is already producing good samples from the Ore from his mine, the miner further argued that some of the sponsors are bogus.

Ministry of Mines Industrial Loan Fund (MILF) and RBZ/FPR received small responses that is (1%) and (3%) respectively. One of the respondents noted that these sources of funding were very useful and they offered favourable repayment methods (they take the repayments as and when miners sell their gold, but the study noted that very few were accessing this facility due to stringent measures that have been discussed above, and it was also noted that most miners were not willing to sell their gold to FPR). The participant argued that even if you sell your gold to FPR, if your gold is less than 100grammes, you are not paid US$ cash you are paid using conversion rate which is way below parallel market rate, and for a miner to be able to sell your gold to FPR, it should be more than 5grammes. The two external sources of funding that were most cited as most useful to this sector included private funding 13 % and tribute system 16%. These sources of funding were playing a pivotal role especially to well-established small-scale miners and foreign owned miners who were not accessing funding from banks, MILF and RBZ. One of the small-scale miners noted that private investors had confidence in the small-scale mining sector and they had less requirements as compared to government and financial institution; they were mainly interested on the ability to payback. Findings from the research revealed that miners in Chegutu Blue Rock and Pickstone area, Sanyati and Mhondoro Ngezi, were benefiting from tribute system. The study also noted that well established Chinese miners were providing local miners with mining vehicles to transport Ore, Mining Machinery and milling facilities and the local miners were paying in form of ore in Chegutu and Mhondoro Ngezi area on tribute system funding. The study explored for the reasons why other ASSGM were using other funding mechanisms even though they felt they were not useful to the ASSGM sector of Zimbabwe.

4.5.3 The reason for using the funding models that were currently in use

One of the participants, Interviewee 5 in Sanyati district, mining in Chakari area noted that they used sponsors because they were readily available and they sometimes became the buyers of the gold that was produced. The participant further argued that some of the buyers who were not bogus, fraudulent and corrupt would pay miners in forex using parallel market prices which were higher than what Fidelity paid. He noted that those sponsors who were honest normally shared the profits equally after deducting all the expenditure and this would help artisanal miners who did not have collateral to access funding from banks. The reasons for using personal savings, owner capital, sale of asset and family labour on the manual side is due to the following reasons which were highlighted by Interviewee 2 in Chegutu at New Found mine as captured by the following statements:

> *The savings are still enough to our funding requirements; there is lack of alternative sources to obtain funding from; sponsors are not yet ready to fund our claims because our samples are still of lower grade and there are too many requirements from other sources of funding* [Interviewee, 2].

A Vinice miner, Interviewee 1 in Sanyati district preferred to work in joint ventures, cooperatives and partnerships because other miners had experience in the mining sector. The miner noted that other miners did not know how to use mining explosives (mahora) which other miners had knowledge of since they had worked in mining companies. He further argued that other miners could not have sufficient capital to work alone so working in partnerships, joint ventures or cooperatives helped in sharing resources, expertise and capital contribution. Findings from the research noted that other miners were allowed to work in conjunction with well-established Chinese millers in Chegutu Gadzema area who were providing milling plant, transport, mining machinery. Other miners were given land from a well-established miner at Berks Mine in Chegutu where they were mining on a joint venture basis their ore was processed

by the mine owner. The Berks Mine was also offering the miners Tribute Mining System which was helping them on mining land and machinery.

Another participant, Interviewee 2 in Makonde district revealed that he had failed to acquire funding from banks due to collateral so to sustain his operations he sometimes used proceeds from shops and farming proceeds and plough back profits. He argued that plough back profits are cheap, though they are not enough to meet all the expenses that are needed on the mine. The other miner in Sanyati district Interviewee 2 revealed that since he had no other option to obtain funding, he had invested his retirement benefit in the mining so that it would continue to generate more interest and another miner in the same district Interviewee 3 revealed that he had inherited his mine from his parents.

A Sanyati miner, Interviewee 1, revealed that he had acquired funding from RBZ/FPR. He argued that this loan had flexible payment methods but it was difficult to acquire. It needed one to have sales of over 100gramms per month, have monthly labour returns and sell all your gold to Fidelity. The reasons why other miners were not using funding from MILF were clearly captured by Interviewee 1 in Makonde district "*The funding from MILF is cheap, but this loan will only be given to miners who are fully registered, who have labour returns and monthly returns and remitting monthly royalties of 2% to FPR"* [Interviewee, 1]. Another participant, Interviewee 3 Chegutu district noted that, other investors were willing to offer private funding to miners who had claims with potential of producing higher output and they offered capital which was enough to their requirements. The miner further argued that investors who offered private funding were not interested in many issues that banks and ministry of mines considered so that's why other miners preferred them. Private investors were mainly interested on the return on their investment. The qualitative data on funding mechanisms available to ASSGM helped the researcher to develop the following quantitative information on these funding models' popularity amongst respondents as presented in the following table in the form of descriptive statistics. The statistics were presented in the form of mean score and standard deviation. Table 4.15 shows descriptive statistics for internal and external funding models

Table 4. 15: Descriptive Statistics for Internal and external Funding Models

	N	Minimum	Maximum	Mean	Std. Deviation
Personal Savings	306	1	2	1.26	.440
Sale of an Asset	306	1	2	1.84	.367
Joint Venture	306	1	2	1.79	.405
Partnership	306	1	2	1.88	.323
RBZ	306	1	2	1.97	.178
Valid N (listwise)	306				

Source: Author 2022

On all funding models (internal and external), the one with the mean which is close to one (1.26) is in use. From Table 4.15, only personal savings with the mean of 1.26 was the most used source of funding. However, the standard deviation of 0.440 explains that other miners were using other sources of funding to fund their claims. By using Gaussian Standardisation at 68% with mean of 1.26 and a standard deviation of 0.440, a plus one standard deviation (+1SD) would result in 68% chance that the returns of 1.7 disagreed that personal savings was the only source of funding important to ASSGM whilst a (-1SD) with a mean of 1.26 and standard deviation of 0.440 will result in returns of 0.80 strongly agreeing that personal savings funding was of great importance to the ASSGM sector. At 95% with mean of 1.26 and standard deviation of 0.440 a (+2SD), there is a 95% chance that the returns of 2.14 will further strongly disagreed that personal savings funding was an importance source of funding to the ASSGM sector and (-2SD) the results will be out of range. The sale of an asset had a mean which was closer to 2 which meant it was not in use. However, the standard deviation of 0.367 which is non-zero reveals that other miners were using capital from sale of an asset to fund their operations. The Gaussian Standardisation at 68% with mean of 1.84 and a standard deviation of 0.367 shows that a plus one standard deviation (+1SD) will result in 68% chance that the returns of 2.207 disagreed that sale of an asset was an important source of funding to the ASSGM sector whilst a 68% (-1SD) with a mean of 1.84 and standard deviation of 0.367 will result in returns of 1.473 agreeing that sale of an asset funding was of great importance to the ASSGM sector. At 95% with mean of 1.84 and standard deviation of 0367 a (+2SD), the result will be out of range,

whilst at 95% (-2SD) with mean of 1.84 and standard deviation of 0.367, there is a chance that the returns of 1.106 would strongly agree that sale of an asset was an important source of funding to the ASSGM sector and a (-3SD) at 99.9% with mean of 1.84 and standard deviation of 0.3067 will result in returns of 0.739 further agreeing that sale of an asset funding is important to the ASSGM.

Although, the mean of joint venture (1.79) non-zero meaning that it was not mainly used by miners, its standard deviation of 0.405 explains that other miners were also using this source of funding in the ASSGM sector. Analysing the results with the Gaussian Standardisation at 68% with the mean of 1.79 and a standard deviation of 0.405 shows that a plus one standard deviation (+1SD) will result in 68% chance that the returns of 2.195 strongly agreed that joint venture source of funding was not used by miners to fund their operations a further (+2SD), the results will be out of range. However a (-1SD) with a mean of 1.79 and a standard deviation of 0.405 will result in a 68% chance that the returns of 1.385 agreed that joint venture funding was used in the ASSGM sector and a further (-2SD) at 95% with mean of 1.79 and standard deviation of 0.405 will result in the returns of 0.98 strongly agreeing that joint ventures were in use in the ASSGM sector of Zimbabwe The standard deviation of 0.323 for partnership explains that even though its mean is almost 2, there were other miners who were using it in funding their claims. Using the Gaussian Standardisation at 68% with mean of 1.88 and a standard deviation of 0.323 shows that a plus one standard deviation (+1SD) will result in 68% chance that the returns of 2.203 disagreed that partnership funding was an important source of funding to the ASSGM sector and again a 68% (-1SD) with a mean of 1.88 and standard deviation of 0.323 will result in returns of 1.557 disagreeing that partnership funding is mainly used in the ASSGM sector. However, at 95% with mean of 1.88 and standard deviation of 0.323 a (-2SD), there is a chance that a return of 1.234 will agree that partnerships were used in the ASSGM sector and a further 99.9% (-3SD) with a mean of 1.88 and standard deviation of 0.323 will have 99.9% chance that there were 0.911 strongly agreeing that partnerships are used in the ASSGM sector.

The standard deviation for RBZ of 0.78 explains that there were also other miners who were funding their mines with this source even though its mean is almost 2 (two). Analysing this result with the Gaussian Standardisation at 68% with mean of 1.97 and a standard deviation of

0.178 shows that a plus one standard deviation (+1SD) will result in 68% chance that the returns of 2.148 disagreed that RBZ source of funding is most used in ASSGM sector and a 68% (-1SD) with a mean of 1.97 and standard deviation of 0.179 will result in returns of 1.792 disagreeing again that RBZ funding is of great importance to the ASSGM sector. At 95% with mean of 1.97 and standard deviation of 0.179, a (+2SD), there will be a 95% chance that the returns of 2.256 again disagree that RBZ is of importance to the ASSGM sector, whilst at 95% (-2SD) with mean of 1.97 and standard deviation of 0.178, there is a chance that the returns of 1.614 will also agrees that RBZ is less used in funding ASSGM however at (-3SD) at 99.9% with mean of 1.97 and standard deviation of 0.179 will result in returns of 1.436 agreeing that RBZ funding is important to the ASSGM. The findings from quantitative analysis consistent with the views that were highlighted by interviewees who noted that most of the miners are using personal savings and few have the access to funding from RBZ and the quantitative fundings also noted that other miners are using joint ventures and partnerships.

4.6 The Involvement of Government and its agencies in the Artisanal and Small-Scale Gold Mines in Zimbabwe

4.6.1 How government and its agencies support Artisanal and Small-Scale Gold Mines in Zimbabwe?

According to Ministry of Mine Official Mashonaland West province, the roles of government in the ASSGM were clearly captured thus: "*The ministry of mines does monitor and evaluations mainly after every three (3) months in the sector, provide funding through MILF, issue and revenue mining licences for ASSGM and provide assistance when accidents happen like collapsing of a mine"* [Ministry of Mines Official Mashonaland West]. The finding from the miners revealed the following, one of the participants Interviewee 1 in Makonde district revealed that most ASSGM were failing to access funding from MILF or RBZ because they had no all-legal documents that were required. The participant noted that most of the miners were mining using a prospecting licence only so they did not qualify for government funding. The miner argued that after obtaining a prospecting licence, ministry of mines comes to monitor whether miners meet the EMA and ZESA requirements which are a requisite for a miner to be issued with the mining licence. Another miner who was mining at her farm revealed that he failed to obtain a mining licence because the Ministry of Mines had noted that she had changed the

purpose of her land from farming to mining. The mine officials from Mashonaland West Province noted that there was need for proper separation of mining areas and farming areas when applying for mining licence, the researcher also noticed that other miners were mining in their farms in the following areas: Zvimba along Pindi Park Road, Sanyati, Vinice and Chakari area.

