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2019

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Challenges versus support offered to small-scale mining in South Africa

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1551789

A research article submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration

Johannesburg, 2019

Protocol number: WBS/BA1551789/260

DECLARATION

I, Sanelisiwe Samantha Siwundla, declare that this research article is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the Graduate School of Business Administration, University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

(Sanelisiwe Samantha Siwundla)

Signed at ……

On the… ……. day of…….2019…

DEDICATION

To my mother, Yoliswa Mary Siwundla. You have been the perfect example of strength, love and perseverance. I love you.

ACKNOWLEDGEMENTS

This has been a long journey and I could not have done it alone. I would like to extend my most sincere gratitude to my family and friend for all your big and small contributions to this journey. Thank you to my mom, Yoliswa Siwundla, for the perfectly timed words of encouragement and my sister, Nonela Mxokozeli, for the support and resourcefulness. A special thank you to Tshepo Mmusi, I will forever be grateful for the support, the patience and the love that you have shown me through this journey.

A big thank you goes to Ceramic Industries Limited and Aquarella investments 289 (Pty) Ltd, without your financial assistance, this dream would have been extremely delayed. I am also grateful for the support from the employees of both companies.

To my supervisor Conrad Viedge, thank you for your guidance, you are a gem.

And finally, to the employees of the Department of Mineral Resources, Mintek and the University of Witwatersrand as well as all those who took time out of their busy schedule for interviews, I thank you.

SUPPLEMENTARY INFORMATION

Nominated journal:	**Natural Resources Forum**
Supervisor / Co-author:	Conrad Viedge
Word count †:	15261
Supplementary files:	Schedule of interview questions

† Including abstract references, etc.

ABSTRACT

Artisanal Small-scale Mining (ASM), according to the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) (2017b) is a complex as well as diverse sub-sector of the mining industry that is characterised by legal, semi-legal as well as illegal activities that exploit minerals and metals across the entire range using low-technology mineral extraction and processing operations (Hentschel, 2003; Hilson, 2002; Legal Resources Centre, 2016). Globally, ASM is recognised as a viable source of income for the unemployed (Dreschler, 2001; IGF, 2017b; Yakovleva, 2007). This is particularly true for developing countries such as South Africa (SA) (Legal Resources Centre, 2016). The Department of Mineral Resources (DMR) believes that ASM is the perfect vehicle to drive socio-economic change and has the potential to contribute immensely towards the SA economy but is confronted by a number of challenges (Ledwaba & Nhlengetwa, 2016; Mutemeri & Ledwaba, 2017)

Over the years, numerous programmes have been established to support the ASM sector, but the sub-sector remains small (Hilson, 2007; Ledwaba, 2017). Researchers have questioned the appropriateness of the support provided, but to date no research has been conducted to assess this (Mutemeri & Ledwaba, 2017).

To take a step towards the provision of appropriate support for ASMs, this research seeks to highlight the differences between the challenges the miners face and the support that they are offered by government as well as private institutions.

Due to the exploratory nature of this study, an exploratory qualitative research methodology was used (Creswell, 2003). To ensure that participants did not feel restricted in their responses; an interview schedule with open-ended questions was drawn up in order to aid the face-to-face semi-structured interviews.

The results of the study reveal a clear mismatch between the challenges experienced by the ASMs and the support that is provided to them.

This study shows that while there is support for ASMs, this support does not entirely talk to the needs of the ASMs on the ground nor does it reach all ASMs that may be experiencing the similar challenges. To resolve the mismatch and close the gaps in

the support provided to ASMs, it is recommended that the supporters consolidate their efforts and employ a collaborative to supporting ASMs.

