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FREE STATE PROVINCE

Opportunities and challenges in Small-scale Mining (SSM) in Free State Province



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1. Introduction

Mining as a key catalyst in economic development has played an important historical role in the development of South Africa and also contributed to the development of the economy of the Free State province. Historically, the labour absorption rate of the mining has been fairly high which made mines one of the biggest employers in the province. The contribution of mining to the provincial economy has significantly changed, due to the downscaling of mining activities in province. This downscaling resulted in looking at other ways to prolong the life of existing mines. One of such approaches is to look at small-scale mining (SSM).

In many parts of the world, artisanal or small-scale mining (ASM) activities are at least as important as large-scale mining activities, particularly in terms of the numbers of people employed. ASM can play a crucial role in poverty alleviation and rural development, taking into account the government's approach to alleviate poverty and to take developments to rural areas. ASM activities also provide an important source of livelihood for women. However, this sector experienced various challenges as highlighted in this report, i.e. the high environmental costs and poor health and safety record. Literature also indicates that many role-players in the industry continue to view it as dirty, unprofitable and fundamentally unsustainable.

Artisanal and small-scale miners are active in a range of commodities, depending largely on the availability of deposits, ease of mining, processing, and extraction, and access to markets. Gold, diamonds, coal, and construction materials (e.g. sand, clay, sandstone, slate, granite) are more commonly mined in the Free State province. Due to the nature of ASM, the methods are limited to open pit and primitive underground excavations. The level of beneficiation depends on the commodity, and with the exception of construction material, is limited. In the case of construction materials, finished products (e.g. bricks) are often produced by ASM entrepreneurs.

One is thus of the opinion, in light of the above, that small-scale mining activities will continue to remain, especially after the withdrawal of the "big" mining operators such as Anglo American, Harmony, De Beers and others. It is therefore essential to look at the status quo of small-scale mining in South Africa and specifically at the current situation of small-scale mining in the Free State province.

This paper as a result deals with the status quo of small-scale mining and the challenges and opportunities in this sub-sector. It is divided into nine sections. Section one is introduction; section two deals with the background to the research project; section three with the research objectives and research question; section four with research methodology and limitations to the study; section five with the contribution of mining to the economy of South Africa; section six with the contribution of mining to the provincial economy; section seven with the key features of artisanal and small-scale mining and section eight with the challenges facing this sub-sector and section nine the opportunities & support structures of ASM. The Report concludes with the key findings of this study and proposing a way forward for the Free State in engaging in the artisanal and small-scale mining sector.

2. Background

In the advent of democracy, the new government identified a “new” form of mining which had the potential to redress some of the legacies left by the apartheid regime. Before 1994, people of colour, women, junior and small-scale mining enterprises were excluded from participating in the minerals and mining economy. To address this challenge, government identified Artisanal and Small-Scale Mining (ASM) as a vehicle for social and economic development, particularly for disadvantaged communities that were excluded from participating in the national mining economy. ASM offered alternative economic opportunities for the majority that reside in rural parts of the country in severe poverty. It was in 1994, following the change in government that the ASM sub-sector was formally recognised in South Africa.¹

The small-scale mining (SSM) sector in South Africa thus has accelerated since democracy as the mining sector opened up to more people. It has become an opportunity for livelihood strategies in ways that were not possible in the past. This has led to the development of the sector in new ways. The growth of what is often referred to as “informal” artisanal mining activities has grown. In addition more women and youth are involved or aspire to participate in the sector as small-scale operators. These developments have resulted in looking at the status quo of the SSM sector as a catalyst for changing the local economic landscape.

The Department of Mineral Resources (DMR) refers to ASM sector collectively as “small-scale mining”, hence the use of the term ASM in this report. 'Artisanal' refers to unorganized mining activity that does not make use of sophisticated machinery, whereas 'small-scale' is used in the context of organized miners that may not necessarily use sophisticated machinery, but have a higher revenue turnover. DMR defines the following sub-categories:

- Artisanal or subsistence mining operations (new entrants);
- Sub-optimal formal mining operations; and
- Entrepreneurs with upfront capital.²

ASM plays a fundamental role in the national and local economies of resource-rich countries in Africa, in South Africa and in the Free State Province. As such, more effort must be geared towards fostering this type of economic activity to sustain livelihoods in rural communities.

ASM is one of the major contributors to national income and is a recognized pillar for poverty reduction in the mineral economies of the developing south. As an economic activity it has the potential to contribute to sustainable development while successfully aiding the development of rural communities. However, despite this recognized potential, ASM activities remain largely informal, with many attempts at

¹ Ledwaba, P., and Nhlengetwa, K., When policy is not enough: Prospects and Challenges of Artisanal and Small-scale Mining in South Africa, *AFE Babalola University: J. of Sust. Dev. Law & Policy* Vol. 7: 1: 2015) p26

² Department of Minerals and Resources, website: www.dmr.gov.za/small-scale-mining.html.

formalisation or regulation being sub-optimal. ASM, as a niche sub-sector of the mining industry, despite the importance thereof continues to face challenges.³

In many developing countries, ASM is largely a poverty-driven activity which plays an important economic role. It is estimated that in the order of 13 million people in about 30 countries are directly engaged in small-scale mining, a significant proportion of which are women and children. A further 80 to 100 million people across the developing world could depend on small-scale mining for some aspects of their livelihoods.⁴

South Africa, which is a global mining powerhouse, has put in place policies to safeguard the interests of artisanal and small-scale miners, such as the Mineral and Petroleum Resources Development Act (MPRDA), Act 28 of 2002. Other policies in this regard are also referred to in *Annexure 2, Legislative framework for small-scale mining*. However, (according to literature) pertinent issues such as lack of a common definition of ASM; being unable to distinguish and categorize the different types and levels of artisanal and small-scale miners; the high standards or benchmarks for environmental and social regulations; and other geo-political dynamics, also make tailored solutions to ASM difficult.

ASM may have a tremendous impact on the economy of the Free State if small-scale mining entrepreneurs are fully supported to actively engage in opportunities that are currently exist in the areas where the big mining houses has close down or down-scale on their mining operations. Literature in this regard has revealed opportunities in Lejweleputswa, in towns like Welkom, Virginia, Odendaalsrus and in Xhariep (towns like Koffiefontein and Jagersfontein). The Thabo Mofutsanyana District is well-known for the mining of sandstone.

The impact that ASM had on the local economies in Africa which is acknowledged as a catalyst for economic growth supports the above statement. In Tanzania for example, ASM workers earn ten times more than farmers, and incomes from ASM are invested in shops, taxis, bars, building guesthouses, and farming.⁵ This sub-sector in this regard presents an opportunity as an alternative source of livelihood for rural dwellers and for local economic development. However much needs to be done to help address the challenge of mitigating the negative effects of ASM and maximizing its potential benefits.

One is thus of the opinion that this sector has the potential to enormously contribute to sustainable development. ASM role in local economies needs to be strengthened to maximise its impact on the livelihood of the local communities. It is therefore essential to maximize the benefits brought and enabled by small-scale mining. This

³ Debrah, A.A., Watson, I., and Quansah, D.P.O., 2014. Comparison between artisanal and small-scale mining in Ghana and South Africa: lessons learnt and ways forward, *Journal of the Southern African Inst. Min. Metall.* vol.114 n.11 Johannesburg Nov. 2014

⁴ Hentschel, T., Hruschka, F., and Priester, M., 2003. *Artisanal and Small-scale Mining - Challenges and Opportunities. Projekt-Consult GmbH, London, 2003*

⁵ Debrah, A.A., Watson, I., and Quansah, D.P.O., 2014. Comparison between artisanal and small-scale mining in Ghana and South Africa: lessons learnt and ways forward, *Journal of the Southern African Inst. Min. Metall.* vol.114 n.11 Johannesburg Nov. 2014

paper therefore, will focus on the importance and opportunities of ASM, in terms of the economic, social, environmental, and legal aspects.

3. Project Objectives and the Research Question

The main objective of the study is to establish the status quo of small-scale mining (SSM) in South Africa, with specific reference to Free State province.

The research question which this research seeks to find answers to is:

What is the status quo of small-scale mining (SSM) in South Africa and specifically in the Free State Province.

Key areas for research, which derived from the main research question, are clustered around several questions, namely:

- The contribution of the mining sector towards the economy of the Free State
- What structures are in place to support small-scale mining
- Challenges facing small-scale mining entrepreneurs
- Prospects and opportunities for a sustainable small-scale mining sub-sector

Finding answers to the above questions in this research will be very beneficial in helping to understand the contribution of small-scale mining and how to address the challenges facing small-scale mining operators.

4. Research methodology and the limitations of the study

The study is to apply a qualitative method by using data from existing literature to establish the status quo of small-scale mining in the province. No questionnaires and/or interviews for this project were undertaken.

The limitations of this study are that only secondary data sources have been used. Support structures to gather primary data is still to be formalised and developed, i.e. internally as well as the forming of partnerships with research stakeholders. It is also important to mention that data released by Statistics SA on mining activities, i.e. volume in production, are only available on a national level and not to the level of the provinces.

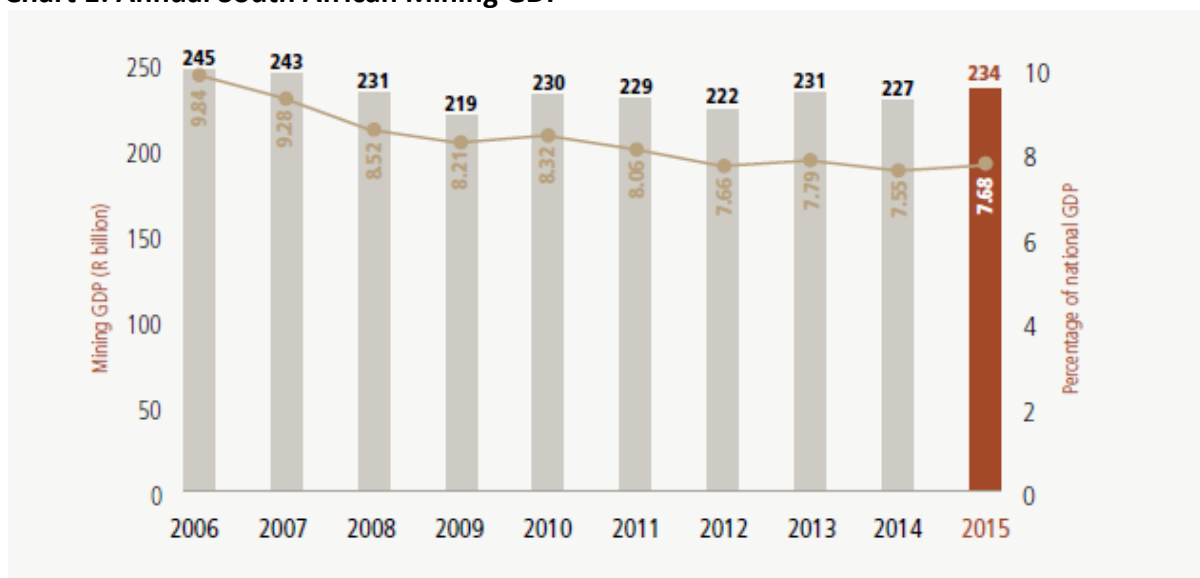
Research on ASM in South Africa is limited and has not been used to substantiate, with science-based evidence, the contribution of ASM to socio-economic indicators (i.e. national GDP, country's mineral production, local economies, local employment, rural development, etc.). A detailed study conducted by the Minerals and Energy Policy Centre (MEPC) in October 1998 is one of the few available pieces of research. This evidence followed the release of the Green Paper on Minerals and Mining Policy in February 1998.