Apart from lack of required legal documents, another participant Interviewee number 1 in Zvimba district cited failure to produce required output by Fidelity and Ministry of Mines. The miner revealed that he was failing to acquire funding from MILF, RBZ and FPL because he was producing output, gold which was less than 5 grams, resulting in failure to sell gold to fidelity. The official from Chinhoyi offices captured that, "*If miners do not sell their gold to fidelity, they do not qualify for funding from government, RBZ/Fidelity requires miners to have output of 100gramms or more per month for the fidelity to starts giving loans to them"* [Chinhoyi Ministry of Mines Official]. One of the participants interviewee number three in Chegutu district cited the presence of parallel markets and price variations between FRP and parallel market as the major reason why other miners were not to selling their gold to FPR. If you fail to sell your gold to FPR, you are automatically eliminated from accessing FPR funding. Ministry of mines Chinhoyi noted that miners were not applying for MILF fund. According to the interview that was done with Ministry of Mines official from Chinhoyi Mashonaland West Province in (2021) the official captured that, "*We have received less than 50 applications for MILF loan for the whole year in 2021 from artisanal and small-scale miners"* [Mashonaland West Province Official, 202]. The study went on to discuss other areas that miners needed assistance from government in non-monetary form with participants

4.6.2 Non-Monetary Assistance to ASSGM from Government

Although assistance in the form of cash and equipment has been found to benefit a few, findings from the study identified other areas which ASSGM sector should be assisted by the government to improve their operations. Table 4.16 show areas that government should assist ASSGM to improve their production.

Table 4. 16: Area that Government should assist ASSGM

Non-Monetary assistance to ASSGM from Government	Reponses	Percentage

Monitoring and Evaluation for Healthy and safety	10	32%
Increase in size of Mining Blocks (land)	7	23%
Training on Financial and Mining Methods	6	19%
Computerised allocation of Mining area to avoid conflicts with large Scale Miners	3	10%
They need assistance on subsidizing ZESA and fuel charges	2	6%
Geological Survey Report exercises and Title Deeds to be used as collateral	3	10%

Source: Author (2022)

Table 4.16 shows that (32%) of the participant identified the need for assistance in the form of monitoring and evaluation for health and safety. The participants noted that officials from Ministry of Mines visit ASSGM areas after every 3 months, most of the times they are not visiting and sometimes they may visit twice a year. Lack of monitoring and evaluations from trained experts was resulting in increased accidents at mine sites, although every mining area had healthy and safety team, some of them were operating in areas that artisanal miners operated and were less experienced and miners were proposing that mine officials should visit their areas on monthly basis since they were contributing loyalties to the government.

Another (23%) of the participants identified the need to give small scale miners big area for mining. Most of the artisanal and small-scale miners had small boxes of land. The findings from the research noted that this was affecting them especially well-established small-scale miners on growth and expansion since their areas of operation were very small. Their mining areas were not enabling them to build offices, houses for their workers and warehouses to store their mining equipment. Furthermore (19%) of the participants revealed that there was need for training on good mining methods since most artisanal miners did not have mining experience and academic education. The study further noted that there was need for education on financial skills, miners should be educated on institutional requirements that issues out loans and how to obtain the loans from different investors that are funding the ASSGM sector so that miners are well versed with different investors available to them. There was need for on-the-job training of books of accounts (profit and loss, cash flows, statement of financial position) how to draft, maintain and their

importance since most of them do not have them and this has made some of the small-scale miners unable to acquire funding.

Ten percent (10%) of the participants revealed that the Government of Zimbabwe (GoZ) should help them with free Geological Survey Report exercises since it was expensive for artisanal and small-scale gold miners. They should allocate mining land to ASSGM in areas that were being surveyed, this will enhance their chances of access to loans from banks if their land has a potential to produce more gold ore. They further noted that the government should give miners Title Deeds and allow them to be used as collateral when they are accessing funding from banks. Another ten (10%) of the participants noted the need for Computerised allocation of Mining areas to avoid conflict with large Scale Miners. Most artisanal miners were mining in areas that were near large-scale mines or near areas that were once mined by large scale mine for instance Chakari area, most artisanal miners were near Falcon Gold Mine, ZMDC Chegutu and Golden Kopje Mine in Makonde area. The study further noted the need to protect local miners from foreigners (Chinese, Indians and Nigerians) who are bringing in hammer mills putting pressure to local small-scale mines who were also surviving by both mining and milling. Six percent (6%) of the participants noted that the government should assist artisanal and small-scale miners by providing them with subsidised fuel and electricity. The study analysed ways which could be used by government and its agencies to improve funding to this sector.

4.6.3 Ways to improve funding to ASSGM by the Government and its Agencies

One of the participants, Interviewee 1) in Sanyati Vinice area noted that RBZ being the central bank should give incentives to banks that were providing funding to this ASSGM sector. Interviewee 5 in Sanyati Chakari area highlighted the need for the Government to remove politicians' involvement in this sector to attract funding from other investors like NGOs and remove risk nature linked to association with politicians. The researcher noted that other areas were not accessible due to political involvement even if there were potential investors who had clearance from the ministry of mines. Some of the areas that had political influence were difficult to penetrate by private investors because miners in those areas would be mining illegally, they did not accept people they were not familiar with. The study further noted that there was need for security from Home Affairs Ministry (ZRP) to remove evil activities that were being done by

Machete Wielding Gangs *(Mashurugwis),* to remove informality and risk nature so that even if banks wanted to assess this sector, they would move around with less risk and no fear.

Interviewee 2 in Makonde captured that:

> *The Government should decentralise payment of small-scale miners to different banks, ASSGM sector should sell their gold to FPR but miners should receive their payments to banks of their choice in US$ like what is happening to tobacco farmers this will improve the visibility of this sector to financial sector and banks will have confidence in this sector* [Interviewee, 2].

Another miner in Kwekwe Interviewee 1 noted the need for FPR to be consistent in their payment methods. The miner highlighted that FPR's payment methods to this sector kept on changing on a yearly bases, the miner noted that this was causing some miners to end up selling their gold on the parallel market. A miner in Chakari area Interviewees 5 noted the need for FPR to decentralise their offices to different parts of the country. The miner noted that FPR should have offices in every district and mobile offices in areas that artisanal and small-scale mining operates. The researcher also observed that FPR were mainly found in areas where there was ZB bank and miners in areas such as Chegutu, Chakari, Pingo Mhondoro Ngezi, Empress and Vinice had to go and sell their gold in Kadoma where there are FPR offices, this increased chances for other miners to access funding from RBZ and FPR since they would be selling their gold to the required buyer.

Mines official noted the need to empower ministry of mines with vehicle so that they could move around monitoring the operation of ASSGM. Officials from the ministry of mines that were interviewed from Midlands and Mashonaland West provincial offices all agreed that there was need to increase vehicles to move around and monitor the activities of artisanal and small-scale gold miners, hearing their challenges and educating the artisanal small-scale miners on modern mining methods to improve their output. They noted that this would help to educate and do

awareness campaigns to ASSGM sector of the loans from Ministry of Mines, RBZ and FPF. One of the participants, Interviewee 2 in Mhondoro Ngezi district suggested that the GoZ should have mining shops controlled by the ministry of mines which will sell mining equipment on hire purchase bases to small scale miners, they could allow small scale miners to pay with the gold or make payments after selling their gold to fidelity. The qualitative information helped the researcher to develop the following quantitative information to analyse the level of involvement of government and other agencies. Table 4.17 shows descriptive statistics on the level of involvement of government and its agencies in supporting Artisanal and Small-Scale Gold Mines in Zimbabwe

Table 4. 17: Descriptive Statistics on the level of involvement of government and its agencies in supporting Artisanal and Small-Scale Gold Mines in Zimbabwe.

	N	Minimum	Maximum	Mean	Std. Deviation
Government	306	1	5	2.52	1.491
RBZ	306	1	5	1.37	.922
NGOs	305	1	1	1.00	.000
Banks	305	1	1	1.00	.000
Joint Venture	305	1	5	2.16	1.597
Partnership	305	1	5	1.92	1.366
Cooperatives	305	1	5	2.26	1.629
Valid N (listwise)	305				

Source: Author (2022)

The government could be involved in the ASSGM through formation of cooperative, partnerships allowing NGOs support formation of joint ventures and revolving funds. The general overview of the responses shows that miners neither agreed or disagreed that there is government involvement in the ASSGM sector of Zimbabwe with the mean which is three (2.52). However, the standard deviation of 1.491 which is non-zero reveals that other miners agrees that there is government involvement in the ASSGM sector. RBZ with the mean of one (1.37) meant that miners strongly disagree that RBZ was involved in the ASSGMs. However, the standard deviation of 0.922 which is non zero reveals that other miners agrees that there is involvement of RBZ in the ASSGM sector of Zimbabwe. NGOs with the mean of one (1) meant

that miners strongly disagree that NGOs were involved in the ASSGMs and the standard deviation of 0 further reveals that miners agrees that there is on involvement of NGOs in the ASSGM sector of Zimbabwe. Banks with the mean of one (1) meant that miners strongly disagree that banks were involved in the ASSGMs and the standard deviation of zero (0) further reveals that miners agrees that there is on involvement of banks in the ASSGM sector of Zimbabwe. Joint Venture with the mean of 2 (2.16) meant that miners disagreed that joint venture was involved in the ASSGMs. However, the standard deviation of 1.597 which is non zero reveals that other miners agrees that there is involvement of joint venture in the ASSGM sector of Zimbabwe. Partnership with the mean of two (1.92) meant that miners disagree that partnership was involved in the ASSGMs. However, the standard deviation of 1.366 which is non zero reveals that other miners agrees that there is involvement of partnerships in the ASSGM sector of Zimbabwe. Cooperatives with the mean of 2 (2.26) meant that miners disagree that cooperatives are involved in the ASSGMs. However, the standard deviation of 1.629 which is non zero reveals that other miners agrees that there is involvement of cooperatives in the ASSGM sector of Zimbabwe. The findings from quantitative analysis are showing that there is less funding from Government (MILF, RBZ and FPR) to the ASSGM sector which is consistent with the responses from qualitative analyses were participants were revealing that they are facing some challenges in accessing funding from RBZ, FPR and MILF.

4. 7 Funding models and optimum gold production for Artisanal and Small-Scale Gold Mines

4.7.1 Actions that should be taken to increase Funding Models and gold production for the ASSGM Sector?

Findings from qualitative analysis noted that there were so many ways that could be used to increase funding models to the ASSGM of Zimbabwe. One of the participants Interviewee 1 from Kwekwe district suggested that there is need for better legislation and regulation of the ASSGM sector for funding models to increase. A ministry of mines official at Chinhoyi offices noted the need for exemption of ASSGM sector from paying taxes and royalties so that they could use the money to buy new machines to improve their production. The official further captured the need for education and training of ASSGM on financial skill so that miners could be well versed with different funding opportunities that exist in the country. One of the interviewees

in Sanyati District, Interviewee 2 revealed that there was need to develop the infrastructure in the ASSGM areas so that banks, investors, and ministry of mines officials could have access to different areas that ASSGM operates. Interviewee 1 in Mhondoro Ngezi district noted that if they had access to institutions which offer funding to them, they will be able to buy modern day mining tools which will help artisanal miners to change from traditional manual mining methods to modern methods. The interviewee further argued that funding from financial institutions would enable them to process for tittle deeds and hire the companies to do Geological Surveying. The findings from the study also noted that most artisanal miners were using simple mining tools and simple mining methods therefore funding would help them acquire modern mining equipment enabling them to mine in areas that have high grade ores but are difficult to mine using simple mining tools.