Keywords: Artisanal Small-scale Mining, Challenges, Support, South Africa

ABBREVIATIONS

ASM	Artisanal Small-scale Mining/Miners
ASPASA	Aggregate & Sand Producers' Association of South Africa
BEE	Black Economic Empowerment
DME	Department of Minerals and Energy
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
GDARD	Gauteng Department of Agriculture and Rural Development
IDC	Industrial Development Corporation
LSM	Large Scale Mining
MHSA	Mine Health and Safety Act
MPRDA	Mineral and Petroleum Resources Development Act
MQA	Mining Qualifications Authority
NEM: AQA	National Environmental Management Air Quality Act
NEMA	National Environmental Management Act
NOSHCON	National Occupational Safety and Health Consultancy
NWA	National Water Act
SA	South Africa/ African
SETA	Sector Education & Training Authority
SLP	Social and Labour Plan
SSM	Small Scale Mining/Miners

1. Introduction

Artisanal Small-scale Mining (ASM) is a sub-sector within the South African (SA) mining sector; it is characterised by legal, semi-legal as well as illegal activities (Hentschel, 2003). The sector has the potential to contribute immensely towards the SA economy but is confronted by many challenges (Ledwaba & Nhlengetwa, 2016). For the full benefit to be enjoyed, the sub-sector requires support.

Over the years, numerous programmes have been established to support the ASM sector, but the sub-sector remains small (Hilson, 2007; Ledwaba, 2017). Researchers have questioned the appropriateness of the support provided, but to date, no research has been conducted to assess this (Mutemeri & Ledwaba, 2017). This research seeks to take a step towards the provision of appropriate support by highlighting the differences between the challenges the miners face and the support that they are offered by the government as well as private institutions.

1.1. Background and definition

Globally, ASM is recognised as a viable source of income for the unemployed (Dreschler, 2001; IGF, 2017a; Yakovleva, 2007). This is particularly true for developing countries such as South Africa (SA), where employment opportunities are scarce and alternative ways of making a living are limited (Legal Resources Centre, 2016). Hoadley and Limpitlaw (2004) in Yakovleva (2007, p.29) states that “there is a correlation between the Human Development Index (HDI) position of countries and the proportion of the total workforce involved in ASM”.

South Africa is a "global mining powerhouse", and the mining sector as a whole is one of the most significant contributors to the country's Gross Domestic Product (GDP) (Debrah, Watson, & Quansah, 2014, p. 913). While there is still some research to be done on how much ASM contributes towards the economy and towards local livelihoods in SA, the Department of Mineral Resources (DMR) believes that ASM is the perfect vehicle to drive socio-economic change, as it can

help achieve the goals and objectives of the Minerals and Petroleum Resources Development Act (28 of 2002) (Legal Resources Centre, 2016; Mutemeri & Ledwaba, 2017; Republic of South Africa, 2014). According to the DMR, ASMs have the potential to alleviate poverty, particularly in rural areas, as they could provide a platform for meaningful participation of Historically Disadvantaged South Africans (HDSA) in the mining sector (Maconachie & Hilson, 2011; Mutemeri & Ledwaba, 2017; Republic of South Africa, 2014). Successful ASM could contribute towards the establishment of small local industries, which would, in turn, contribute towards women's empowerment, skills transfer and rural development (Abor & Quartey, 2010; Mutemeri & Ledwaba, 2017).

According to Mutemeri & Ledwaba (2017), ASMs exploit minerals and metals across the entire range, including precious metals (such as gold and platinum), fossil fuels (like coal), gemstones (such as diamonds), as well as industrial rocks or minerals (such as clay, sand, kaolin and limestone) (Hilson, 2002; Legal Resources Centre, 2016). In South Africa, most ASM operations exploit industrial minerals and fossil fuels (African Union, 2009; Ledwaba, 2017; Legal Resources Centre, 2016). The geology in South Africa makes these minerals easier to mine because they are close to the surface; therefore capital investment and complicated extraction techniques are not required (Mutemeri & Ledwaba, 2017). For the same reason, abandoned areas that have previously been mined by big mining companies and not rehabilitated after the completion of the mining campaigns are also targeted by ASMs (IGF, 2017b). This is mainly the case when the abandoned mining areas are known to have produced precious metals and gemstones, which according to Mallo (2012), have a high intrinsic value; making them very profitable for ASMs to mine.