5. Mining's contribution to South Africa's GDP

The South African mining sector faced significant challenges in 2015, but despite this, the industry has remained resilient and is still one of the driving forces in the economy. The sector maintained its share of 7.7% of national Gross Domestic Product (GDP) in 2015 compared to 2014. This does not mean it has emerged from 2015 unscathed. Given increasing costs, labour unrest and low commodity prices, many mines struggled to remain profitable. In particular, as many as 80% of South African platinum mines operated at a loss at some point during the year.⁶

South African Mining GDP in 2015 was R234 billion as depicted in chart 1 below. This represents an increase of R7 billion if compared to the R227 billion in 2014 (*chart 1*) which is very encouraging. However, the decrease of R11 billion in the GDP from R245 billion in 2006 to R234 billion in 2015 is not good news for the national economy, as well as the provincial economy.

Chart 1: Annual South African Mining GDP



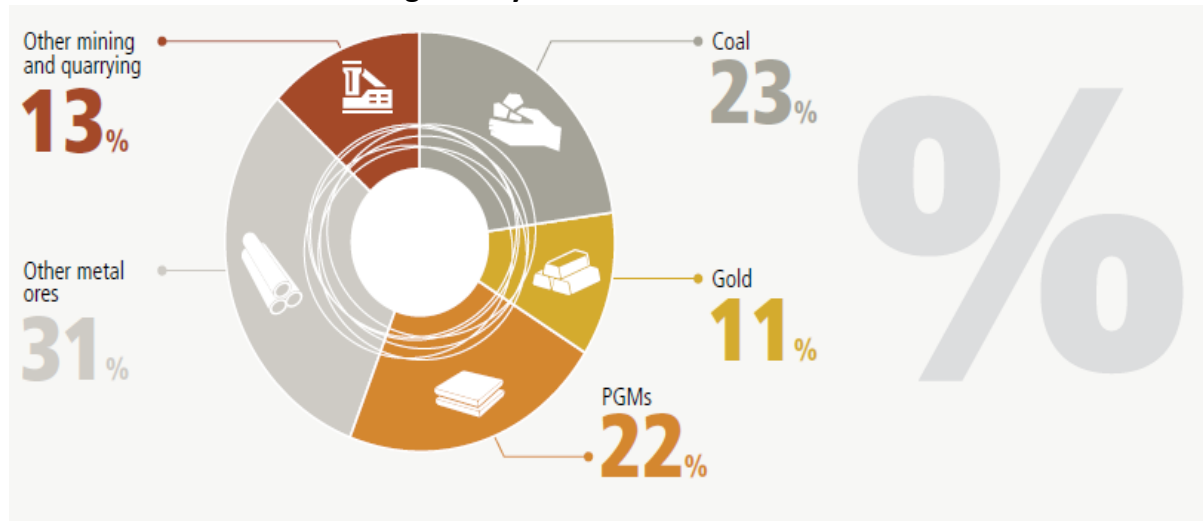
Source: Chamber of Mines of South Africa – Integrated Annual Review 2015

The largest contributors, as per *chart 2* below, to total mining GDP remained the coal, Platinum group metals (PGM) and gold sectors, which contributed 23%, 22% and 11% respectively. Both the coal and gold sectors conducted wage negotiations in 2015 and were able to avoid significant impacts on production. The gold sector successfully reached agreement without a strike, while the coal sector incurred a one-week strike, which had a minimal impact on production.⁷

⁶ Chamber of Mines of South Africa – Integrated Annual Review 2015

⁷ Ibid

Chart 2: Contribution to mining GDP by sector – 2015

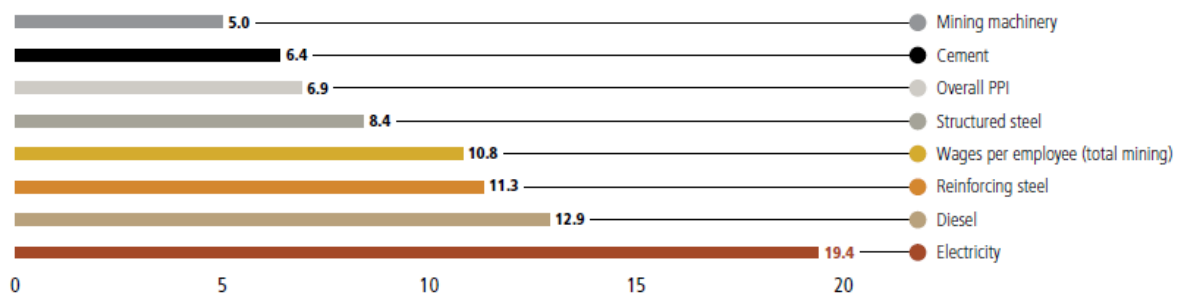


Source: Chamber of Mines of South Africa – Integrated Annual Review 2015

The Chamber of Mines in their Integrated Annual Review report revealed that in terms of costs the industry incurs, coal and gold will see increased labour costs in the coming years, but recent wage deals have taken into account the struggles facing the industry and it is likely that the job losses seen in the platinum industry following the 2014 platinum strike will be avoided. Lower diesel costs in 2015 presented a reprieve to the industry, with diesel prices reaching levels last seen in 2012.

What is evident in *chart 3 below* is the increase in the key cost drivers in the mining industry. It is reported that steel prices tumbled during the year, but the largest cost drivers in the mining industry, labour and electricity, both increased. The cost of electricity in particular rose on the implementation of a 12.69% tariff increase. Overall electricity prices in South Africa increased by 19.4% on average annually for the period from between 2008 to 2014.⁸

Chart 3: Key cost drivers - Average annual rate of increase in costs for 2008-2014 (%)

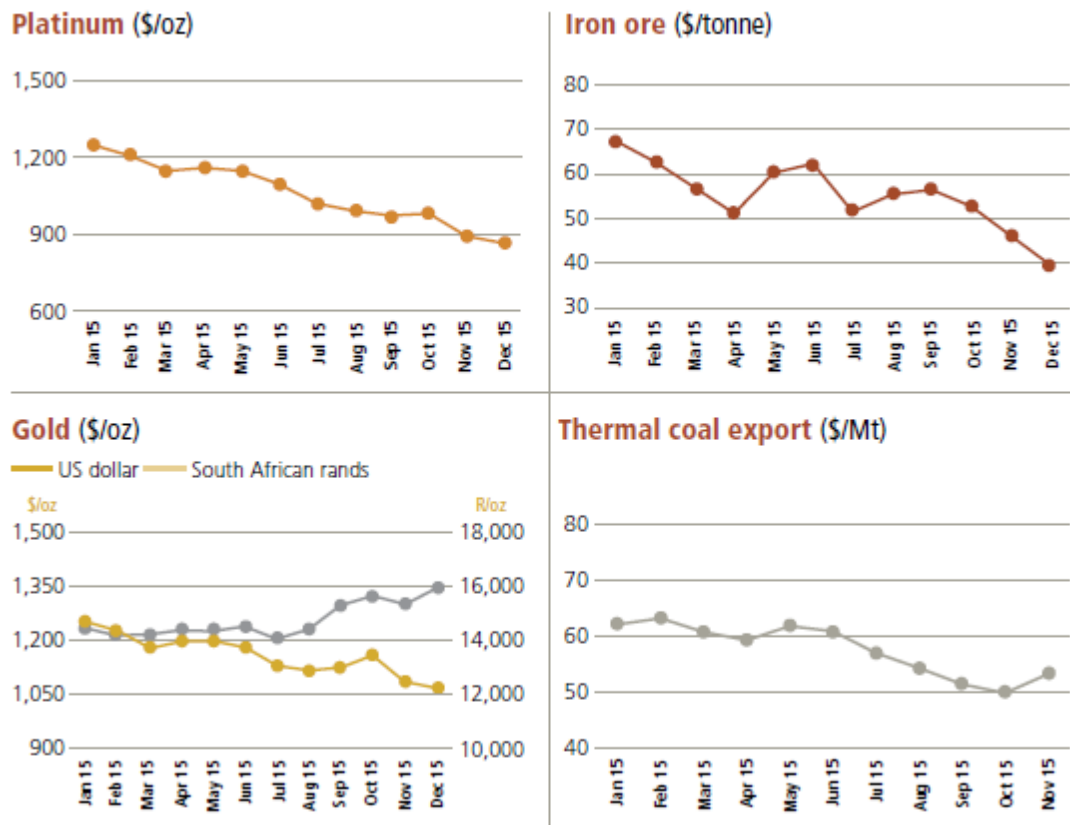


Source: Chamber of Mines of South Africa – Integrated Annual Review 2015

⁸ Chamber of Mines of South Africa – Integrated Annual Review 2015

The report from the Chamber of Mines also revealed that the market did not help ease the pressure placed on the mining industry, because mining commodity prices tumbled throughout 2015 as per *chart 4* below.