Another miner, Interviewee 5 in Mhondoro Ngezi district argued that good funding models will help miners to pay experts (qualified miners) who will increase production and those who help them to maintain their books of accounts. He further argued that if they accessed funding, they could attend mining workshops where ministry of mines will be training artisanal miners and avoid funding from bogus sponsors. Another participant, Makonde interviewee 1 argued that good funding mechanisms would help them pay their workers, increase workforce and operate at maximum capacity which would result in increase in gold production. According to a Ministry of Mines Official in Kadoma, good funding models would improve the health and safety and security in the mining area thereby reducing accidents and unnecessary costs which miners incur when accidents happen. The official further argued that good funding models would help in the growth and expansion of the sector. The interviews helped the researcher to develop quantitative information to analyse the importance of good funding models to the ASSGM and gold production in Zimbabwe. Table 4.18 shows the descriptive statistics on the importance of good funding models to the ASSGM Sector and gold production in Zimbabwe.

Table 4.18: Descriptive Statistics on the Importance of Good Funding Models to the ASSGM Sector and gold production in Zimbabwe

	N	Minimum	Maximum	Mean	Std. Deviation
Good Funding Models will lead to optimum gold production for ASSGM sector	306	2	5	4.99	.171
Good Funding Models will lead to survival and growth of ASSGM sector	306	2	5	4.99	.171
Good Funding Models will lead to the full realization of the full mining capacity of mineral resources towards achieving optimum GDP	306	2	5	4.99	.171
Good Funding Models will lead to increase in exports of Gold and employment of the Country	306	2	5	4.99	.171
Good Funding Models will lead to increase in contribution of Gold to FPR and national output by ASSGM	306	2	5	4.99	.171
Good Funding Models will lead to increase in overall performance of ASSGM Sector	306	2	5	4.99	.171
Overall response				**4.99**	**.171**
Valid N (listwise)	306				

Source: Author 2022

Table 4.18 shows that the mean score is 5. The mean score of 5 corresponds with the strongly disagree implying that gold productivity declined or deteriorated. This is further reinforced by a lower standard deviation which is closer to zero of 0.172 which implies that only a few made it whilst the rest concurred that productivity deteriorated. The overall response mean for all proxy measures is 4.99 and the mean standard deviation which is non zero (0.171) means that others have benefited. Findings from qualitative and quantitative are not consistent on funding models and gold production. Few respondents from quantitative data are agreeing with qualitative participants on good funding models and gold production. This might be because questionnaires were distributed at random to respondents but interviews were mainly done with officials from the ministry of mines officials and artisanal and small-scale gold mines miner who were well versed with the sector

4.8 Ways to improve funding to artisanal and small-scale gold mines from banks

The researcher discussed with the participants on ways that should be used to increase funding to the ASSGM sector. Thirty-one participants gave the following responses on ways that should be used to improve funding to the ASSGM sector, fourteen (14) of the respondents highlighted the need for formalisation, four (4) explained the need to have geological survey reports, nine (9) highlightened the need to market the ASSGM sector, three (3) agreed that proper mining methods should be followed to conserve the environment and one (1) argued that there was need to improve roads for easy accessibility to all areas that ASSGM operates. Fig 4.3 shows ways to improve funding to ASSGM Sector

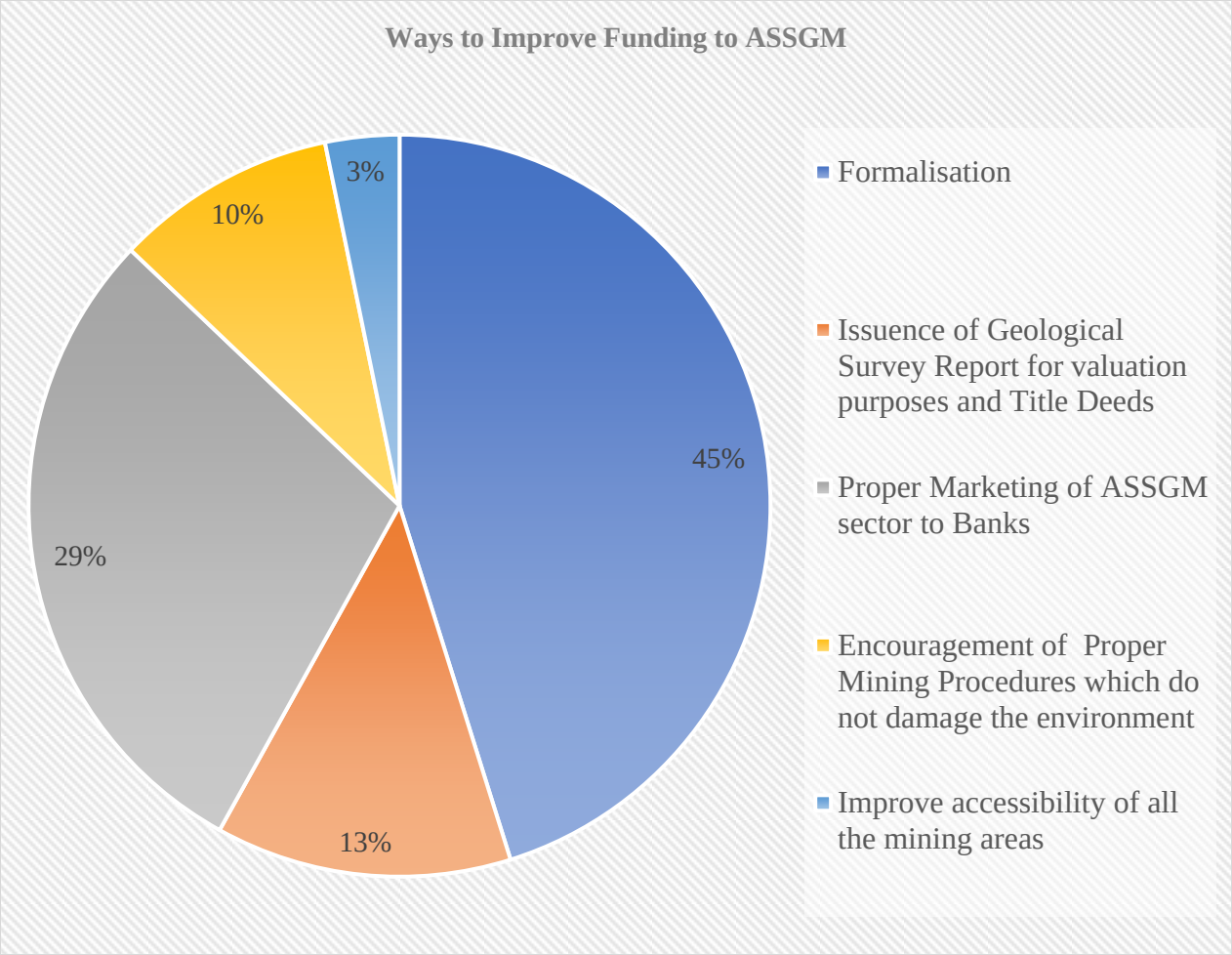

Figure 4. 3: Ways to Improve Funding to ASSGM

Source: Author (2022)

Fig 4.3 is revealing that 45 % of the respondents agreed that there was need for formalisation of the sector. These participants argued that there was need for registration of all the miners so that the mining sector became formal to financial institutions. About 13% of the participants agreed that for ASSGM to easily access funding from different investors, there was need for geological survey reports for miners. They argued that this would help investors such as banks for valuation purposes even if other miners had collateral assets, the geological survey report would help financial institutions in making funding decision since this sector was still new. Other respondents (29%), believed that this sector was still new and so there was need for proper marketing of the ASSGM sector to the financial sector by Ministry of Mines, RBZ and Fidelity Printers and Refineries. Ministry of Mines should move around monitoring each and every

miner, the study noted that some of the miners only had mining licences, but on the ground, there were no mining operations taking place. The ministry of mines Mashonaland West Province (Chinhoyi) revealed that some of the miners who are properly registered are the ones who turn out to be buyers and they buy gold enough to be given loans by RBZ/ FPR but there are no operations at their mine sites, yet those who are actually mining will not be able to produce gold sufficient enough to meet the requirements for the loan facility.

Other participants (3%), believed that there was need to improve accessibility of all the areas where small scale mining was taking place so that Ministry of Mines would fund the miners who deserved funding, although most areas were now easily accessible. Furthermore, 10% of the participants noted that there was need for proper mining procedures which did not cause environmental degradation to attract more investors to the sector. Miners should mine according to mining regulations on safety and health protocols to avoid fatalities that mainly happen in areas that small scale mines operate. A ministry of mines official in Kadoma noted that this gave a bad image to potential investors.

4.9 Inferential Statistics

The data is not continuous, it has categories. Since our variables are categorical which does not follow the normal distribution, the researcher used nonparametric tests for inferential statistics. Nonparametric tests can be used when data are ordinal or lack normality. Zikmund *et al.* (2013) describe a non-parametric test to be defined by any form of assumed distribution of data, with any type of variance, and having an ordinal or nominal characteristic

4.10 Effects of Funding Models on Gold Productivity

4.10.1 Model Summary

Table 4.19: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.454[a]	.443	.452	.173

Source: Author 2022

The goodness of fit is commonly measured by the coefficient of determination R Squared. The regression model explains almost 45.2% of the changes in gold production are explained by the given funding models. So, 54.8% is explained by other factors outside the model other than funding models. It might be due to other factors like technical expertise and the markets. This model can be based on primary decision making in explaining the following variables: personal savings, sale of an asset, RBZ, partnerships and joint ventures.

4.10. 2 Model Significance

Table 4.20: Model significance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.026	5	.005	.173	.030[b]
	Residual	2.945	300	.030		
	Total	2.971	305			

Source: Author 2022

The value of 0.030 is less than 0.05 implying that our model is significant in explaining what it tries to explain (the funding variables in mining productivity

4.10.3 Coefficients

Table 4.21: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
	(Constant)	1.069	.155		32.755	.000		
	Personal Savings	.021	.034	.034	.473	.037	.896	1.116
	Sale of an Asset	-.006	.029	-.013	-.214	.041	.891	1.122
	Joint Venture	-.013	.025	-.031	-.525	.100	.971	1.030
	Partnership	.012	.031	.022	.381	.034	.967	1.034
	RBZ	.018	.056	.019	.327	.244	.974	1.027

Source: Author 2022

$$\boldsymbol{Gold\ Productivity = 1.069 + 0.034\ personal\ savings - 0.013\ sale\ of\ an\ asset - 0.031\ joint\ venture + 0.022\ partinerships + 0.019\ RBZ}$$

Assuming that the explanatory variables are zero, it means an output of 1.069 can be realised which is attributed to other factors outside the model. Since RBZ and joint ventures have p values that are greater than 0.05, they are insignificant in explaining variability in gold production and they were left out in the final model. Personal savings is positively associated to gold productivity its coefficient is 0.034, it means that a 1% change or increase in the usage of personal savings in funding gold mining, it will lead to a 0.034 increase in gold productivity. Sale of an asset is negatively associated to gold productivity its coefficient is -0.013, it means that a 1% change or increase in the usage of sale of an asset in funding gold mining, will lead to a -0.013 decline in gold productivity. Joint venture is negatively associated to gold productivity

its coefficient is -0.031, it means that a 1% change or increase in the usage of personal savings in funding gold mining, will lead to a -0.031 increase in gold productivity. Partnership is positively associated to gold productivity its coefficient is 0.022, it means that a 1% change or increase in the usage of partnerships in funding gold mining, will lead to a 0.022 increase in gold productivity. Ideally a 1% increase in RBZ support should lead to 0.019 increase in gold production at 24% error rate there the relationship does not hold a 5% error rate. For predictor variables to be considered as not correlated, they should have a Variance Inflation Factor (VIF) of less than 5%. All the explanatory variables are not correlated there, there is no multi collinearity. Tolerance level is simply the reciprocal of VIF and it also shows that all the variables are not correlated. The importance of personal savings was also noted by Kyokutamba (2011) who noted that in financing small firms, a significant proportion of the initial fixed and working capital of small enterprises is derived from personal savings accumulated from other activities.