According to Ledwaba (2017) and Mutemeri & Ledwaba (2017), the SA ASM sector is comprised of three broad activities: i) legal operators – holders of a mining authorisations approved by the DMR; ii) informal operators – for all intents and purposes these are illegal operators, as they do not have a mining authorisation issued by the DMR, but are tolerated because of their legitimate claim to the land and are, therefore, given permission to mine by traditional

leaders (chiefs) or landowners; iii) illegal operators who are linked to organised crime and who are colloquially known as *Zama-Zamas*.

The sub-sector is misunderstood due to the various activities and components within the sub-sector (Abor & Quartey, 2010). As a consequence, no official undisputed definition of ASM exists in SA (Buxton, 2013; Ledwaba & Nhlengetwa, 2016). Currently, ASM is encompassed by the definition of SSM that was adopted from the South African National Small Business Amendment Act 26 of 2003, where an ASM is defined as a “mining activity employing less than 50 people, and has an annual turnover of less than R10 million, with fixed and moveable assets of less than R6 million” (Mutemeri & Ledwaba, 2017, p. 3). According to Hentschel (2003), ASM is small-scale, informal mining conducted by individuals using rudimentary equipment (Ledwaba & Nhlengetwa, 2016). The IGF (2017b, p. 5), however, states that the ASM sector is a "complex and diversified sector which ranges from informal individual miners seeking a subsistence livelihood, to small-scale formal commercial mining entities responsibly producing minerals". For this research, ASM will be "an all-encompassing label for the low-technology mineral extraction and processing operations prevalent in developing countries” (Hilson, 2002, p. 151).

1.2. Problem statement

Main problem

After being ignored by the apartheid regime, the ASM sector was recognised in 1994 by the newly elected ANC government (Solomon, 2012). Since its recognition, the sub-sector has been one of the DMR’s priorities (Ledwaba, 2017). As part of the Reconstruction and Development Programme (RDP), the sub-sector was earmarked as a vehicle to redress the injustices of the past in the mining industry (Ledwaba, 2017). It was anticipated that the involvement of HDSAs in the mining industry would spark economic growth and, as a result, various support programmes and interventions were established to assist ASMs to start up and grow (Mutemeri & Ledwaba, 2017). While the ASM sector has

grown over the years, the formal portion of the sector remains small as most ASMs operate outside the regulatory framework (Buxton,2013; IGF, 2017b; Ledwaba, 2017; Yakovleva, 2007). It can, therefore, be deduced that the support provided has not had the desired effect of unleashing the potential of ASM (Ledwaba, 2017). The challenge is to understand why this is the case.

The purpose of the research will be to identify the challenges that the miners face 'on the ground', as well as the support that is provided to them by the government and private organisations. This research seeks to establish if there are gaps between the challenges faced by ASMs and the support that is offered to them. The following questions will have to be answered:

- What are the challenges confronting ASMs?
- What support is provided to ASM operations?

1.3. Delimitations of the study

As stated above, in SA there are three types of ASM operations: legal, semi-legal and illegal (Ledwaba, 2017). The legal operations are authorised to mine via a mining authorisation issued by the DMR. The semi-legal operations are ASMs that may not possess an authorisation from the DMR, but have authorisation to mine granted by the landowner and may be registered with the DMR or other organisations that offer support to miners. Illegal operations deliberately operate outside the SA regulatory framework (Mutemeri & Ledwaba, 2017). This research will focus on the legal and semi-legal operations, as they are eligible for support from legal entities. The illegal operations (Zama-Zamas) will fall outside the scope of this research. The study will be limited to surface mining operations that mine minerals in the in South Africa.

As the research will look to identify challenges faced by the mining operations themselves, and not by employees, the interviews will be conducted with the owners of the operations. In their absence, the mine manager will be approached.

1.4. Assumptions

The research will focus on legal and semi-legal ASMs, based on the assumption that: a) they are eligible for support; b) the miners may have previously received support from government and/or private institutions; c) the miners welcome external support and; d) the miners plan to continue mining.

Excluding illegal operations from the scope of the research is based on the assumption that government and private organisations do not support illegal activities.