Chart 4: Global commodity prices (January – December 2015)



Source: Chamber of Mines of South Africa – Integrated Annual Review 2015

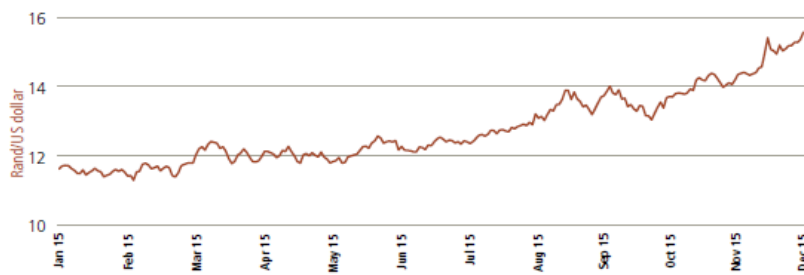
The changes in the global commodity prices can clearly be seen in the chart above, i.e. the average monthly platinum prices fell from \$1,252 an ounce at the start of 2015 to \$865 an ounce at year end. Similarly, the average monthly gold price dropped from \$1,252 an ounce to \$1,068 an ounce by year end. The price of iron ore decreased from \$67.39 per tonne to \$39.60 per tonne and the South African thermal coal export price decreased from \$62.18 per metric tonne to \$49.98 per metric tonne.⁹

These declines in commodity prices were somewhat offset by the weakening of the rand in terms of the US dollar. While the rand weakened steadily from May 2015, this weakening gained momentum from August as per *chart 5* below. The weaker rand meant that gold, for example, saw its monthly average price increase in terms of rands over the year from R14,489 to R15,951 an ounce, providing a positive platform for the start of 2016. Other commodities did not benefit to the same extent but the weaker rand: dollar exchange rate did at least mitigate some of the commodity price depreciation in 2015.

⁹ Chamber of Mines of South Africa – Integrated Annual Review 2015

Chart 5:

Rand/US dollar exchange rate



A sharp weakening of the rand towards the end of 2015 benefited dollar-denominated commodities.

Source: South African Reserve Bank



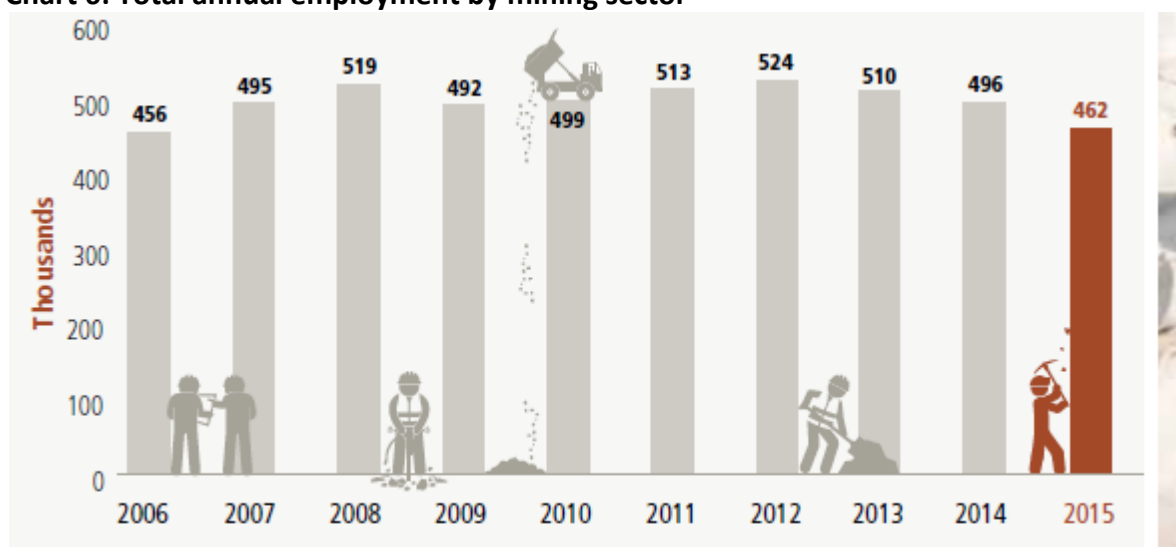
Source: Chamber of Mines of South Africa – Integrated Annual Review 2015

When looking at employment, despite above-mentioned factors, mining has continued to be a strong provider of employment in South Africa. The mining industry employed 462,000 individuals in 2015 as per *chart 6* below. Although this is a decrease of 6.85% from 496,000 in 2014, the industry has done its best to minimise job losses. The volatility in employment in this sector can clearly be seen in *chart 6* where the employment was the highest in 2012 (524 000) and 2008 (519 000) with the lowest levels in 2006 (456 000) and 2015 (462 000).

The industry signed what was termed the “jobs pact” in August as part of a commitment to the sustainability of the industry and avoiding job losses.

Unfortunately, not all job losses could be avoided, but voluntary packages were used as much as possible to mitigate the effect of retrenchments.¹⁰

Chart 6: Total annual employment by mining sector



Source: Chamber of Mines of South Africa – Integrated Annual Review 2015

6. Mining’s contribution towards the Free State’s economy

6.1 Gross Value Added (GVA) by the mining sector

The Free State Province's economy is made up of various industries as per *table 1*. The GVA-R variable provides a sector break-down, where each sector is measured in terms of its value addition in the local economy. The mining sector is but one of nine sectors that are contributing to the GVA of the province.

The summary as per *table 1* below puts the Gross Value Added (GVA) of National in relation to that of the Free State Province in 2015 in current prices.

Table 1: GVA by Broad Economic Sector - Free State, 2015 [R Billions, Current Prices]

Sector	Free State	National Total	Free State as % of national
Agriculture	8.4	85.1	9.8%
Mining	20.4	286.0	7.1%
Manufacturing	17.6	474.5	3.7%
Electricity	7.3	131.6	5.6%
Construction	4.9	145.3	3.3%
Trade	25.5	539.0	4.7%
Transport	18.6	368.0	5.1%

¹⁰ Chamber of Mines of South Africa – Integrated Annual Review 2015

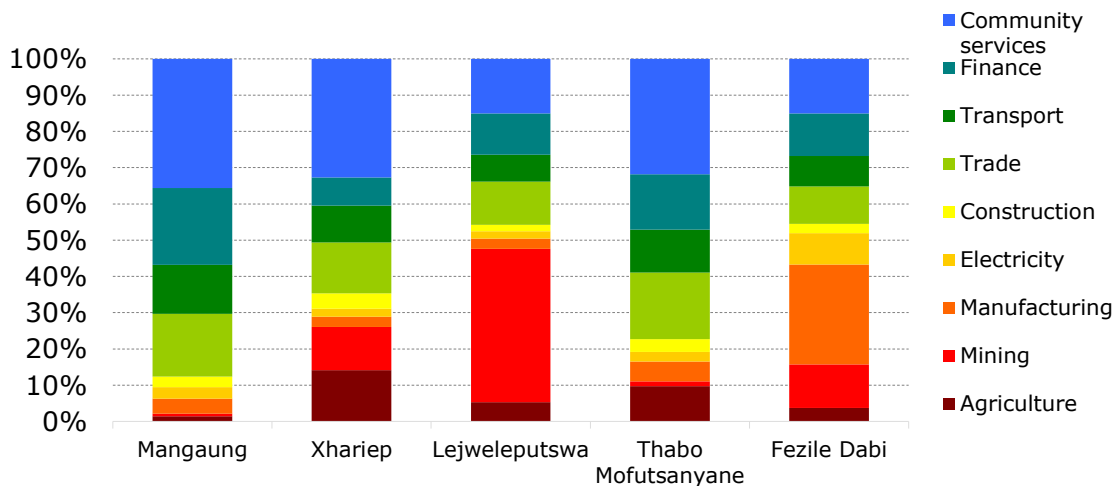
Finance	26.8	739.1	3.6%
Community services	45.1	821.2	5.5%
Total Industries	174.6	3,589.8	4.9%

Source: IHS Global Insight Regional eXplorer version 1046

In 2015, the community services sector is the largest within Free State Province accounting for R 45.1 billion or 25.8% of the total GVA in the province's economy. The sector that contributes the least to the economy of Free State Province is the construction sector with a contribution of R 4.87 billion or 2.79% of the total GVA.¹¹ The mining sector ranked 4th with its contribution of R20.4 billion or 11.68% to the GVA of the Free State Province.

When looking at the regions within Free State Province it is clear the mining sector within the Lejweleputswa District municipality contributed the highest (42.3%)¹² towards the GVA of the district, as well as the highest if compared to the contribution of the mining sectors in the metro and the four district municipalities (see *chart 7* below). ASM in Free State if successfully managed and supported by all stakeholders in the industry may increase the contribution of the mining sector in Lejweleputswa, as well as in the others district municipalities.

Chart 7: Gross Value Added (GVA) by broad economic sector – metro & District Municipalities of Free State Province, 2015 [Percentage Composition]



Source: IHS Global Insight Regional eXplorer version 1046

6.2 Economic Performance of the mining sector

The GVA in the construction sector, between 2005 and 2015, had the highest average annual growth rate in Free State at 4.31% as per *table 2* below. The

¹¹ Global Insight Regional eXplorer version1046, p. 19

¹² IHS Global Insight Regional eXplorer version1029, see also Annexure 1

electricity sector had an average annual growth rate of 0.08%, while the mining sector had the lowest average annual growth of -0.94%.¹³

Mining furthermore recorded a contribution of R20.2 billion (constant prices) in 2015 compared to the R22.2 billion in 2005. Thus, the mining sector's contribution towards the provincial economy has decreased over the last ten years with R2 billion.¹⁴

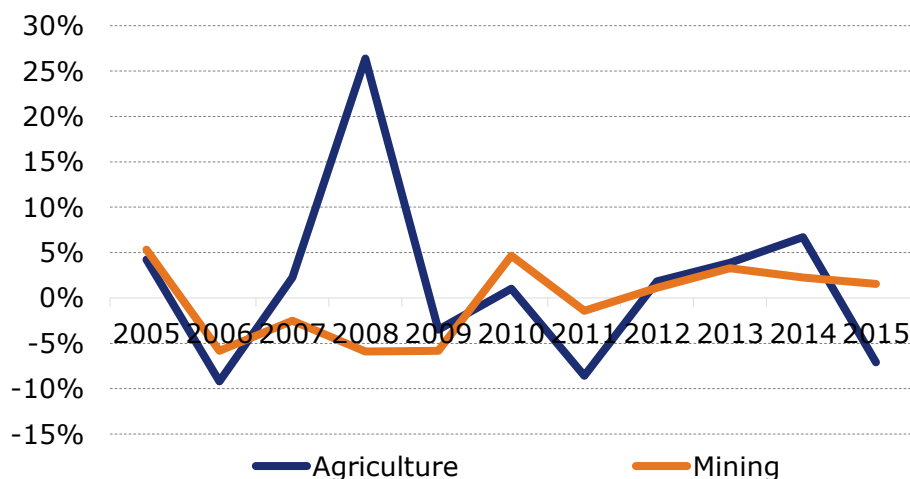
Table 2: Gross Value Added (GVA) by Broad Economic Sector - Free State Province, 2005, 2010 and 2015 [R billions, 2010 Constant Prices]

	2005	2010	2015	Average Annual growth
Agriculture	5.8	6.7	6.4	0.92%
Mining	22.2	18.9	20.2	-0.94%
Manufacturing	13.1	14.6	15.3	1.53%
Electricity	4.5	4.5	4.5	0.08%
Construction	2.7	3.8	4.2	4.31%
Trade	20.1	22.6	26.0	2.58%
Transport	10.1	11.6	12.6	2.24%
Finance	17.0	20.5	22.5	2.85%
Community services	26.0	30.5	34.3	2.80%
Total Industries	121.6	133.6	145.9	1.84%

Source: IHS Global Insight Regional eXplorer version 1046

It is evident that the performance of the mining sector is declining for the past ten years. *Chart 8* below represents the average growth rate in the GVA for the primary sector (which consist of agriculture and mining) in Free State Province from 2005 to 2015.