4.10.4 Bivariate analysis of the relationship between government and other agent support and gold productivity

Table 4.22: Bivariate Analysis

Correlations				
			overall productivity	Government support
Spearman's rho	overall productivity	Correlation Coefficient	1.000	.011
		Sig. (2-tailed)	.	.149
		N	306	306
	government support	Correlation Coefficient	.011	1.000
		Sig. (2-tailed)	.149	.
		N	306	306

Source: Author (2022)

Table 4.22 shows that there is very weak association between government and other agent support and gold productivity and the weak association is insignificant at 5% error rate. May be this might have something to do with the policies or the way the funding is administered (structured) which may be a cause of concern. The weak association between government funding and output from small scale gold miners is consistent with what was discussed in the literature review, UNIDO (2018) revealed that Fundo de Fomento Mineiro (FFM) of Mozambique was actively funding small scale gold miners but output from small scale miners remained low due to production challenges and inconsistent production levels resulting in some other miners failing to repay their loans. However, according to Adomako-Kwakye (2019), the government funding proved to be relatively successful, miners agreed to the terms, shared the equipment procured with the loan relatively incident-free, and complied with the regimented plan for repayment.

4.12 Chapter Summary

The chapter presented and analysed data collected from the questionnaire survey and interviews. The chapter started with analysis of the background information of the participants and presented findings of the institutional factors to consider before funding Artisanal and Small-Scale Gold Mines; how government and its agencies are involved in the Artisanal and Small-Scale Gold Mines of Zimbabwe; the funding mechanisms that are available to Artisanal and Small-Scale Gold Mines in Zimbabwe and the importance of good funding models for the Artisanal and Small-Scale Gold Mines in achieving optimum production. Findings from quantitative and qualitative analysis helped the researcher to come up with funding models that ASSGM could adopt for optimum gold production. Conclusions and recommendations are presented in the next chapter.

CHAPTER 5

SUMMARY, CONCLUSIONS AND IMPLICATIONS

5.0 Introduction

This section summarises the research on the funding models for optimal gold productivity from artisanal and small-scale gold mines in Zimbabwe. The overall summary of the findings is based on the findings from the study and the recommendations are guided by the literature review, the findings from the study and the analyses that were done by the researcher. The study concluded by identifying the areas for further study.

5.1 Summary of Findings

The research highlights the enormous contribution of artisanal and small-scale gold mining sector to the economy of Zimbabwe. By analysing different funding mechanisms that were availed to the ASSGM sector of Zimbabwe, the research noted that the funding from government, MILF, RBZ and FPR failed to adequately address the funding challenges that ASSGM are facing and these funding methods were not covering the whole ASSGM sector. Meanwhile there were other external funding mechanisms that were in existence for the past decade, these are: private funding, tribute system, cooperatives, joint ventures, sponsorship and partnerships, these are external sources of funding that were used by miners. On the internal sources of funding, personal savings, owner capital were the most commonly used sources of funding and other sources included sale of an asset, proceeds from other business, retirement packages and inheritance of the business from the parents. In-spite of the fact that ASSGM had been in existence for a long period of time, the sector had formalisation challenges and it was considered new by financial institutions. A lot has been done by government and the ministry of mines to formalise the sector but the number of unregistered miners is increasing by each day, month and year. Lack of formalisation resulted in increased corruption cases, smuggling of gold

out of the country and the emergency of Machete Gangs *Mashurugwis* in the ASSGM sector. The low use of funding from banks was mainly due to lack of collateral, non-availability of nearby banks, lack of paperwork required by banks and that some miners never visited banks looking for funding. The outcome of the previous research included risky nature of the sector, higher interest rates and collateral as the major reasons why miners were not accessing funding from banks, the researcher adopted a survey approach that combined findings from both questionnaires and interviews. The thesis intended to understand the reason why there was lack of funding from formal financial services, the association between funding models and optimal gold productivity and what could be done to increase funding from financial institutions and other investors to ASSGM sector. To investigate causes of low funding to the sector, the researcher developed a semi structured questionnaire with some scale measurement after the researcher interacted with the miners asking interview questions to get a deeper meaning of the reasons behind lack of funding in the ASSGM sector. The research noted that most miners were failing to access funding from MILF, RBZ and FPL due to requirements that every miner had to meet. Apart from meeting those requirements, miners were also required to sell gold to RBZ. The research also noted that there was less involvement of government and its agencies in the ASSGM sector. Some miners had never seen NGOs helping the ASSGM sector though some of them acknowledged that there were NGOs that helped ASSGM sector. Miners needed both financial and non-financial assistance from the government. On non-financial assistance, miners expected government to help them with Geological Survey Reports, Title Deeds and Hire Purchase shops which could sell mining equipment at subsidised prices. To increase gold output to RBZ, there was need to increase Fidelity selling points (mobile shops) in areas that artisanal and small-scale gold mining normally took place.

To correctly estimate the amount of gold from ASSGM, there was need to monitor corruption, formalisation of the sector and minimisation of gold smuggling out of the country by everyone including those who were linked to politics and government positions. The weakness of using internal sources of funding alone is that the capital is not adequacy to acquire new and modern mining machines for the artisanal and small-scale gold miners. Even though sponsors continued to exist in the ASSGM sector, most miners were not willing to be funded by them and other sponsors were not genuine. Most miners agreed that several areas they operated in were easily

accessible by roads and it was only banks that were not moving around in areas the miners operated. The major source of uncertainty when funding artisanal miners was the gold rushes. It was revealed that during gold rushes, artisanal miners could leave their mines and others would not come back. Microfinances were finding it plausible to fund most small-scale miners than artisanal miners because most of the small-scale miners had acquired physical assets. The research also noted that the ASSGM sector of Zimbabwe was still dominated by males. This was consistent with previous findings which showed that there was less involvement of females in the businesses. On the level of education, it was also revealed that few miners had gone beyond 'O' level qualification, few miners had attained their mining qualifications at higher and tertiary level. Most of them had on the job experience only. Most of the mines for artisanal and small-scale gold mines were between 1 to 10 years. Even though others had more than 10 years, they were still small in size, the reasons that were noted as the major cause of the mines to remain small included lack of government policies favoring the growth of this sector, lack of capital for growth and expansion and poor (traditional) mining method which is resulting in them producing lower output and failure to mine in other areas.

To identify the mechanisms that are of useful to the ASSGM, the researcher asked miners of their opinions through interviews and questionnaires. Personal Savings and Owner Capital were preferred as internal sources of funding whilst on external sources of funding, tribute system and private funding were mostly preferred.

5.2 Conclusions

This research set out to investigate the best funding models for artisanal and small-scale gold mines that would lead to optimal gold productivity. The funding models which should be taken by miners as they gain experience, mature and increase their output were discussed together with their merits during data analysis. The findings from this study may best be concluded in relation to the main objectives which are set out in Chapter One and some of questions that were asked by the questionnaire.

5.2.2 Objectives

5.2.2.1 Objective 1. To determine institutional factors that are considered before funding is given to Artisanal and Small-Scale Gold Mines.

From the findings above, it can be concluded that the major institutional factors that are considered before funding is given to ASSGM sector include: lack of collateral and inability to payback the loans. It was revealed that most assets that miners (especially artisanal miners) had were simple mining tools. It was also noted that most small-scale miners had collateral but some were being affected by lack of geological survey reports and tittle deeds to access funding from banks. It was suggested that government and banks should help miners by allowing them to use title deeds as collateral. The geological survey reports are mainly done by private companies, government should help artisanal and small-scale gold miners to carry out the process on their behalf because it is expensive for ASSGM. It was also noted that most ASSGM were failing to access funding from banks because banks had clearly defined and measurable performance standards which ASSGM sector did not meet to be given loans. Some of the miners were not registered and others shifted from one place to another looking for mineral rich areas or following gold rushes. Furthermore, banks lacked financial products that met specific ASSGM needs, since this sector was still new to the banks, there was need for banks to create financial products and rating systems that suited the miners. Due to the increased turbulence that miners faced in their sector, the time the miners took for their loans to be processed and lack of funding in the United State of American Dollars, some of the miners were not visiting banks looking for funding. The issue of not visiting banks was accelerated by lack of banks near places which miners worked. Miners had to travel all the way from Vinice and Embress to Kadoma or Kwekwe for financial services. The presence of gold buyers with hard cash in foreign currency was further dampening the desire for miners to visit banks. Firm size, presence of financial and technical skills was also affecting availability of funding to the ASSGM sector. From regression analysis, the miners acknowledged that the following were important in accessing funding: adequate financial skills, financial data for performance valuation purposes, availability of books of finance, knowledge by other ASSGM on the loans from banks, adequate entrepreneurial skills, adequate mining skills, size of the mine and the amount of gold output from the mine to FPR. It was also concluded that there were some other factors which affected funding to ASSGM sector other than institutional factors.

5.2.2.2 Objective 2. To examine funding mechanisms available to Artisanal and Small-Scale Gold Mines in Zimbabwe.

The findings from the study reveal that most mine owners were satisfied with the use of personal savings, owner capital private funding and tribute system, there were various funding models that are in use in the artisanal and small-scale gold mining sector. These sources include internal and external sources. Internal sources include: personal savings, sell of an asset, proceeds from other business, retirement package, inheritance, plough back profits, owner capital and family labour. External sources include: joint ventures, partnerships, cooperatives, hiring equipment, sponsors, tribute system, private funding and ASSGM associations. Of all the external sources, sponsorship is very common in the ASSGM sector. The research noted that ASSGM is not accessing funding from reginal and local banks in Zimbabwe. According to Eniola and Entebang (2015), accessing financing has been accentuated as the foremost constraints poignant the performance and development of small business in Africa. They further noted that due to a lack of funding provision and entrepreneurship skills, there was a high death rate of small firms in Africa. The study noted that mine owners strongly agreed that access to funding is vital for growth and expansion of the ASSGM sector. The miners argued that for them to have sustainable operations in the sector, there was need for access to funding from external sources, this would help the sector to achieve optimum production. The study concluded that the performance of the artisanal and small-scale gold mining sector was enhanced by access to external sources of funding.