2. Literature Review

Introduction

The ASM sector has been a source of livelihood for the unemployed, particularly for those living in remote areas where access to alternative livelihoods is limited (Banchirigah & Hilson, 2010; Ledwaba, 2017). The White Paper on Minerals and Mining Policy for South Africa was released in 1998 and revealed that the Department of Minerals and Energy (DME), now DMR, acknowledged that many challenges confronted the ASM sector and needed support (Ledwaba, 2017). In the past 20 years, both government and private organisations have established numerous programmes to aid the development of the ASM sector, but these do not seem to have been successful (Banchirigah, 2008; Ledwaba, 2017).

This section will discuss the challenges that have been identified in the literature and the support offered to ASM in response to the challenges. The section will culminate with a table that matches the support that has been provided or is currently being provided to the challenges identified.

2.1. Challenges in the ASM sector in South Africa

The rise in the unemployment rate and the high levels of poverty, coupled with the low barriers to entry, have made the sub-sector very attractive (Heemskerk, 2005; Ledwaba, 2017; Mutemeri, 2017). The challenges confronting the ASM sector are identified and discussed below, based on the literature reviewed.

2.1.1. Government

Legislative framework

According to Hoadley & Limpitlaw (2004) and Muswaka (2017), the DMR has sole regulatory control over the minerals sector in South Africa and is supported by other government departments such as Department of Water and Sanitation (DWS), Department of Environmental Affairs (DEA) and the municipalities. The DMR, governs the sector, with its limited resources, using the Minerals and Petroleum Resources Development Act (22 of 2002) (MPRDA) as the umbrella act. This means that ASMs in South Africa are governed by and have to comply with the same legislation as large-scale mines (LSM). In December 2014, the DMRs' control over the sector was extended when the DMR became the competent authority for the environmental management of mining activities (Muswaka 2017; Republic of South Africa, 2014).

As a national department, the DMR, although it does have regional offices, governs the sector from a national and centralised perspective and its objective is to have all mining operations comply equally (Hoadley & Limpitlaw, 2004). As a consequence of this, the DMR takes a "one-size fits all" approach to compliance Booysen and Spalding (2019, p 1). Both Dreschler (2001) and Booysen & Spalding (2019) believe that this approach puts ASMs at a disadvantage when compared to the bigger mines.

Based on the MPRDA, a person (natural or juristic) can apply for one of three types of mining authorisations at a time; i) a prospecting right which grants the applicant the right to survey and explore an area of land for possible mineral

deposit; ii) a mining permit which gives the applicant the right to mine an area of five hectares over a period of two years, or iii) a mining right, which give the applicant the right to mine the chosen area over a period of 30 years (Republic of South Africa, 2014). The administrative process of obtaining a mining authorisation is long, complicated and littered with stringent requirements (Ledwaba, 2017; Republic of South Africa, 2014). These requirements include: filling in and submitting online application forms, applying for environmental authorisation, employing independent consultants, consulting with the landowner or land occupier, consulting with parties interested in and/or affected by the proposed activities, providing proof of technical ability and even providing financial guarantees prior to breaking ground for land rehabilitation set to occur post-mining (Mutemeri & Ledwaba, 2017; Republic of South Africa, 2014). According to Hoadley & Limpitlaw (2004) and Mutemeri & Ledwaba (2017), it can take up to six months to obtain a prospecting right or a mining permit and nearly nine months to obtain a mining right.

According to Ledwaba (2017), the mining permit was intended for use by those who were interested in mining, but who could not afford to apply for a mining right. This was mostly applicable to HDSAs (Ledwaba, 2017). The mining permit, however, although cheaper to apply for than the mining right, is limiting, in that it only grants permission to mine over a relatively small area (five hectares) within a period of two years, with the option to renew the permit three times for a period of one year at a time (Republic of South Africa, 2014). In order to obtain a mining right, which grants the applicant permission to mine over a larger area for anything between five and 30 years, the ASM would have to spend money on a detailed assessment on the environmental impact of the proposed operations, as well as develop and commit to implementing a Social and Labour Plan (SLP) - this is in addition to the list of requirements already mentioned (Republic of South Africa, 2014; Nel, Binns, & Gibb, 2014).