Chart 8: Gross Value Added (GVA) by primary sector - Free State, 2005-2015 [Annual percentage change]



Source: IHS Global Insight Regional eXplorer version 1046

¹³ IHS Global Insight Regional eXplorer version 1046, p21

¹⁴ IHS Global Insight Regional eXplorer version 1029, p.21

Between 2005 and 2015, the agriculture sector experienced the highest positive growth in 2008 with an average growth rate of 26.4%. The mining sector reached its highest point of growth of 5.3% in 2005. The agricultural sector experienced the lowest growth for the period during 2006 at -9.2%, while the mining sector reaching its lowest point of growth in 2008 at -5.9%. Both the agriculture and mining sectors are generally characterised by volatility in growth over the period.

6.3 Economic growth forecast of the mining sector

It is expected that Free State Province's GDP will grow at an average annual rate of 0.77% from 2015 to 2020 as per *chart 9* below. South Africa as a whole is forecasted to grow at an average annual growth rate of 1.61%, which is higher than that of the Free State Province. In 2020, Free State's forecasted GDP will be an estimated R 167 billion (constant 2010 prices) or 5.1% of the total GDP of South Africa.¹⁵

Looking at the *gross value added (GVA) by broad economic sector*, it is expected that mining as per *table 3 below* is to grow at an average -0.06% annually, which is not very promising. It is thus important that all role-players in this industry have to support the growth and development of ASM in an effort to increase the contribution of the mining sector.

Table 3: Gross value added (GVA) by broad economic sector - Free State Province, 2015-2020 [R billions, constant 2010 prices]

	2015	2016	2017	2018	2019	2020	Average Annual Growth
Agriculture	6.4	5.9	6.0	6.0	6.0	6.2	-0.77%
Mining	20.2	19.3	19.8	20.0	20.2	20.2	-0.06%
Manufacturing	15.3	15.5	15.5	15.7	15.8	16.1	0.98%
Electricity	4.5	4.4	4.4	4.5	4.6	4.7	0.86%
Construction	4.2	4.1	4.1	4.1	4.1	4.1	-0.29%
Trade	26.0	25.8	25.7	26.0	26.2	26.7	0.53%
Transport	12.6	12.5	12.5	12.8	13.0	13.4	1.27%
Finance	22.5	22.6	22.7	23.1	23.6	24.2	1.50%
Community Services	34.3	34.8	34.7	34.8	35.3	36.1	1.01%
Total Industries	145.9	145.0	145.4	146.9	148.9	151.5	0.76%

Source: IHS Global Insight Regional eXplorer version 1046

¹⁵ IHS Global Insight Regional eXplorer version 1046, p18

The finance sector is expected to grow fastest at an average of 1.50% annually from R 22.5 billion in Free State Province to R 24.2 billion in 2020. The community services sector is estimated to be the largest sector within the Free State Province in 2020, with a total share of 23.8% of the total GVA (as measured in current prices), growing at an average annual rate of 1.0%. The sector that is estimated to grow the slowest is the agriculture sector with an average annual growth rate of -0.77%.¹⁶

It is furthermore expected that the Primary sector is to grow at an average annual rate of -0.23% between 2015 and 2020. The Secondary sector is to grow at 0.74% on average annually, whilst the Tertiary sector is expected to grow at an average annual rate of 1.03% for the same period.

ASM inclusion has the potential to shape and affect the district and provincial economies directly and indirectly. It furthermore has the potential to bring employment, revenue for the local and district municipalities and opportunities for economic growth and diversification.

7. Key features of Artisanal and Small-Scale Mining

7.1 Definition of Artisanal and Small-Scale Mining (ASM)

The small-scale mining (SSM) sector is very difficult to classify and categorise. One of the key issues with regard to this is the definition of small-scale mining and the kinds of activities that one associates with sector. Mutemeri et al. in their report, *Status of SSM in South Africa, August 2010 indicated that “the SSM sector is deemed to include all mineral-related activities of small organisations”*.¹⁷ The definition of small organisation, according to Mutemeri et al. is as described in National Small Business Act, 1996, i.e. for mining and quarrying less than 50 employees, a turnover of less than R7.5 million and gross asset value of less than R4.5 million. Categorisation is complicated by the fact that some operations in the SSM sector may have a very low turnover and asset value which to all intents and purposes should be classified as a small organisation, but employ more than 50 unskilled people which is the cut-off number of employees in a small organisation. The opposite, according to Mutemeri et al. is also true where consultancy firms with a high turnover may employ less than 50 people and sometimes as few as 3 or 4 professionals.

Above report stated that it is often more prudent to classify according to requirements of a specific intervention or reason. One of the reasons for classifying the sector is so that interventions can be structured appropriately. One way to

¹⁶ IHS Global Insight Regional eXplorer version 1046, p26

¹⁷ Mutemeri, N., Sellick, N., Mtegha, H., *Status of SSM in South Africa: Report, 26th August 2010*, Mining Qualifications Authority (MQA) - Centre for Sustainability in Mining and Industry (CSMI)

categorise the sector, according to different stakeholders is by level of sophistication of the activity, i.e. whether it is registered and pays taxes and levies, or submits returns as required by relevant laws. Categories for the sector have also been defined based on level of capitalisation, technology applied, mechanisation and formalisation. These differences have to be reflected in strategies to service this sector.¹⁸

The Mineral and Petroleum Resources Development Act (MPRDA), which regulates mining activities in South Africa, does not define SSM but makes provision for a Mining Permit which includes those activities that would generally be accepted as SSM, based on the physical size of an operation (limiting it to 1.5 ha) and the duration of the mining activity (3 years).

A broader definition of ASM, however, includes mining operations with no or low levels of mechanization, undertaken by individuals, families, or groups. The activities are possibly on a subsistence level, and are often seasonal or supplementary to other economic activities, and in many cases are informal (outside of the legal system). Within the South African sector, mining activities range from artisanal mining to small-scale and junior mining and to very large, industrial-scale mining. It is argued here that the MPRDA does not address this full range of activities, with the focus on the SSM being on the small, rather than artisanal, miners. It is understood that the size of the SSM sub-sector has increased since the transition to democracy, with the sub-sector opening up to more people. There is, however, a significant lack of reliable data. It is estimated that there were around 20 000 miners active in the sub-sector, although a more recent report estimates the number to be 10 000, with many of them women. Of these, only an estimated 6000 were operating within the legal framework and mostly on the small-scale mining end of the spectrum.¹⁹

Literature also refers to ASM as informal mining activities carried out using low technology or with minimal machinery. It is estimated that more than 100 million people rely on this sector for income, mainly in developing nations. In some areas ASM takes place alongside large-scale formal mining leading to conflicts.

A common definition for this sector has not been adopted as its legal status, defining criteria, and local definitions vary from country to country. In some countries a distinction is made between 'artisanal mining' that is purely manual and on a very small scale, and 'small-scale mining' that has some mechanization and is on a larger scale. In some West African countries (for example, Mali), small-scale mining is differentiated from artisanal mining by the presence of permanent, fixed installations that are established once an ore body is confirmed.

It is difficult to estimate the extent of ASM due to the lack of a common definition, its use of seasonal and occasional workers, and a lack of official statistics. In 1999 there were a reported 13 million people working directly in ASM globally, with the

¹⁸ Ibid

¹⁹ Mutemeri, N., Sellick, N., Mtegha, H., *Status of SSM in South Africa: Report, 26th August 2010*, Mining Qualifications Authority (MQA) - Centre for Sustainability in Mining and Industry (CSMI)

livelihoods of a further 80-100 million people affected indirectly (p.11).²⁰ A more recent estimate notes that these numbers have likely risen in response to higher gold and commodity prices, and that there are now at least 25 million artisanal miners, with 150-170 million people indirectly reliant on ASM.

The reasons that individuals enter ASM are varied and include both 'push' and 'pull' factors. In Africa, for example, increased participation in ASM has been linked to a decline in the viability of agriculture, or as a way to supplement agricultural income. Other push factors include poverty, conflict, natural disasters, or economic crisis. Pull factors that encourage people to enter this sector include the potential for high profits or gold-rush type situations.²¹

However, what the literature neglects to mention is that, small scale miners are not the ones benefiting mostly from the minerals they mine but the syndicate they sell their minerals to. Furthermore, the fact that there is not a common understanding of what small scale mining is, may be a mammoth concern policy makers because they do not know what they are dealing with.²²

7.2 Characteristics of Artisanal & Small-scale Mining (ASM)

In the absence of a common definition, ASM is often characterized by a number of conditions, namely²³:

- Poor qualification of personnel at all levels of the operation
- Inefficiency in exploitation and processing of mineral production (low recovery value)
- Exploitation of marginal and/or very small deposits, which are not economically exploitable by mechanized mining
- Low level of salaries and income
- Lack of social security
- Chronic lack of working and investment capital
- Minimal machinery or technology used; instead, ASM mining relies on simple techniques and physical labour;
- Operates without legal mining titles (concession, claim) or a valid contract with the title holder;
- Low productivity since ASM often takes place in very small or marginal plots, is limited to surface or alluvial mining, and uses inefficient techniques. (However, total recovery is improved by repetitive scavenging & reprocessing);
- Lack of safety measures, health care or environmental protections;

²⁰ Hentschel, T., et al., Global Report on Artisanal & Small-Scale Mining, 2002, Minerals, Mining and Sustainable Development (MMSD)

²¹ Hruschka, F. And C. Echavama, *Rock-solid Chances: For Responsible Artisanal Mining*, in Series on Responsible ASM, No.3 2011, Alliance for Responsible Mining (ARM)

²² Mkubukeli Z, Tengeh R (2016) Prospects and Challenges for Small-Scale Mining Entrepreneurs in South Africa. *J Entrepren Organiz Manag* 5: 202. doi: 10.4172/2169-026X.1000202)

²³ Hentschel, T., Hruschka, F., and Priester, M., 2003. Artisanal and Small-scale Mining, Challenges and Opportunities, *Projekt-Consult GmbH*, London, 2003

- May be practised seasonally (e.g., to supplement farm incomes) or temporarily in response to high commodity prices; and
- Economic insecurity.