5.2.2.3 Objective 3. To evaluate the role of government and its agencies in supporting Artisanal and Small-Scale Gold Mines in Zimbabwe

There are several funding mechanisms that were establish by the government of Zimbabwe to finance the whole mining sector including ASSGM. The following institutions: ministry of mines, RBZ and FPR came up with loans that were specifically for artisanal and small-scale gold miners. The government also came up with policies that promoted lending to the miners after observations that there was shortage of funding in the ASSGM sector. Findings from the literature review and data analysis revealed that both government and ministry of mines had come up with the following: ministry of mines industrial loan fund, hire or hire-to-buy equipment program, and the RBZ/FPR funding scheme to finance the ASSGM sector. Lack of

funding in the ASSGM sector is also blamed for low technological advancement in this sector, low ore output, poor ore and the use of traditional mining methods, which is resulting in lack of growth and expansion of the sector, some of the mines have been in existence for more than a decade but they are still small due to lack of funding. There was direct and indirect funding by government and donors to cushion this sector from around 2000 up to date. Although there is evidence of funding the mining sector from literature review and data analysis, findings from the data analysis have shown that there is low evolvement of government and its agencies in the ASSGM. Findings from the research reveal that 246(80.4%) of participants strongly believed that RBZ was not involved in the ASSGM sector, 305 (100%) of the participants strongly believed that NGO were not involved in the ASSGM sector and 114(37.3%) participants strongly believed that government was not involved in the ASSGM sector of Zimbabwe. Furthermore, finding from regression analysis revealed that the association between government and other agent support and gold productivity was very weak. The association is insufficient at 5% error rate and it concluded that it had something to do with the policies or the way the funding is administered (structured) which may be a cause of concern. The study noted that government's involvement in the ASSGM sector included aspects of monitoring and evaluations and not on the financial side,

5.2.2.4 Objective 4. The effects of funding models for Artisanal and Small-Scale Gold Mines and optimal gold productivity

Results from regression analysis revealed that other that the following funding models personal savings, partnerships and RBZ funding had a positive relationship with gold output. However, the relationship between RBZ and gold output at 5% error rate did not hold, the regression analysis concluded that only personal savings and partnerships were of great importance in funding ASSGM. For ASSGM in Zimbabwe to achieve optimum gold production the following internal and external funding mechanisms should be employed: internal (personal savings and owner capital), external (private funding, tribute system, joint ventures cooperatives and partnerships). Of all the internal and external sources of funding, personal saving, owner capital, private funding and tribute system are the most useful funding models in the artisanal and small-scale gold mining sector of Zimbabwe. The reasons why these are mostly used by miners is that they have less requirements. Private investors are mainly interested in their return on investment.

The financial sector which was available to ASSGM are microfinances, most ASSGM in Zimbabwe shun them due to higher interest rates. However, in Guinea according to Planet Gold Report (2020), around 1998, the Australian Agency for International Development (AUSAID) commissioned a comprehensive study of artisanal and small-scale miners. Multiple donors and the private sector funded miners through microfinance funding. It is estimated that about 184,000 borrowers and 509,000 depositors were reached by the microfinance institutions under this project. The microfinance was granted full banking license by the government.

The bank was named Nationwide Microbank (NMB). NMB operated on a commercial basis and became the biggest licensed microbank in Guinea with over 100,000 active customers with savings accounts through its 14 branches. Although the bank has some problems with its portfolio quality, with more than 18% of the portfolio "at risk" this bank helped small scale miners to access funding and it also received a fund by EU a grant of 6.8 million euros. The grant was awarded to this bank to specifically fund small scale miners (Planet Gold Report, 2020). But in Zimbabwe, the ASSGM sector is still unfamiliar territory to the financial institutions. The ASSGM sector environment is viewed by financial intermediaries as being risky, banks are still yet to consider ASSGM sector as a possible investment opportunity, the banking sector still have a negative general perception towards the sector. The sector still has high level of uncertainty. Sponsors are common in the sector but some of the miners do not favour funding from them due to increase in bogus sponsors. The study revealed that the youths, females and young children who venture into the mining for the first time normally prefer internal sources of funding (personal savings and owner capital) on external sources, they prefer cooperatives, joint venture and partnerships. The findings of the study also revealed that private funding is mainly used by small scale miners and tribute system is mainly done by miners mining in cooperatives, joint ventures and partnerships like what is happening at Blue Rock mine Chegutu, Berks mine.

5.3 Implications

5.3.1 Implications to Policy

For artisanal and small-scale gold miners who are operating in this unstable environment to succeed, they required policies from government which would help to drive this sector to realise

their goals. The following policies are of great importance in increasing funding to the ASSGM sector:

5.3.1.1 Decentralisation of Registration Offices to District Level

To encourage formalisation of the ASSGM sector of Zimbabwe, there is need for decentralisation of mining offices to the district level. In provinces that have a lot of gold mining activities like Mashonaland West, Central and East and the Midlands province, there is need for decentralisation of mining offices to district level. One of the main sectors where there has been some decentralisation in Zimbabwe is the ministry of primary and secondary education, this has brought ease in control, monitoring and management of the sector. Decentralisation will bring in easy management of the small-scale mining sector, easy control of the accidents, monitoring of child labour and better control in the allocation of mining land and easy management of ownership conflicts. Nearness to miners will help mining officials understand problems they are facing and minimises the cost they incur in registering their mines. It will also help to reduce corruption in the issuance of licenses and access to mining areas which are rich in mineral ore.

According to Ncube (2021), when a prospective miner brings applications indicating areas where they have discovered gold, licensing authorities may deliberately delay licensing that particular applicant and tip illegal miners to go and pounce in that area. Even though there was decentralisation of zone mines office level which has helped in making the system more efficient and integrating artisanal and small-scale gold mining sector into the local planning and administrative systems, other districts still have to travel to provincial offices for mining permits (Ncube, 2021). In 2014, the decentralisation of artisanal and small-scale gold mining to the local authorities to regulate and issue licenses for alluvial gold panning was outlawed due to environmental hazards that were emanating from alluvial gold panning along major rivers in the country. Even though the ministry of mines has decentralised mining offices to Kadoma, the district has fewer officers in charge of processing applications for the three districts (Chegutu Sanyati and Mhondoro Ngezi). This is causing delays in terms of inspections of the areas, processing of licences and issuance of permits. This is taking too long forcing other miners to travel to provincial offices.

5.3.1.2 Decentralisation of Gold Payment to other Banks

The Central Bank (RBZ) should come up with measures of improving the visibility of the ASSGM sector to the banking system. Measures like introducing payment of gold miners through different banks like what happened to tobacco farmers is of great importance to the mining sector. This will help miners to have bank accounts, increase familiarisation of miners to different financial institutions and individual banks will be familiar with the ASSGM sector. Such development will help to increase funding to the artisanal and small-scale gold mining sector, according to Bankers association of Zimbabwe BAZ (2015), 2013/14 season the banks have availed $620 million towards agriculture financing and as much as $343 million (55%) was for tobacco farming.

5.3.1.3 Hire Purchase Shops for ASSGM

The findings from the study noted that about 235 (76.8%) of the miners had assets that were worth less than USD 5000. This shows that miners did not have capital to buy machines. On the external sources of funding, it was revealed that most miners were relying on hiring equipment like compressor, jackhammers and generators. The study recommended for the need to have hire purchase shops for ASSGM for easy access to machines. The shops should be controlled by ministry of mines and offer machines to registered miners. The miners should be allowed to repay the loans as they sell their gold to FPR. Hire purchase shops are of great importance since they allow easy access of equipment by miners. This will help to increase physical assets that miners can use as collateral at the premises which may also enhance their chances of accessing funding from banks due to increase in assets. According to Planet Gold (2020) this policy has been there around 1990s where any individual deemed to have a viable mining venture, following an initial assessment by government, was eligible to hire or hire-to-buy equipment under hire purchase scheme. The program was being administered by Mining Industry Loan Fund (MILF) but Planet Gold Report (2020) revealed that the program could not be sustained due to hyperinflation.

5.3.1.4 Policy Consistency on the control and governance of ASSGM in Zimbabwe

One of the policies that favored the mining sector for local people was the indigenisation policy. This policy encouraged more local citizens including the youths to enter into the mining industry as it required non local industries to cede 51% of their shares to the local people. However due to changes and shifting of policies, around 2006 to 2008 the government of Zimbabwe criminalised artisanal mining and launched a violent crackdown on miners Operation end the illegal mining (Operation Chikorokoza Chapera) and Operation where did you get your money (Operation Mariyawanda Wakaiwanepi), this affected both registered and unregistered artisanal and small-scale miners. Policies in the artisanal and small-scale gold mining sector are mainly driven by political gains rather than for the improvement of welfare of the miners and their standard of living. Most mines like at Tix and New Found were cooperatives formed to accommodate Zanu PF youths and the cooperatives have management who hold positions in the ruling party structures and every miner pays a certain amount every time the ruling party has events close to their areas. Kabonga and Marime, (2017) opined that the national policies such as the fast-track land redistribution programs, the quasi-fiscal policies and promises of creating million jobs have largely been populist political gimmicks and grand electioneering strategies drawn from ZANU-PF, the ruling party's election manifestos.

5.3.1.5 Consistency in Gold Payments for ASSGM in Zimbabwe

For a long period of time, FPR pays substantially less for gold than international buyers. The international buyers also pay all the gold in US dollars. This is fueling black market; most miners prefer black market because they can get straight US dollar payments immediately after selling their gold. Prices of gold that is paid by FPR continues to change almost on yearly basis in May 2020, Zimbabwe's industrial miners only received 55% of their payments in US dollars, and later during that year, the payment increased to 70%. Around 2018 RBZ –FPR was paying artisanal and small-scale gold miners 60% cash in US dollars and 40% as bond notes and in 2021, For Fire Assay, gold above 100g it's paying US$55.74/g cash. And for the gold below 100g, it is not paying in US$ but it's using the Exchange Rate of that period. There is need for consistence in gold payment method by FPR, to eliminate smuggling and the existence of black market. Gold miners should be paid in US$ since the machines they are using are normally sold in hard currency.

5.3.1.6 Building Confidence in the Financial Sector

The artisanal and small-scale gold mining sector should thrive to build confidence in the banking sector. The success of miners in accessing funding depends on the degree of confidence that miners have in visiting financial institution, opening bank accounts with different financial institutions, sending their loan application papers for assessment and the socialisation between mine owners and bank officials, could help to instill the confident and increase networking between the two parties. Regular banks deposits from registered miners, savings deposits and fixed deposits will constitute an important part on the balance sheet of banks which will enable this sector to be easily recognised and considered if they are applying for loans. To boost confidence of miners, the banking sectors should always make regular visits to the areas that miners work, lend the miners with the currency they are able to pay with and have adequate liquid assets to honor their deposits. Loss of confidence in the financial system causes leakages in credit creation. Liquidity preference of the general public constrains the power of banks to create credit. For instance, the cash which is kept idle under the pillow by other artisanal and small-scale gold miners could be used for productive purposes by deficit units earning income for banks and the miners.

5.3.1.7 Improvement of Asset Quality (Collateral) of ASSGM

Artisanal and small-scale gold miners should spend their significant time, energy, and resources managing their assets, particularly their physical assets. The size, their working premises and the quality of physical assets can detract them from their ability to successfully apply and acquire funding from financial institutions. A mere visit to the premises that most miners operate presence a bad picture which any financial institution will not accept to offer funding. Mine owners should be diligent and focused when acquiring their physical assets, reviewing their premises and managing their operations. The banking sector should believe that the miners will be able to pay back the loans by mere looking at the assets that the miners have, the output being produced and the general appearance of the premises. Bank officials should notice the going concern of the mines. Banks normally exercise prudent lending and they want their loans and investments to be adequately secured, so asset quality is the major factor which banks normally consider before administering their loans to companies. When advancing loans, banks consider

all the cannons of safety. Security is one of the most critical areas which affect the financial and operating performance of banks as well as the soundness of the nation's financial system.

5.3.1.8 Education of ASSGGM on Knowledge of Finance

One of the key issues affecting funding to the ASSGM from banks is lack of Knowledge. Most miners are not aware of the paperwork that is required by banks for them to be given loans. There is need for education on financial skills to the miners at least the basic level of finance so that the new generation of miners comes to the industry with financial knowledge. This approach will improve miners understanding of general principals of finance, the importance of financial knowledge on lending and debt

5.3.1.9 Hiring experts to do books of finance for ASSGM

The study noted that books of accounts are mainly done by mine owners 241 (78.8%). The study recommended for the need to hire experts to help miners in maintenance of the books of accounts. Books of accounts are of great importance in accessing funding from financial institutions as was noted in the study.