The Mining Qualifications Authority (MQA) uses Standard Industrial Classification Codes (SIC) for classification of the sector. These include 21000 to 29000, 34240, 39212 and 39219. Those small organisations which have been registered are shown in *table 4, Annexure 1, p34*. However, aggregation of some of the SIC codes into subsectors is often done for a better picture in designing interventions to support the sector. The subsectors are:

- Coal Mining
- Gold Mining
- Platinum Group Metals (PGMs) Mining
- Diamond Mining
- Other mining which includes the mining of iron ore, chrome, manganese, copper, phosphates and salt
- Cement, Lime, Aggregates and Sand (CLAS)
- Services Incidental to Mining
- Diamond Processing
- Jewellery Manufacturing

7.3 Formal and informal ASM relationship

ASM is part of the informal sector in many countries, as in the case of Colombia where the mining sector is characterised by widespread informality. A recent census revealed that 72 per cent of all mining operations in Colombia are classed as 'artisanal and small-scale mining' (ASM), and 63 per cent are 'informal', lacking a legal mining concession or title. Large-scale mining (LSM) comprises only one per cent of operations. Over 340,000 Colombians depend directly on ASM and medium-scale mining (MSM) for their income.

This informality deprives the state of important financial resources, while the current poor conditions (environmental, social, health and safety, labour, technical and trading) prevent the sector from delivering on important social objectives, such as generating formal employment and improving quality of life in mining communities.

Industrial and multinational mining companies in Colombia in this regard have started to take some responsibility for formalisation. For instance, member companies of Colombia's large-scale mining sector association (SMGE in Spanish), created the Social Alliance for Formalisation, in which each member company has committed to support the formalisation process of at least one ASM operation within its area of influence. This evolution in LSM/ASM relations has become increasingly important in formalisation strategies.²⁴

²⁴ Echavarría, C., 2014. *What is legal? formalising artisanal and small-scale mining in Colombia*. International Institute for Environment and Development (IIED), London and ARM, Colombia. September 2014

The above-mentioned approach as per the case in Columbia may assist in addressing some of the legal issues that ASM entrepreneurs may experience in South Africa, as well as in the Free State province.

The mine operator must often comply with the legal conditions and this LSM/ASM relationship may assist in addressing the following:

- ✚ Possession of a mining title (concession, claim or similar) or valid contract with concession holder;
- ✚ Compliance with environmental legislation;
- ✚ Possession of an environmental operation licence;
- ✚ Registration of the company at the mining authority or other fiscal authorities;
- ✚ Payment of taxes (royalties, company taxes);
- ✚ Enrolment of staff in the national social security system; and
- ✚ Legal exportation of the products (export licence or tax).

The informal nature of ASM makes it amenable to illegal dealings, especially in high-value minerals such as diamonds, gold and coltan (columbite-tantalite). As an informal activity with weak or non-existent legal protection, artisanal miners are easy victims of organised crime and paramilitary organisations.²⁵

8. Challenges facing Artisanal and Small-scale Mining (ASM)

8.1 Challenges faced by ASM

The multitude of challenges faced by ASM in Africa is well documented in literature. These challenges include inadequate policy and regulatory frameworks; limited technical capacity and access to appropriate technology (and consequent environmental degradation); lack of finance; inadequate access to exploration and mining areas; difficulties in accessing the market; issues associated with conflict minerals; and women and child labour concerns. The opportunity for ASM to be transformed into a tool for sustainable development, particularly in rural areas, can thus be realised only if these challenges are considered holistically.²⁶

Challenges facing small scale mining entrepreneurs in South African and those outside SA are no different to one another. However, a common challenge is whether they participate in the economy or not. It is believed that most small-scale mining entrepreneurs are operating informally and illegally. In some instances, they tend to operate in abundant mining sites. As a result of this, small scale mining entrepreneurs lack effective participation in the mainstream economy partly due to the wide-ranging challenges they face. On a different note, Mutemeri et al. contend that small-scale mining entrepreneurs are growing in numbers and young men and women entrepreneurs are being drawn into small-scale mining all over the world.

²⁵ Love, J., Report of the SAHRC Investigative Hearing - *Issues and Challenges in relation to Unregulated Artisanal Underground and Surface Mining Activities in South Africa*, July 2015. p25

²⁶ Love, J., Report of the SAHRC Investigative Hearing - *Issues and Challenges in relation to Unregulated Artisanal Underground and Surface Mining Activities in South Africa*, July 2015. p24

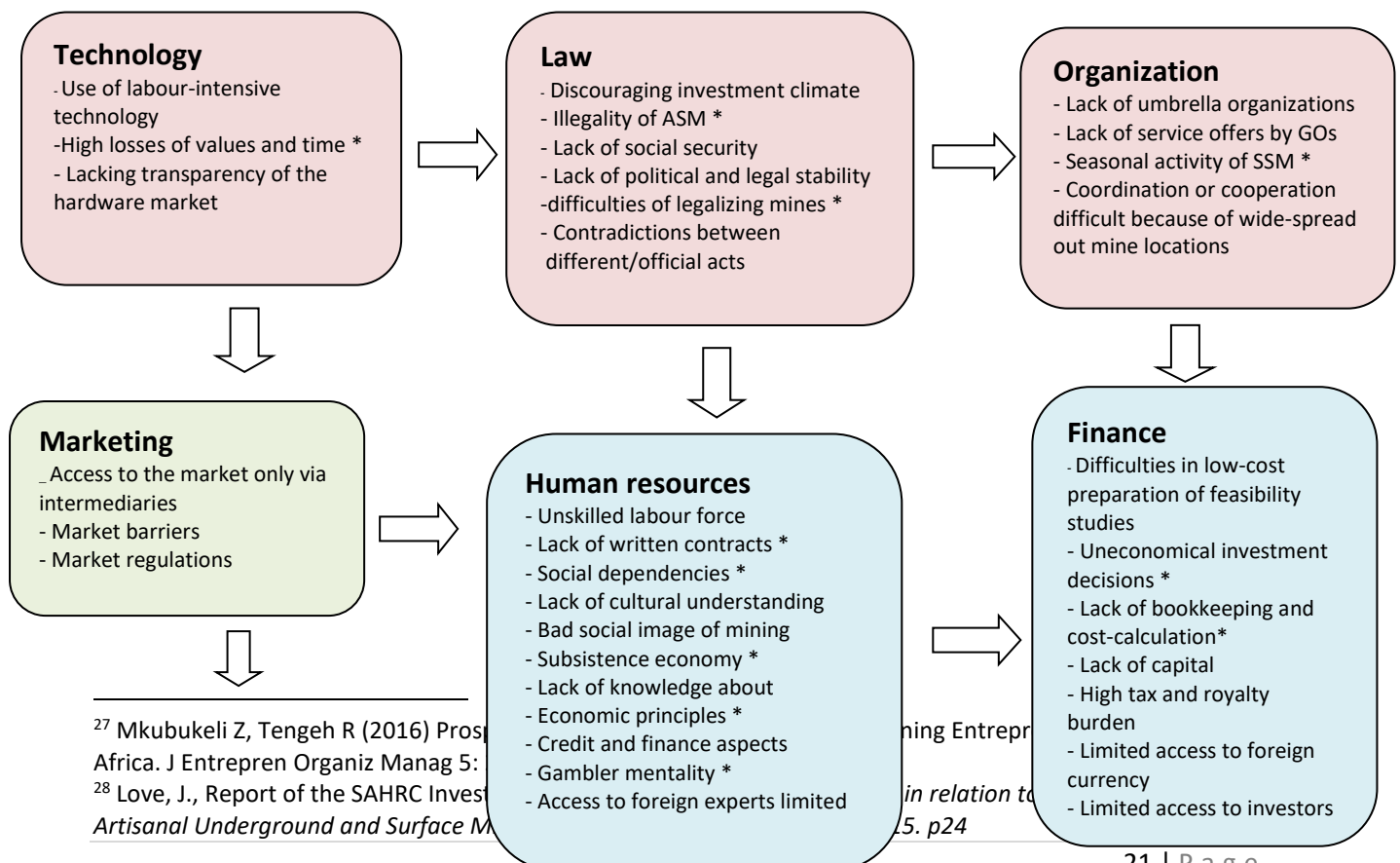
Despite this seeming contradiction, small-scale mining entrepreneurs like other entrepreneurs in SA are confronted by daunting challenges during both the start-up phase and next phases of their businesses. Although several studies have confirmed similar challenges, it seems there are few studies focusing on addressing the various challenges identified as a handicap for small scale miners.²⁷

The absence of specific policy frameworks facilitating the emergence or growth of sustainable ASM operations is a major constraint in most African countries. In some countries, small-scale mining policy and regulations fall under general mining policy, which makes no distinction between LSM and ASM. Thus the peculiar challenges in small-scale mining do not receive the attention that they deserve. Even in countries with a separate small-scale mining policy, the procedures for acquiring licences are generally cumbersome, which becomes a barrier to formalisation. Without specific frameworks, ASM operators face challenges in getting mining rights.²⁸

In addition to the above-mentioned is the lack of appropriate institutional, financial and technical support mechanisms that negatively impacts on the sustainability of ASM's. Technical support amongst others includes the provision of geological information and services, technical and marketing support or facilities for upgrading miners' skill levels.

The challenges as indicated above resulted in a lack of effective participation in the mainstream economy for small-scale mining entrepreneurs. These challenges according to Hentschel et al. are reflected in *figure 8*.

Figure 8: Typical problems of artisanal small-scale mining



²⁷ Mkubukeli Z, Tengeh R (2016) Prospects of Small-Scale Mining in Africa. *J Entrepren Organiz Manag* 5: 1-10

²⁸ Love, J., Report of the SAHRC Investigative Committee on the Mining Industry. *Artisanal Underground and Surface Mining in South Africa*. p24

Geology

- Lack of appropriate ore bodies
- Lack of information about these ore bodies



*Special problem of informal ASM

Source: Artisanal and Small-scale Mining, Challenges and Opportunities, C and O Thomas Hentschel, Felix Hruschka, and Michael Priester

Several other challenges that are hampering the growth and development of small-scale mining are also referred to in literature, as follows:

(a) Relationship between large scale mining (LSM) and ASM

LSM and ASM have historically experienced conflictual relations in South Africa. Reports of police and private security actions against artisanal miners, especially using legislation dealing with trespassing onto LSM property, is common. However, there have been some recent shifts in policy towards promoting integration in the mining sector.

Firstly, when ASM takes place on formal concessions, it can create health and safety risks for LSM miners. Secondly, increased security may also be necessary to protect LSM workers and mining equipment, and conflicts between LSM and ASM workers can result in work stoppages. Thirdly, conflict between large-scale mines and artisanal miners has created controversy and significant tension in some areas, such as Tanzania, leading to high-profile conflicts and negative perceptions of international mining.²⁹

ASM can also damage the reputation of LSM operations and threaten community support for the larger mines. ASM is much more environmentally damaging than LSM, and can leave a legacy of water and land pollution, river damage, and abandoned pits and shafts.³⁰ ASM activities may also be tied to illegal activities, child labour, and human rights abuses that are not related to LSM but are nonetheless picked up by the media and pressure groups and used to damage the reputation of LSM companies.

The response of LSM operations to ASM varies depending on the situation and nature of interaction, but increasingly consultation and discussion helps manage and minimize risk. Such engagement can also bring benefits for the LSM operations beyond risk mitigation. ASM may help in exploration activities, and their inclusion in post-mine closure plans can help ensure that a positive mining legacy remains. ASM engagement may also be part of the Corporate Social Responsibility strategies

²⁹ Mitchell, P., Mining and economic growth. The case for Ghana and Tanzania. South African Journal of International Affairs, 2006. 13(2): p.55-67

³⁰ Hentschel, T., et al., Global Report on Artisanal & Small-Scale Mining, 2002, Minerals, Mining and Sustainable Development (MMSD)

of mining operations, and contribute to a sustainable and positive post-mining legacy.³¹

Nonetheless, small-scale mining entrepreneurs in SA are confronted with pervasive challenges during both the start-up phase and post start-up phase of their businesses. Given these challenges, mining entrepreneurs who lack support structures often conduct small-scale mining operations individually and illegally.³²

(b) Social and environmental concerns affecting artisanal mining

The artisanal mining sector can adversely affect mining communities and may provide communities with no benefit at all during or after mining. Mining activities can also lead to an influx of workers and create conflict with existing miners, communities, and indigenous populations. Sanitation and basic health care are often lacking in ASM areas and substance abuse, alcoholism and communicable diseases may often increase.³³ Women and children are also frequently involved in ASM activities creating specific health, physical and psychological concerns.

The lack of formality (legality) in the ASM sector also affects worker safety, according to Hentschel. Dangers in the workplace include lack of training, poor ventilation, lack of safety equipment, improper use of chemicals, and obsolete equipment. In fact, ASM can be very dangerous, as in the case where at least 6,000 workers are killed each year in small illegal Chinese coal mines alone.

Furthermore, ASM communities may also be affected by environmental degradation. This type of mining activity may pollute waterways through mercury use, dam construction, a build-up of silt, poor sanitation, and effluent dumped in rivers. Improper mine closure and lack of reclamation can also result in acid rock drainage. Monitoring and enforcement of environmental regulations is hampered by informality, the remote location of mine operations, and a lack of resources.³⁴

ASM activities may also present financial challenges for governments. Miners involved in ASM trade gold and minerals informally and do not pay tax or royalties, limiting the ability of governments to provide services or enforce laws.³⁵ ASM may also be used to fund corruption, launder money, and support guerilla activities while undercutting the viability of legal mining.

³¹ Communities and Small-Scale Mining (CASM), et al., *Working together how large-scale miners can engage with artisanal and small-scale miners*, 2009. ICMM: www.icmm.org.

³² Mkubukeli, Z. (South Africa), Tengeh, R.K. (South Africa), *Small-scale mining in SA: an assessment of the success factors and support structures for entrepreneurs*, Environmental Economics, Volume 6, Issue 4, 2015

³³ Hentschel, T., et al., *Global Report on Artisanal & Small-Scale Mining*, 2002, Minerals, Mining and Sustainable Development (MMSD)

³⁴ Hentschel, T., et al., *Global Report on Artisanal & Small-Scale Mining*, 2002, Minerals, Mining and Sustainable Development (MMSD)

³⁵ Communities and Small-Scale Mining (CASM), et al., *Working together how large-scale miners can engage with artisanal and small-scale miners*, 2009. ICMM: www.icmm.org.

In conclusion, the social, health and environmental impacts of unregulated ASM activities in South Africa, particularly artisanal mining, have serious consequences for the rights to life and security.³⁶ It is for these reasons that the Commission resolved to undertake an investigation into the issues and challenges in relation to artisanal mining in the country.

(c) Issue of illegal mining

The re-opening of old mine workings is not uncommon in ASM and is presenting a significant environmental, safety, and security challenge to the large mining companies that are either still operating or are responsible for these mines. In this case there is a blurred line between informal ASM and illegal mining. Illegal mining in South Africa is a criminal industry involving national and international syndicates and valued at around R5.6 billion (address by the Minister of Mineral Resources to the National Council of Provinces in the debate on illegal mining, 16 September 2009), and has been increasing since the early 1990s, largely due to downscaling in the large-scale mining sector. Illegal miners (zama-zamas) access disused mines, largely gold mines, to extract the small quantities of remaining ore. The areas around Barberton, Westonaria, and the Free State gold fields have been hardest hit by their activities.³⁷

8.2 Measures to mitigate the challenges experienced by ASM

Despite the challenges mentioned above small-scale mining entrepreneurs can still be successful in their respective mining activities. They are the cornerstone to (of) any economy. However, that a wide range of characteristics not limited to profit and the number of years in business may be taken into consideration when determining business success.³⁸

These success factors as per *table 5* are categorized by differentiating entrepreneurial and managerial success factors.

Table 5: Success factors

Category: Entrepreneurial success factors	Category: Managerial success factors
• Creativity and innovation	• Planning
• Risk orientation	• Knowledge of competitors
• Leadership	• Mainly market orientated
• Good human relations	• Client services
• Positive attitude	• High quality work enjoys priority

³⁶ Love, J., Report of the SAHRC Investigative Hearing - *Issues and Challenges in relation to Unregulated Artisanal Underground and Surface Mining Activities in South Africa, July 2015. p24*

³⁷South African Government News Agency, 19 July 2012

³⁸ Mkubukeli, Z. (South Africa), Tengeh, R.K. (South Africa), *Small-scale mining in SA: an assessment of the success factors and support structures for entrepreneurs*, Environmental Economics, Volume 6, Issue 4, 2015

<ul style="list-style-type: none"> • Perseverance 	<ul style="list-style-type: none"> • Financial insight and management
<ul style="list-style-type: none"> • Commitment 	<ul style="list-style-type: none"> • Knowledge and skills with regards to the business
	<ul style="list-style-type: none"> • The use of experts

Source: Mkubukeli and, Tengeh *Small-scale mining in SA, 2015*

Drawing from the above table, it is evident that entrepreneurial success factors are inherent, whilst managerial success factors are attainable.

Nonetheless, in order for small-scale mining entrepreneurs to be successful, mining entrepreneurs need to be in possession of the following: human capital; appropriate equipment; be passionate about entrepreneurship. Most importantly, small-scale mining entrepreneurs need to have the ability to mine efficiently and effectively, in order to remain sustainable.

Furthermore, the success of small-scale mining entrepreneurs is not limited to having a marketing ethos and requisite business knowledge, but also the passion and having the right work ethics to be successful small-scale entrepreneurs.³⁹

9. Opportunities and support structures for SSM entrepreneurs in SA

9.1 Opportunities for small-scale mining entrepreneurs

South Africa, according to literature, is one of the countries blessed with considerable mineral resources. Actually many would contend that South Africa is a world leader in mining. The country is renowned for its plethora of mineral resources, accounting for a substantial proportion of world production and reserves, and South African mining companies are essential players in the global industry.

Estimated at R20.3-trillion (\$2.5-trillion), South Africa's total reserves remain some of the worlds most valuable and the world's fifth-largest mining sector in terms of GDP value. Despite that SA's total mineral reserves estimated at \$ 2.5 trillion, the South African mining sector favours most the minority of the country. It is believed that there is considerable potential for the discovery of other world-class deposits in areas yet to be exhaustively explored. South Africa's prolific mineral reserves include precious metals and minerals, energy minerals, non-ferrous metals and minerals, ferrous minerals, and industrial minerals.⁴⁰

³⁹ Ibid

⁴⁰ Mkubukeli Z, Tengeh R (2016) Prospects and Challenges for Small-Scale Mining Entrepreneurs in South Africa. *J Entrepren Organiz Manag* 5: 202. doi: 10.4172/2169-026X.1000202)

Bilateral agreements signed between South Africa and countries, such as Brazil, Russia, India and China (all members of BRICS) open up opportunities for small-scale mining sector entrepreneurs and those in the rural areas in South Africa. Small-scale mining entrepreneurs can create joint ventures with international companies and share synergies in order to increase their business efficiency. Heemskerk and van der Kooye argue that these opportunities mean that small-scale mining entrepreneurs have the prospect of: direct ownership of mines, contracting mining services, outsourcing new services and marketing and trading.⁴¹

Progressive policy changes in the mining sector in South Africa have created a number of opportunities for small scale mining entrepreneurs. The mining charter is an example of such policies. The objective of the mining charter includes but not limited to:

- Promoting equitable access to mineral resources
- Expansion opportunities for previously disadvantaged people
- Empower previously disadvantaged people and to
- Promote beneficiation of SA’s mineral resources.

Mintek further describes numerous alternative employment opportunities it has helped to foster in mining communities, including: ceramics, beading, and brick making. However, little to no information is reported on the success of its programmes. It is thus difficult to assess the impact and the role companies like Mintek have played in the development of the ASM sector in South Africa. *Table 6* below depicts details of projects where the Small-scale Mining Division of Mintek was involved.