5.3.1.10 Networking Between Miners and Bank Officials

There is need for strong networking between miners and bank officials. This will help to enable better cooperation, coordination and interaction between miners and bank officials. Bank officials should link up; develop financial products that will allow miners to access them.

5.3.1.11 Review of RBZ/FPR and MILF funding Requirements

The findings from the study noted that for one to be able to sell gold to RBZ/FPR, the gold should be more than 5gramms, the miner should be a registered miner. For one to access funding from RBZ/FPR and MILF, one should have labour returns, selling gold of more than 100gramms per month. These requirements are beyond the rich for many miners especially the artisanal miner. All ASSGM are supposed to pay royalties. The government of Zimbabwe has reviewed the royalty downwards but some miners are still unable to repay them, the royalty rate was slashed back to 1% from 2% in 2021. The study recommended for the review of the requirement. The government should assess the requirement basing on the production and ability of miners.

Other artisanal miners do not have formal workers, they hire for short periods of time, their output per month might not rich 100gramss due to poor mining methods and lack of modern mining machines.

5.3.2 Implications to Theory

The findings from this study have a bearing on how artisanal and small-scale gold mines should be funded in the unstable and emerging economies. Several theories that were discussed in the literature review were mainly focusing on small firms. This research has developed the framework which can be applied in the emerging economies. My study is one of the few in this area, the information on funding models for optimum production for ASSGM sector is still scanty. My research has helped to fill that gap. This research further reinforced the following theories that Perking Order and Financial Cycle theories which suggests that small firm should start with least cost funding mechanisms and moves on to safe debt and equity as they grow. The study of funding the ASSGM sector is no longer the same due to this model which addresses real problems associated with each funding model and coming up with funding models that are of use to the ASSGM sector. The framework provides a new perspective in analysing funding models for the ASSGM sector.

5.3.3 Implications to future research

The research analysed funding challenges that ASSGM sector is facing, effects of funding models and gold productivity and why financial institutions are reluctant to fund this sector and it also explored possible solutions in encouraging funding to the sector from government and other agencies. Despite the fact that this area remains a new customer base to the banking sector and that this sector is playing a pivotal role to the economy of Zimbabwe, the area continues to face funding challenges, further research should be conducted in the following areas:

- Further research should be done in the same industry ASSGM sector analysing the impact of financial skills on loan repayment since this study only covered funding models for optimum gold production from artisanal and small-scale gold mines in Zimbabwe.
- There is need to carried out a research to establish the symbiotic relationship between ASSGM and LSGM on how ASSGM can benefit from LSGM and how LSGM can also benefit from ASSGM

- A comparative analysis of funding of ASSGM between countries.

On the artisanal and small-scale gold miners' financial skills and loan repayment, there is need to have a wider scope of data which includes artisanal and small miners from different provinces covering all key geographical locations in the country as well as increased number of participants. A study with such broader perspective will further enhance my findings on the need to provide good funding models for the artisanal and small-scale gold mining sector of Zimbabwe.

5.4 Limitations of the study

The researcher encountered some limitations which possibly affected the data collection, analysis of the findings and conclusions of the research. The limitations include the following: refusal of other miners to complete the questionnaires, arguing that their mines could be grabbed by the government. This proved to be a real challenge in some of the districts that the researcher had visited especially Kwekwe district which is also shown by low percentage return of response rate. The miners lacked trust in the researcher, some of the mines were operating illegally so the owners feared they were spied on by some ministry of mines officials. The areas that were assessed had too much political interference, for the researcher to successfully distribute his questionnaires in Kwekwe district, the researcher had to go via the councilor's office. This affected the response rate. The researcher also noted that most of the miners had literacy challenges, for the questionnaires to be successfully completed, there was need for the researcher to explain the whole questionnaire to most mine owners and at times the researcher had to complete together with the miners in areas like *Tix* and New found cooperatives where there was high number of artisanal miners operating closer to one another. The researcher also noted that some of the questionnaires that were given to foreign nationals were returned without being fully completed, and others were not allowing the researcher to leave his questionnaire at their premises, the researcher perceived that the foreign nationals did not understand the importance of the research; therefore, they failed to place the intended degree of seriousness on the study. The researcher also observed that some of the artisanal miners who did not return the questionnaires followed the gold rush in other areas.

Due to changes that continuously take place in the ASSGM sector, new policies that may be implemented to the sector, it will be difficult to generalise the findings after a certain period of time say after ten (10) years from now. The environment in which ASSGM sector operate may change, hence there is need to continuously monitor changes in the ASSGM sector and update the existing body of knowledge. Some of the mines may grow and expand and this will influence how some mine owners may respond. However, it is still assumed that the views of the mine owners are the prime determinant of the funding models in the ASSGM sector of Zimbabwe.

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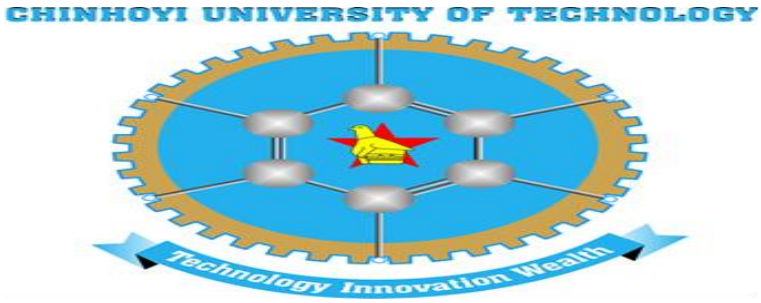
Appendix 1: Questionnaire



To the Respondent

Re: An Academic Questionnaire

I am a PhD student at Chinhoyi University of Technology carrying out academic research entitled **"Funding models for optimum gold production from artisanal and small-scale gold mines in Zimbabwe"** in fulfilment of the requirements of PhD in Finance. The purpose of the study is to come up with Funding Models that are suitable for the Zimbabwean ASSGM sector.

Based on the experiences that your organization has gone through and that you are registered under the ministry of mines, I have identified your organization as one of the mines that may contribute significantly to this study. At the end of the study, I will present the findings and recommendations to the ASSGM sector. Please be assured that the information gathered will be exclusively used for academic research and will be treated with the utmost confidentiality it deserves. Your cooperation in this matter is greatly appreciated. For further information you can contact me on 0773 277 894 or email me at lmatsiwira@gmail.com.

Thank you for devoting your precious time and effort in making this academic research a success.

Yours Sincerely

Last Matsiwira (C19140307E)

Part 1 Background Information

Place a tick (√) in a box against your answer to a question.

1. Gender

Male	
Female	

2. Can you please specify your highest educational level?

O' Level	
A' Level	
Diploma/ Professional Mining Course	
First / Undergraduate Degree	
Post Graduate	
Other: Please specify	

3. In which age group do you fall under?

Below 25 years	
26 to 35 years	
36 to 45 years	
46 to 55 years	
56 + years	

4. For how long have you been working in the Artisanal and Small-Scale Gold Mine Sector?

1 to 5 years	
6 to 10 years	
11 to 15 years	
16 to 20 years	
21 years and above	

5. Age of your mine

1-5 years	
6-10 years	
11-15 years	
16-20 years	
21 years and above	

6. Number of employees in your organization

1-10	
11-20	
21-30	
31-40	
41-50	
Over 51	

Part 2 Funding Models available to Artisanal and Small-Scale Gold Mines.

You can tick more than one answer in this section.

7. Which internal sources of Funding is available to your organisation

Personal Savings	
Sale of an Asset	
Owner Capital	
Plough Back Profits	
Family and Friends	
Other: Please specify	

8. Which external sources of Funding is available to your organisation

Loans from Local Banks	
Loans from Reginal Banks	
Loans from International Banks	
Leasing	
Hire Purchase	
Factoring	
Joint Venture	
Partnerships	
Business Angels	
Venture Capital	
NGOs	
Government	
RBZ	
Cooperatives	
Revolving Funds	
Other: Please specify	

9. Why ASSGMs do not qualify to access capital from other sources of Funding

Unavailability of Collateral	
Low expected profit margin	
Poor information (Information asymmetry) on the Sector	
Informality of the Sector	
Availability of other sources of Funding	
Risk nature of the Sector	
Other: Please specify	

Part 3 Financial and technical Skills

Tick all relevant answers (Question 10-11b)

10. Which books of accounts do you have in your organization?

Statement of Profit or loss and other Comprehensive Income	

Balance Sheet (Statement of Financial Position)	
Cash Flow Statement (Statement of Cash Flow)	
Statement of Changes in Equity	
Only Preliminary records of Bookkeeping	
None	
Other: Please specify	

11. a. Who does books of accounts in your organization?

Accountant	
Accountants Clerks	
Mine Owner	
None	
Other: Please specify	

11. b. What do you use to measure your firm performance?

Sales Growth	
Growth in Profit	
After tax returns on total sales	
Total sales to total assets ratio	
Total gold output to FPR	
Return on Assets	
Other: Please specify	

12a. Do the following financial information influence the availability of Funding from Banks to ASSGM.

Statements	Strongly Disagree 1	2	3	4	Strongly Agree 5
12a.1. Adequate education and training on financial skills					
12a.2. Financial Data for performance valuation purposes					
12a.3 Availability of Books of finance					
12a.4. Knowledge by other ASSMG					

owners on availability of loans from Banks					
12a.5. Adequate entrepreneurial skills					
12a.6. Other: Please specify					

12 b: Do the following mining information influence the availability of Funding from Banks to ASSGM

Statements	Strongly Disagree 1	2	3	4	Strongly Agree 5
12b.1. Adequate education and training on mining skills					
12b.2. The size of the Mine for valuation purposes					
12b.3. The amount of gold output from the mine to FPR					
12b.4 Availability of Mining Equipment					
12b.5 Adequate mining management skills					
Other: Please specify					

Part 4: Size of Artisanal and Small-Scale Gold Mines

Tick all relevant answers (Question 13 and 14)

13. At what stage of business growth cycle is your organisation

Start Up	
Growth	
Maturity	
Decline	
Resuscitation	
Other: Please specify	

14. Do the following cause ASSGM to remain small for a long period of time?

Statements	Strongly Disagree 1	2	3	4	Strongly Agree 5
14.1. Lack of internal funding for					

growth					
14.2. Lack of experience in the mining sector					
14.3. The nature of their business prohibits them from accessing external funding					
14.4. Government Policies not Favouring growth of ASSGM Sector					
14.5. Other: Please specify					

15. Indicate whether the following affects small firms in accessing external Funding.

Factors	Strongly Disagree 1	2	3	4	Strongly Agree 5
15.1. Stage of ASSGM in the Growth Cycle					
15.2. Goodwill of the company					
15.3. Small output					
15.4. Small Profits Generated					
15.5. Inaccessibility of other ASSGM premises for assessment by banks					
15.6. Lack of Business Plan					

Part 5: Collateral security of Artisanal and Small-Scale Gold Miners

Tick all relevant answers (Question 16 and 17)

16. Which assets does your organization have?

Land	
Plant and Machinery	
Motor Vehicles	
Buildings	
Simple Mining Tools	
Other: Please specify	

17. Please specify the total assets which your company has in monetary value?

Less than $US 1000	

1000-5000 $US	
6000-10 000$US	
11000-15000 $US	
16000 + $US	

18. Indicate your agreement with the following statements regarding availability of Funding from Banks to ASSGM.

Statements	Strongly Disagree 1	2	3	4	Strongly Agree 5
18.1. There are clearly defined and measurable performance standards from banks which ASSGM sector do not meet to be given loans.					
18.2. Banks have an organized system for monitoring assets of the company and its ability to pay back the loan					
18.3. Other than collateral, banks also consider economic potential of the business before giving out loans					
18.4. Failure of ASSGM to meet due diligence requirements affects their ability to access loans					
18.5. Financial Institutions do not have financial products that meet specific ASSGM needs					

Part 6: Formalization of Artisanal and Small-Scale Gold Mines

19. Indicate your agreement that the following items are formalization barriers to access funding from formal financial institutions.