Table 6: Examples of projects whereby the SSM division were involved include, amongst others:

AREA	TYPE	DESCRIPTION
Eastern Cape	Ceramics incubator, called Timbita	Test of different clays for pottery and bricks
Lichtenburg	Small panning plant for testing diamond-bearing gravel deposits	Project is providing employment for 50 people
Limpopo	Manufacturing of fertilisers to improve the growth of a variety of vegetables	Agrogeo programme identifies suitable local mineral deposits, which are blended with ash and organic ingredients to form a soil ameliorant called Slash
Free State, Eastern Cape, Limpopo, and North West	Brick-making	Mintek is involved in a number of projects to assist small-scale operators for the manufacturing of both fired clay bricks and concrete bricks
Gauteng	Two plants have been commissioned for gold miners and several others are planned	The mercury-free ‘iGoli’ process has been developed by Mintek to make gold extraction more efficient and environmentally responsible.
Free State, Eastern Cape, Northern Cape, Limpopo and North West Province	Manufacturing of glass beads	Mintek has developed a process for the manufacture of traditional style glass beads from recycled bottles. These beads are combined with other items like shells, or semi-precious stones to make jewellery
Qwa Qwa, Free State	Manufacturing of dimension stone	Six sandstone producers in Qwa-Qwa have been

⁴¹ Ibid

		assisted with obtaining mining permits
Port St Johns	Manufacturing of dimension stone	Travertine makes beautiful tiles and slabs. An entrepreneur was assisted to develop a viable business plan and obtain a mining permit
	Manufacturing of cobblestones and kerbstones	A women's group was assisted in setting up a plant to beneficiate granite waste and to secure funding to purchase equipment.
Mintek, Pretoria	SSM training school	Conducted elementary courses for 580 learners at Mintek and at satellite sites around the country. In subjects such as: an introduction to small scale mining, legislation, geology, mining, minerals processing, health and safety, environmental aspects, beneficiation, and business skills. A further 120 learners were trained in specialised technologies

Source: <http://www.mintek.co.za/wp-content/uploads/2011/10/Support-for-small-scale-mining.pdf>

In addition to the above projects relevant to the Free State other potential economic diversification initiatives were identified in the Xhariep District Municipality. It was reported that there are possibilities to rework the mine dumps of Koffiefontein and Jagersfontein as a resource that could increase the mine's life. However, these opportunities are limited because the average grade of the dumps is not extremely high. The problem with this opportunity was that it did not develop on a small scale while the main mining activities were still in operation. The crusher stone from the mine dumps could be used for making bricks and road construction. However, the limited road construction in the vicinity, as well as the high transport costs associated with the transport of crusher stone, limits the use of this possibility.⁴²

9.2 Support structures for small-scale mining entrepreneurs

Given the impediments they face, small-scale mining entrepreneurs are compelled to use rudimentary methods and often conduct small-scale mining operations individually and illegally. As a direct result of the impediments to small-scale mining entrepreneurs, their use of unorthodox business methods of extracting gold or other minerals are increasingly becoming deleterious to the environment and human health. Supporting the foregoing premise, small-scale mining entrepreneurs extract gold from the ore using mercury (a highly toxic chemical), thus creating a gold-amalgamation. Additionally, in order to separate the gold from the amalgamation, the gold-amalgamation is heated in the open, thus contributing to air pollution.⁴³

Literature in support of the above indicates that artisanal miners are therefore kept in a poverty trap where their operations rarely graduate above subsistence and remain economically and environmentally-unsustainable. Hence there is a need for government support or to increase support in areas where it already exist.

⁴²Centre for Development Support (CDS). 2006. Towards a post-mining economy in a small town: Challenges, obstacles and lessons from South Africa. *CDS Research Report, LED and SMME Development, 2006(1)*. Bloemfontein: UFS.

⁴³ Mkubukeli Z, Tengeh R (2016) Prospects and Challenges for Small-Scale Mining Entrepreneurs in South Africa. *J Entrepren Organiz Manag* 5: 202. doi: 10.4172/2169-026X.1000202

The Department of Mineral Resources (DMR) in this regard has been responsible for formulating policy i.e. the Mining Charter, Minerals and Petroleum Resources Development Act and the Precious Metal and Diamond Amendment Act. These pieces of legislation have been designed to facilitate the transformation of the South African mining\mineral industry from producers of material to a wider role of value addition to minerals.

In South Africa, the number of miners involved in ASM is estimated to be anywhere from 8,000 to in excess of 30,000.⁴⁴ The main commodities mined by ASM in South Africa are diamonds and gold. All these mining entrepreneurs need some kind of support to operate efficiently and economically.

DMR as indicated above, along with other institutions such as Mintek, the Council for Geosciences, and the Mining Qualifications Authority (MQA) offer support specifically to the SSM sub-sector so as to enable greater participation. The DMR's major focus is on assisting small-scale miners to meet the legal requirements, with the Small Scale Mining Board providing capacity and experience in planning and developing viable mining projects through their pre-feasibility stages.

Furthermore, Mintek's Small-Scale Mining and Beneficiation Division supports the sub-sector through research and development of appropriate technologies and by providing training and business development skills on the manufacturing and marketing of products from clay, sand, gold, and granite. The MQA has also set aside funds for the provision of technical training in minerals extraction, geological aspects, health and safety, environmental management, and mining legislation.⁴⁵

Mintek's Small Scale Mining (SSM) Division was established with the aim of assisting entrepreneurs to apply for mining licences, conducting the test work required to draw up feasibility studies, and in some cases commissioning their plants for value-adding operations. The overall purpose is to assist artisanal and small-scale miners (ASMs) to operate more efficiently and economically, to ensure sustainability, and to improve the informal and environmentally unsound practices that prevail in this sector.

The Small-scale Mining and Beneficiation (SSMB) Division according to Mintek⁴⁶ website is involved in numerous projects (as indicated in *table 6*, as well as other projects) supporting small-scale miners, including:

- Extractive technologies in mining for small-scale mining and related sectors;

⁴⁴ Hoadly M. and Limpitlaw D. "The artisanal and small scale mining sector & sustainable livelihoods." A paper presented at the Mintek Small Scale Mining Conference, 2004, 9 September, Nasrec, Johannesburg, Book of Proceedings pp1-9.

⁴⁵ Comparison between artisanal and small-scale mining in Ghana and South Africa: lessons learnt and ways forward, A.A. Debrah; I. Watson; D.P.O. Quansah (Journal of the Southern African Inst. Min. Metall. vol.114 n.11 Johannesburg Nov. 2014)

⁴⁶ Mintek website, "Mintek is South Africa's national mineral research organisation and is one of the world's leading technology organisations specialising in mineral processing, extractive metallurgy and related areas. Mintek's mandate is to serve the national interest through research, development and technology transfer, to promote mineral technology and to foster the establishment and expansion of industries in the field of minerals and products derived there from."

- Beneficiation of resources;
- Techniques to ensure that ASM's operate more efficiently and economically to ensure sustainability;
- Methods to improve the informal and environmentally unsafe practices that frequently prevail in this sector;
- Training and skills development; and,
- Marketing of products.

DMR through their Directorate for Small-Scale Mining claims it is “working to legalise the small-scale mining operations that currently exist, and find ways to help make them economically viable in a way that is relevant, understandable and affordable to small-scale miners.”⁴⁷ It assists aspiring small-scale miners in the following ways:

- Establishment of a legal entity;
- Guidance towards the identification of mineral deposits;
- Environmental Impact Assessments (EIAs);
- Legal and contractual arrangements, mineral rights etcetera;
- Reserve estimation of the selected deposits;
- Mining feasibility study;
- Market study; and
- Development of the mining equipment.

Other support structures are also available to aspiring and existing small-scale mining entrepreneurs. This statement is substantiated by a report instigated by the South African Department of Mineral Resources (2006, pp. 1-43). According to this report, there are institutions located across the country that offer financial and non-financial support to previously disadvantaged entrepreneurs (especially small-scale mining entrepreneurs).

Some of the support structures to name a few, includes, the Industrial Development Corporation (IDC); New Africa Mining Fund (NAMF); Anglo Khula Mining Fund (AKMF); National Empowerment Fund (NEF) and others. Despite this and other notable support structures, some literature, discredit the proclamations of support structures by both national and international governments claiming that governments are yet to innovate support structures.

Drawing from the foregoing argument, small-scale mining entrepreneurs in SA cannot be compared to other small-scale mining entrepreneurs outside SA, especially taking into account the differences in the economic and political settings. However, despite the political settings of any region, some authors are of the opinion that given the increased availability of support structures to small-scale mining entrepreneurs, small-scale mining would potentially be the cornerstone of rural development. Therefore, uplifting host communities, despite the pros and cons of small-scale mine⁴⁸.

Other stakeholders for the SSM sector in South Africa include:

⁴⁷ Mintek website, “Support for Small-Scale Miners”

⁴⁸ Mkubukeli Z, Tengeh R (2016) Prospects and Challenges for Small-Scale Mining Entrepreneurs in South Africa. *J Entrepren Organiz Manag* 5: 202. doi: 10.4172/2169-026X.1000202

- Associations of small-scale miners, like the Small Scale Mining Chamber, Northern Cape Small Miners Empowerment Co-op
- Relevant government departments including those with a regulatory function over the SSM sector, like Department of Labour (DOL), Department of Higher Education and Training (DHET), Department of Trade and Industry (DTI), Department of Science and Technology (DST)
- Institutions working with the SSM sector in research, support and service provision, e.g. CSIR, Khula, IDC, Anglo-Zimele, State Diamond Trader, World Bank SME initiative, smaller learning providers
- Other relevant industry bodies like the Chamber of Mines, SAMDA, Jewellery Council of South Africa, Diamond Council
- Labour organisations like the National Union Mineworkers

10. Conclusion

Mining has the potential to shape and affect economies directly and indirectly. Mining brings employment, government revenues, and opportunities for economic growth and diversification. Mining as such can also change the economic landscape of the Free State, in so-doing improving the living conditions of people especially in the rural areas. However, market fluctuations, economic and public institutions, and resource revenues can present challenges in converting natural resource wealth into sustainable economic growth and development.

Artisanal and small-scale mining can play a crucial role in poverty alleviation and rural development. This sector as such can potentially contribute to development by creating employment, increasing local purchasing power, stimulating local economic growth and slowing urban migration. However, this sector also creates social, environmental and financial challenges that may undermine development.⁴⁹ Many continue to view ASM as dirty, unprofitable and fundamentally unsustainable.

Literature in this regards revealed that, currently, the main reason to support small-scale mining entrepreneurs is that local communities and the economy benefit immensely from small-scale mining operations. It asserts that across all regions small-scale mining employs a large number of local people in communities; as a result the sector plays a very critical role in addressing unemployment and poverty in rural areas.⁵⁰

When looking at employment creation, owing to its high labour intensity, ASM is commonly acknowledged to create far more jobs per invested dollar than large-scale mining (LSM). The profile of jobs, however, is largely that of poorly remunerated, unskilled labourers who have gone into mining to avoid destitution and poverty. The working environment generally has poor conditions. Employment in the sector is highly cyclical, especially reflecting harsh economic conditions, such as those

⁴⁹ Communities and Small-Scale Mining (CASM), et al., *Working together how large-scale miners can engage with artisanal and small-scale miners*, 2009. ICMM: www.icmm.org.

⁵⁰Mkubukeli, Z., *Challenges and prospects for small-scale mining entrepreneurs in South Africa*, 2016

induced by drought and economic restructuring. During periods of stable economic activity in other sectors, the pull of ASM falls and the sector shrinks.⁵¹

It is also recorded, in support of the above, that many workers sell their minerals at lower than market prices to middlemen, some of whom sponsor their operations. The incomes of such miners are usually below the poverty line and ASM operators are generally migratory.

Literature also indicates that it seems that there are widespread benefits to be gained from small-scale mining operations.⁵² This necessitates that proper support structures be in place to develop and assist artisanal and small-scale mining entrepreneurs.

Successful small-scale mining operations benefits various role-players, amongst others owners of small-scale mines, surrounding businesses, communities and the government (locally, provincially and nationally). Successful and sustainable small-scale miners enable people living in extreme poverty to be their own source of income. The number of people, as a result that is engaging in small-scale mining can increase the amount of mineral deposit being mined. It is also encouraging that if more people are engaging in small-scale mining, more money is circulating within the economy thus increasing the Gross Domestic Product (GDP). Small-scale mining across the globe provides a source of income to more than 30 million people and accounts for an estimated 20% of the gold global production.⁵³

However, despite strong arguments for small-scale mining, this sector has attracted a great deal of controversy. Mkubukeli mentioned that even though it provides direct employment to a substantial number of poor people in rural communities, some critics believe that small-scale miners growing their workforce as a means of decreasing the cost of establishing their businesses. It is further indicated that “small-scale mining entrepreneurs do not have the strategic acumen that would enable them to grow their operations into multinational companies, as do large scale mining operators”. Hence, small-scale mining entrepreneurs cannot acquire the necessary resources and technology needed to decrease emission of pollutants into the atmosphere or other impacts on the environment.⁵⁴

In addition to the above arguments, some have argued that the environmental and social costs of artisanal mining outweigh the benefits, and so these activities should not be encouraged. However, the immense contribution of artisanal mining to poverty eradication at the community level cannot be ignored. Therefore every attempt must be made to address the negative aspects and optimize the benefits in order to find a better balance between the two, being the environment and mining. Nevertheless, the question would always remain whether this form of mining should be encouraged. The answer the authors purport is that simplistically, the major aim

⁵¹ Hayes, K., “2008 Regional Workshop: Small-scale Mining in Africa – A Case for Sustainable Livelihood”, Common Fund for Commodities, November 2008

⁵² Mkubukeli, Z., Challenges and prospects for small-scale mining entrepreneurs in South Africa, 2016

⁵³ Hayes, K., “2008 Regional Workshop: Small-scale Mining in Africa – A Case for Sustainable Livelihood”, Common Fund for Commodities, November 2008

⁵⁴ Mkubukeli, Z., Challenges and prospects for small-scale mining entrepreneurs in South Africa, 2016

of ASM is poverty alleviation; hence it must be encouraged, although not at the expense of the environment. Stringent and cautious efforts must be made by the South African government to address some of the peculiar challenges that the ASM sub-sector is fraught with, in order to promote the interests of the artisanal, small-scale and junior miner as well as regulate their activities to aid in the protection of the environment.⁵⁵

In conclusion, successive governments have introduced numerous initiatives over the last 26 years to formalise the sector. However, these efforts were not effective for a number of reasons, including the weak state capacity to manage the sector, the short timeframes provided for miners to apply for legal titles, inadequate support for local miners, a pervasive culture of informality, and widespread violence and human rights violations by armed groups in mining areas.⁵⁶

11. Recommendations

Successful, effective engagement of ASM initiatives has occurred when miners are able to work under legal title and participate in defining policies. This requires coordinated support and dialogue.⁵⁷ The main priorities that are to be considered by the Free State provincial government and its stakeholders, in light of the aforementioned statement can be summarised as follows:

- Promotion of ASM business development by strengthening the administrative structure and procedures of ASM producer organisations and medium-scale enterprises to help formalise their administrative and trading functions.
- Strengthening miners' associations by engaging with formalised ASM enterprises and organisations in regional dialogues and formalising projects. These associations may bring down the cost of supplies through economies of scale and help miners to access government services for formalisation.
- Support transparent and fair relations between ASM and mining companies – collaborative formalisation programmes between LSM, ASM and regional mining authorities have allowed ASM miners to work legally on LSM leases.
- Delivering of legal, financial and technical support. Informal miners cannot comply with the current formalisation requirements without help. Training centres and banking systems for ASM should be promoted; formalisation

⁵⁵ Debrah, A.A., Watson, I., and Quansah, D.P.O., 2014. Comparison between artisanal and small-scale mining in Ghana and South Africa: lessons learnt and ways forward, *Journal of the Southern African Inst. Min. Metall.* vol.114 n.11 Johannesburg Nov. 2014

⁵⁶ Echavarría, C., 2014. *What is legal? Formalising artisanal and small-scale mining in Colombia*. International Institute for Environment and Development (IIED), London and ARM, Colombia. September 2014

⁵⁷ Echavarría, C., 2014. *What is legal? Formalising artisanal and small-scale mining in Colombia*. International Institute for Environment and Development (IIED), London and ARM, Colombia. September 2014

commitments are to be tied; efficient, safe and legal access to explosives; and linking formalisation programmes to ethical certification initiatives.

A recommendation was also made at a Tripartite Meeting on Social and Labour issues in Small-scale Mines, held in Geneva that a Consultative Group on Artisanal and Small-scale Mining is to be established to support a coordinated program of assistance for small-scale mining. Role-players in Free State should consider this structure as a sub-sector of the Mining Forum.

Businesses support is needed by small-scale miners in the province and therefore, support structures are to be strengthened and skills development initiatives for small-scale mining entrepreneurs should take place on a continuous basis. In fact a business consultancy service unit at the department (DESTEA) should be tailored made for small-scale mining entrepreneurs. Although an institutional support structure is available in Lejweleputswa (regional office of the Department of Mineral Resources in Welkom), support services for value-addition as well catering to the needs of ASM is to be improved. Therefore, providing a 'one-stop-shop' at a district level where information on the legal requirements and financial support is freely available will be helpful in redressing the needs of the small-scale mining sector.

Legislation to formalise ASM as in the case of Colombia who created a new National Formalisation Policy in 2013 may successfully contribute to the development of a sustainable small-scale mining sector in South Africa.

Furthermore, Debra et al. is of the opinion that it is evident that the lack of a definition and, specifically in the South African case, the shortage of reliable data, is a hindrance to the development of the ASM sub-sector. The broad range of activities that are grouped under the general title of 'artisanal and small-scale mining' needs further and finer classification in order to understand and provide for the specific requirements of the different sub-groups. Collecting data that illustrates this diversity within the sub-sector, the scale and distribution of ASM, and its contribution to the economy would allow for more informed and hopefully better decision-making by the authorities and development agencies. Further research in this regard is thus necessary.

There is thus a need for legal regimes to consider the type of mineral deposit and the geological formation, and define a prerequisite size for the different groups within the categories of artisanal and small-scale miners. This would aid in improving the regulation and management of the different variants in ASM.

Environmental Management Plan (EMP) seemingly creates a barrier for the artisanal miner who cannot afford to meet the benchmarks. As such, there is need for a simplified EMP supported by institutional structures that can reach those already involved in illegal artisanal mining and to protect their interests as well as the environment.⁵⁸

⁵⁸ Debrah, A.A., Watson, I., and Quansah, D.P.O., 2014. Comparison between artisanal and small-scale mining in Ghana and South Africa: lessons learnt and ways forward, *Journal of the Southern African Inst. Min. Metall.* vol.114 n.11 Johannesburg Nov. 2014

In conclusion, future studies should investigate the appropriateness of the support structures currently allocated to small-scale mining entrepreneurs, as well as to obtain reliable data of the small-scale mining sector in the Free State.

Annexure 1

Table 4: Percentage distribution of small organisations by standard industrial classification codes (SIC), data from MQA small organisations database. A total of 976 organisations registered.

	DESCRIPTION	SIC CODE	%
1	Mining of Coal and Lignite	21000	6.03
2	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction except surveying	22100	1.15
3	Mining of gold and uranium ore	23000	5.32
4	Thick tabular operations	23002	0.14
5	Massive mining operations	23003	2.16
6	Mining of metal ores; except gold and uranium	24000	1.15
7	Mining of iron ore	24100	0.43
8	Mining of non-ferrous metal ores; except gold and uranium	24200	0.29
9	Other mining and quarrying	25000	26.29
10	Quarrying/dimension stone operation	25101	4.45
11	Open cast/strip mining operations	25102	2.16
12	Open pit operations	25103	1.01
13	Dimension stone (granite; marble and slate)	25110	0.14

14	Mining of diamonds (including alluvial diamonds)	25200	0.14
15	Marine and quarrying	25201	0.57
16	Coastal mining operations	25202	0.72
17	Extraction and evaporation of salt	25320	12.79
18	Other mining and quarrying	25390	0.14
19	Mining of precious and semi-precious stones except diamonds	25391	1.01
20	Service activities incidental to mining of minerals	29000	15.80
21	Manufacture of cement; lime and plaster	34240	3.16
22	Manufacture of jewellery and related articles	39210	8.05
23	Jewellery and related articles composed of precious metals, precious and semi-precious stones and pearls	39211	5.46
24	Diamond Cutting and Polishing	39212	0.14
25	Other precious and semi-precious stone cutting and polishing	39219	1.29

Annexure 2 - Legislative framework for Small Scale Mining (SSM)

The policy and legislative framework that is relevant to the SSM sector in South Africa can be considered from two perspectives. The first relates to the regulation of the mining sector and secondly it relates to administration of the mining sector. The other policies and legislative provisions are concerned with the fact that SSM operations are business entities. Some of the key policies and legislation are as follows:

5.1 Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA)

The SSM sector in South Africa is regulated through the Mineral and Petroleum Resources and Development Act 28 of 2002 (MPRDA).

5.2 1998 White Paper on Minerals and Mining Policy

The White Paper on Minerals and Mining Policy of 1998 dedicates an entire section to policy statements meant to encourage and facilitate the development of the small-scale mining sector.

5.3 The Mine Health and Safety Act (MHSA), 1996 and Amendment of Section 10 of the MHSA (Act 74, 2008)

The health and safety of small mines is regulated by the Mine Health and Safety Act (MHSA), 1996 and amendments. The Mine Health and Safety Council was set up in accordance with sections 43 and 44 of the MHSA. Its mandate is to advise the Minister on issues of legislation, research and promotion of occupational health and safety in the mining industry. It also oversees research in the mining sector pertaining to issues of health and safety.

Amendment of Section 10 of the MHSA (Act 74, 2008) has certain stipulations about the provision of safety, health and environment (SHE) training.

5.4 The National Environmental Management Act (NEMA) 1998

The obligations of environmental management are regulated by National Environmental Management Act (NEMA) 1998.

5.5 National Small Business Act

ASM in South Africa is defined as a “mining activity employing less than 50 people, and has annual turnover of less than R10 million with fixed and moveable assets of less than R15 million.” This formal definition is adopted from the National Small Business Act which is legislative framework enacted to promote Small, Medium and Micro Enterprises (SMMEs) development in the country.

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