Funding Barriers	Strongly Disagree 1	2	3	4	Strongly Agree 5
19.1. Lack of Track records					
19.2. Risky nature of the ASSGM Sector					
19.3. Lack of information on ASSGM by banks					
19.4. Lack of Legal System to govern the Sector					

19.5. Lack of Formal registration with Ministry of Mines					

20. Indicate your agreement that the following are causing ASSGM sector to remain informal.

Funding Barriers	Strongly Disagree 1	2	3	4	Strongly Agree 5
20.1.1 Involvement of Politicians					
20.2. High Registration Costs which ASSGM Sector do not afford					
20.3 Licensing Process is long, hectic and arduous.					
20.4 Bureaucratic, Delays in Paying Gold Producers.					
20.5. Availability of informal market to sell gold					

Part 7 Financial support to Artisanal and Small-Scale Gold Mines from Government and agencies like Donor Community, Fidelity Printers and Refineries

21. Please rate the level of involvement of the following to ASSGM sector

Participant	Not Involved at all 1	2	3	4	Extremely involved 5
Government					
RBZ					
NGOs					
Banks					
Hire Purchase					
Factoring					
Joint Venture					
Partnership					
Leasing					
Business Angels					
Revolving Funds					
Cooperatives					
Venture Capital					

Part 8 Funding Models and Production of Gold

22. To what extent do the following statements have an effect on Funding Models and increase in gold production by ASSGM Sector?

Statements	No effect at all 1	2	3	4	Strong Effect 5
22.1 Better legislation and regulation of ASSGM sector will increase Funding Models					
22.2 Exemption of ASSGM from paying taxes and loyalties will increase Funding to ASSGM Sector					
22.3Education and training on financial skills will lead to increase in Funding Models to ASSGM Sector					
22.4Formalization of ASSGM sector will lead to increase of Funding Models to ASSGM Sector					
22.5Development of Infrastructure in ASSGM areas will lead to increase in Funding Models to ASSGM Sector					

23. Indicate your agreement that the following statements are true on Funding Models to the ASSGM sector

Statements	Strongly Disagree 1	2	3	4	Strongly Agree 5
23.1Good Funding Models will lead to optimum gold production for ASSGM sector					
23.2Good Funding Models will lead to survival and growth of ASSGM sector					
23.3Good Funding Models will lead to the full realization of the full mining capacity of Zimbabwe's mineral resources					

towards achieving optimum Gross Domestic Product					
23.4Good Funding Models will lead to increase in exports of Gold and employment of the Country					
23.5Good Funding Models will lead to increase in contribution of Gold to FPR and national output by ASSGM					
23.6. Good Funding Models will lead to increase in overall performance of ASSGM Sector					

END OF QUESTIONNAIRE

THANK YOU

Appendix 2 Participant Information Sheet

Participant Information Sheet

Dear Participant

Please take some time to read through the following information. If at any point you have any question, please do not hesitate to contact the researcher, Matsiwira Last at 0773277894 or email him at lmatsiwira@gmail.com.

Overview

You have been invited to take part in the PhD research study on "**Funding models for optimum gold production from artisanal and small-scale gold mines in Zimbabwe".**

What you have been asked to do

You have been asked to participate in the confidential and anonymous face to face interview session, lasting around a few minutes. This will be arranged for a time, date and location of your convenience prior to the end of September 2021. You will be asked questions about your current role and experience in the ASSGM sector and Funding Models available for ASSGM. You will be asked different questions concerning funding models that are currently being used in the ASSGM sector and the reasons they are using them. You will be asked the reasons why there is less funding from financial institution in the ASSGM sector and ways which should be done to increase funding to this sector. For the purpose of enhancing accuracy of the qualitative analysis of the data from our interview session, with your concert, I will record the audio of the session. From your concert, I may include selective quotes from our conversion to illustrate the points in my thesis and resulting publication. Great care will be taken to ensure that any quotes cannot be attributed to you as an employee of your current organisation. Your interview response will remain confidential, notes and recordings will be anonymous and will be stored confidentially.

Appendix 3: Permission Letter

CHINHOYI UNIVERSITY OF TECHNOLOGY

PERMISSION LETTER

Student Name …… Matsiwira Last

Student number …….C19140307E

Programme …… Doctor of Philosophy Degree in Finance

Approved research topic:

Funding models for optimum gold production from artisanal and small-scale gold mines in Zimbabwe

TO WHOM IT MAY CONCERN

I hereby confirm that the above-mentioned student is registered at Chinhoyi University of Technology for the programme indicated. The proposed study met all the requirements as stipulated in Chinhoyi University of Technology policies and guidelines and has been approved by the Graduate Business School.

The proposal adheres to ethical principles as outlined by the Research Ethics Committee of the University. Permission is hereby granted to carry out the research as described in the approved proposal. May you please assist the student in any way possible.

The main objective of the study is to:

Investigate funding models that are being used by small scale miners and come up with funding models that will lead to optimum gold production in the artisanal and small-scale gold mines in Zimbabwe

Best Regards

…….

Signature and Date Stamp

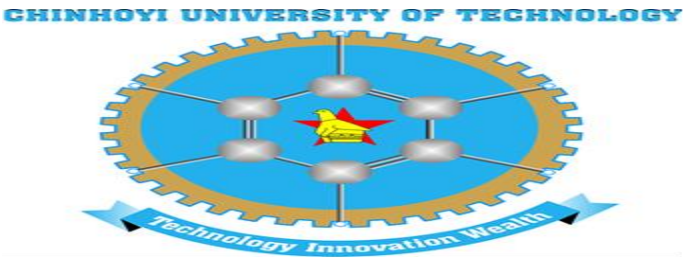
…….

Name of Director, Graduate Business School

Tel: +263 267 2129447

E-mail: directorgbs@cut.ac.zw / directorcutgbs@gmail.com

Appendix 4: Interview Consent Form



PhD Thesis tittle

Funding models for optimum gold production from artisanal and small-scale gold mines in Zimbabwe

Interview Consent Form

Participant Name

…….

Date

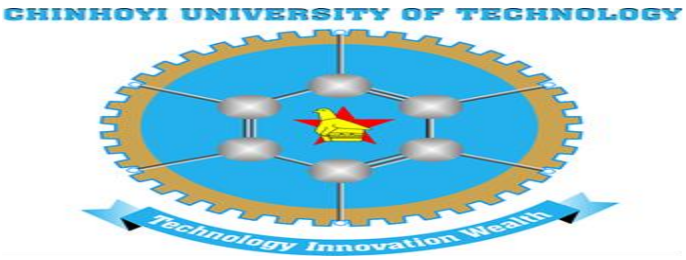
……/……/……..

- I confirm that my participation in this research is voluntary.
- I understand that I will not receive any payment for participating in this research interview.
- I understand that most interviews will find the discussion interesting and thought provoking, I have the right to decline to answer any question or to end the interview.
- I confirm that the research will last in a reasonable time.
- I understand the researcher will not identify me by my name in any reports using information from this interview and that my confidentiality as a participant in this study will remain secure.
- I have read and understood the explanation provided to me.
- I have been given a copy of the consent form.
- I wish to review the notes, transcripts, or other data collected during the research interview.
- I agree that the researcher may publish documents containing questions answered by me.

By signing this form, I agree to the terms indicated above

Participant's Signature	**Researcher's Signature**
……	**…….**
Date Signed	**Date Signed**
……/……/……	**…/……/……..**

Appendix 5 Interview Guide



To the Participant

Re: An Interview Guide

I am a PhD student at Chinhoyi University of Technology carrying out academic research entitled “Funding models for optimum gold production from artisanal and small-scale gold mines in Zimbabwe” in fulfilment of the requirements of PhD in Finance. The purpose of the study is to come up with Funding Models that are suitable for the Zimbabwean ASSGM sector.

Based on the experiences that your organization has gone through and that you are registered under the ministry of mines, I have identified your organization as one of the mines that may contribute significantly to this study. At the end of the study, I will present the findings and recommendations to the ASSGM sector. Please be assured that the information gathered will be exclusively used for academic research and will be treated with the utmost confidentiality it deserves. Your cooperation in this matter is greatly appreciated. For further information you can contact me on 0773 277 894 or email me at lmatsiwira@gmail.com.

Thank you for devoting your precious time and effort in making this academic research a success.

Yours Sincerely

Last Matsiwira (C19140307E)

Interview guide ONE: For Artisanal and Small-Scale Gold Mine Owners

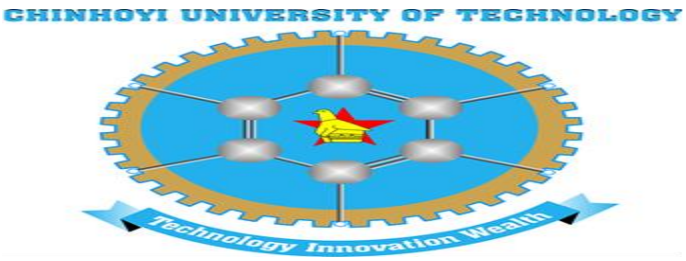
1. What are the external sources of funding available to your organisation?
2. What are the internal sources of funding available to your organisation?
3. Of the funding models available to your organization which ones do prefer?
4. What is the reason for using the funding models that are currently in use at your organization?

5. Which funding models are useful to ASSGM sector of Zimbabwe?
6. Do you maintain books of finance in your organisation? If yes please list them.
7. What have been the major challenges you have encountered in accessing funding from financial institutions (banks)?
8. Do you have all paper work that banks require when giving out loans?
9. Can we attribute the lack of funding from banks to ASSGM to lack of collateral or the sector is still new to Banks?
10. Does lack of technical and financial skills affect your ability to acquire funding from financial institutions?
11. Other than institutional and formalisation challenges, what are other factors that affect funding to ASSGM sector.
12. What needs to be done by artisanal and small-scale gold mines to improve funding to their sector?
13. Why others are not accessing funding from the Government and RBZ.
14. Other than funding by cash and equipment, what other forms of assistance are you receiving from Government?
15. What do you think the Government should do to improve funding to ASSGM from different lenders?
16. Apart from banks and Government and its agencies requirements, what other lenders require for you to qualify for their funding.
17. What is affecting formalisation of ASSGM?
18. What needs to be done to encourage formalisation of the ASSGM sector?
19. What causes ASSGM remain small despite others operating for a long period of time?
20. What should be done to encourage growth of ASSGMs?
21. Are there Loans specifically for small scale firms, if yes why do you not qualify?

END OF INTERVIEW GUIDE

THANK YOU

Appendix 6 Interview Guide



Interview guide ONE: For Ministry of Mines Officials

22. What are the external sources of funding available to artisanal and small-scale gold miners?
23. What are the internal sources of funding available to artisanal and small-scale gold miners?
24. What are the reasons for using the funding models that are currently being used by artisanal and small-scale gold miners?
25. Which funding models are useful to ASSGM sector of Zimbabwe?
26. What do you think are the major challenges that the artisanal and small-scale gold miners are facing in accessing funding from financial institutions (banks)?
27. Can we attribute the lack of funding from banks to ASSGM to lack of collateral or the sector is still new to Banks?
28. Does lack of technical and financial skills affect artisanal and small-scale gold miners to acquire funding from financial institutions?
29. Other than institutional and formalisation challenges, what are other factors that affect funding to ASSGM sector.
30. What needs to be done by artisanal and small-scale gold mines to improve funding to their sector?
31. Why other artisanal and small-scale gold miners are not accessing funding from the Government and RBZ.
32. Other than funding by cash and equipment, what other forms of assistance do artisanal and small-scale gold miners receive from Government?
33. What do you think the Government should do to improve funding to ASSGM from different lenders?
34. Apart from banks and Government and its agencies requirements, what other lenders require for artisanal and small-scale gold miners to qualify for their funding.
35. What is affecting formalisation of ASSGM?
36. What needs to be done to encourage formalisation of the ASSGM sector?
37. What causes ASSGM remain small despite others operating for a long period of time?

38. What should be done to encourage growth of ASSGMs?

39. Are there Loans specifically for small scale firms, if yes why do you not qualify?

END OF INTERVIEW GUIDE

THANK YOU

Appendix 7 Key Institutional Factors Institutional Factors Abbreviations

FS	Financial Skills
FDVP	Financial Data for Valuation Purposes
BF	Books of Finance

K of B	Knowledge by other ASSGM owners on the availability of Banks
ES	Entrepreneurship Skills
MS	Mining Skills
SM	Size of the Mine
GO	Gold Output to FPR
ME	Mining Equipment
MMS	Mining Management Skills
GS	Stage of Growth Cycle of ASSMG in the Growth Cycle
GW	Goodwill of the Company
SO	Small Output
SPG	Small Profits Generated
IP	Inaccessibility of ASSGM Premises
BP	Business Plane
DMP	There are clearly Defined and Measurable Performance standards from banks which ASSGM sector do not meet to be given loans.
OSMA	Banks have an Organized System for Monitoring Assets of the company and its ability to pay back the loan
EP	Other than collateral, banks also consider Economic Potential of the business before giving out loans
DDR	Failure of ASSGM to meet Due Diligence Requirements affects their ability to access loans
FP	Financial Institutions do not have Financial Products that meet specific ASSGM needs

Appendix 8 Key Funding Models Abbreviations

P S	Personal Savings
S of A	Sell of an Asset
OC	Owner Capita
PBP	Plough Back Profit
FF	Family and Friends

PP	Partnership
LRB	Loans from Reginal Banks
LIB	Loans from International Banks
JV	Joint Venture
HP	Hire Purchase
Gvt	Government
VC	Venture Capital
BA	Business Angels
LLB	Loans from Local Banks

Appendix 9 Descriptive Statistics

Principal Component Analysis. Institutional Factors

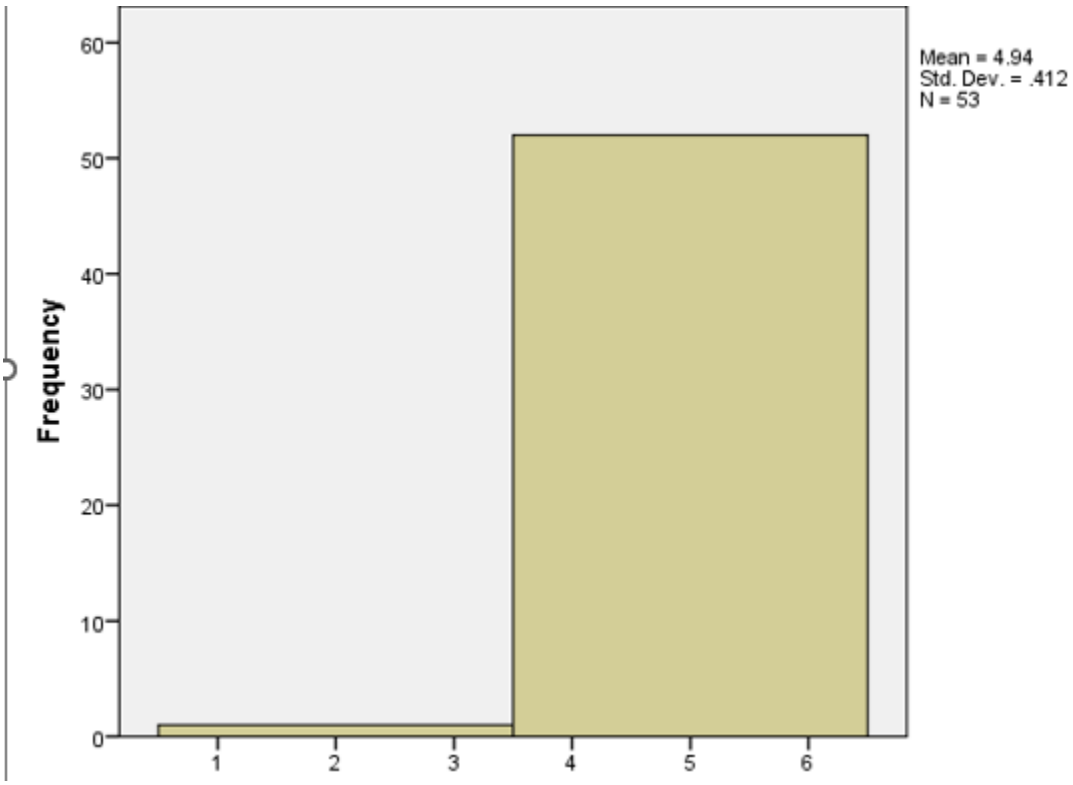
	Component

	1	2	3	4	5	6	7	8
FS	-.067	.316	.163	.043	-.116	.452	.534	-.296
FDVP	.155	.480	-.264	.182	-.108	-.014	-.507	-.113
BF	.068	.286	.202	.156	.561	.206	-.036	.295
K of B	.069	.444	.094	.403	-.119	.213	.057	-.232
ES	.101	.132	-.201	.095	.206	.602	-.061	.547
MS	.164	.337	.630	.001	.396	-.006	-.079	-.270
SM	-.046	.410	-.454	.287	-.372	-.198	.163	.298
GO	-.025	.378	-.262	.097	.468	-.293	.055	-.080
ME	-.036	.324	.493	.319	-.485	.002	-.009	.112
MMS	.037	.473	.300	.465	-.008	-.267	-.019	.237
GS	-.015	.379	-.119	-.365	.080	-.159	.568	.176
GW	-.005	.449	-.273	-.334	-.072	.427	-.267	-.145
SO	.049	.340	.330	-.532	-.059	-.275	-.204	.231
SPG	.048	.421	.286	-.579	-.272	.094	-.036	.177
IP	-.009	.505	-.223	-.020	.220	-.221	.103	-.071
BP	.003	.592	-.309	-.157	-.035	-.030	-.065	-.296
MPS	.770	-.024	.051	.022	-.040	-.018	-.013	-.053
OSMA	.989	-.040	-.037	-.008	-.020	-.011	.043	.003
EP	.989	-.040	-.037	-.008	-.020	-.011	.043	.003

DDR	.989	-.040	-.037	-.008	-.020	-.011	.043	.003
FP	.989	-.040	-.037	-.008	-.020	-.011	.043	.003

Key See Appendix 6 for Abbreviations of Components

Histogram for Normality Tests



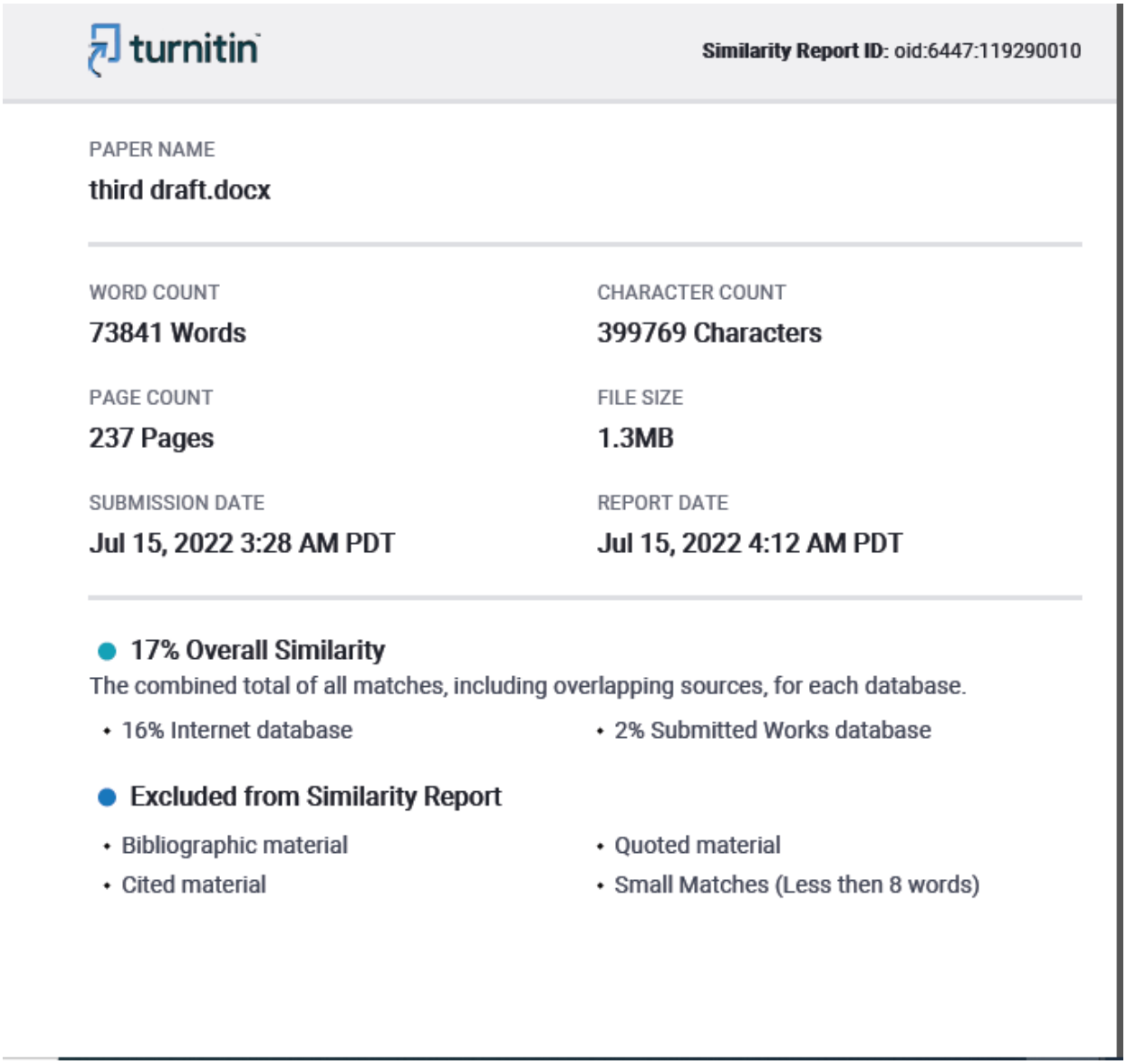
Principal Component Analysis Funding Models

	Initial

q7Personal Savings	**1.000**
q7Sale of an Asset	**1.000**
q7Owner Capital	**1.000**
q7Plough Back Profit	**1.000**
q7Family and Friends	**1.000**

Extraction Method:

Appendix 10: Plagiarism Report



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Appendix 11: Publications

1. Matsiwira, L., Mabvure, T. J., & Sifile. O. (2021). Financing the artisanal and small-scale goldmining sector of Zimbabwe: A Review of Options. *International Journal of Economics, Commerce and Management.* Vol. IX, Issue 11, Nov 2021.

2. Matsiwira, L., Mabvure, T. J., & Sifile. O. (2021). The nexus between financial skills and funding models that lead to optimum gold production for Artisanal and Small-Scale Gold Miners (ASSGM) in Zimbabwe. *International Journal of Economics, Commerce and Management***.** Vol. X, Issue 6, June 2022