Regulatory requirements

According to Heemskerk (2005) and Ledwaba (2017), the current regulatory requirements are financially taxing for ASMs as they are typically poor and can

barely make enough money to sustain themselves and their families. Licence holders are required to comply with the rules and regulations set out in: their mining authorisation, the MPRDA and all other mining-related legislation, such as National Environmental Management Act (NEMA), the National Water Act (NWA) and the National Environmental Management Air Quality Act (NEM:AQA) (Republic of South Africa, 2014). Complying with these requirements is very expensive and, according to Ledwaba (2017), only those with financial resources can comply. Those miners who are unable to comply fall into the category of illegal miners (Hentschel, 2003). As a result, the formal ASM sector has remained small, even though the sector itself is said to have grown (Buxton, 2013; Mutemeri, 2017; Ledwaba, 2017).

Hentschel's (2003) view is that there is no incentive for ASMs to operate within the legal framework, as the associated fees are a challenge for most. Ledwaba (2017) and Maconachie & Hilson (2011) agree with this view, further identifying the cost of regulatory compliance as the reason ASM choose to remain illegal. According to Nel et al. (2014), acquiring an authorisation, therefore, does not make economic sense for ASMs, particularly considering the scale at which they mine (IGF, 2017b).

2.1.2. Lack of financial resources

Capital investment

Ledwaba and Nhlengetwa (2016) correctly state that mining is generally a capital-intensive activity. In order to mine efficiently, miners have to invest in equipment; however, as indicated above; ASMs are predominantly borne out of necessity (Mkubukeli & Tengeh, 2015). This means that miners typically do not have the funds to invest in the operations and any supporting functions (Mutemeri & Ledwaba, 2017).

According to the DMR's definition of legal mining operations, most ASMs are illegal (Legal Resources Centre, 2016). The illegality or informality of the operations, as well as the absence of bankable feasibility studies, makes it

difficult for them to access funds from traditional financial institutions (Mutemeri & Petersen, 2002). This challenge is compounded by the stigma of criminal activity and child labour practices that hover over the sub-sector (Mutemeri & Ledwaba, 2017). Traditional financial institutions are unwilling to give large long-term loans to ASMs because they are considered to be risky borrowers (Mutemeri & Petersen, 2002). ASMs, therefore, rely on personal income to fund their operations and hope for government as well as private organisations to donate funds and equipment (Ledwaba, 2017).

2.1.3. Enterprise

Access to markets

The majority of ASM operations depend primarily on surrounding communities as their principal markets (Ledwaba, 2017). Sourcing customers is usually done haphazardly and in an unsystematic fashionas there are no funds to dedicate to marketing and the owners do not have the required marketing skills or knowledge to enter bigger markets (Mutemeri & Petersen, 2002). Except for those who mine high-value minerals that are always in demand, ASMs depend on word of mouth as their primary marketing tool (Mallo, 2012; Mutemeri & Ledwaba, 2017).

2.1.4. Technical

Technology

Most ASMs are heavily reliant on manual labour and use rudimentary tools during mining and processing (IGF, 2017a; Mutemeri & Ledwaba, 2017). According to IGF (2017b, p.5), the ASM sector is "characterised by low productivity" due to its labour-intensive nature (Yakovleva, 2007). This makes scaling up production difficult and as a consequence; pricing competitively becomes a challenge (Dreschler, 2001; Mutemeri & Ledwaba, 2017; Mutemeri & Petersen, 2002). Most of the technology available for mining in Southern Africa caters for medium and large-scale mining and not ASM operations (Dreschler, 2001; Hilson, 2002). IGF (2017b) and Ledwaba (2017) both noted that as miners try to move along the

continuum, from artisanal to small-scale, the technologies developed typically come at a cost the ASMs cannot afford and sometimes require skills that the miners do not possess. This according to IGF (2017b), Dreschler (2001) and Hilson (2002) presents a significant challenge to the growth of these operations.

Additionally, ASMs have difficulty when it comes to pinpointing the exact location of their minerals, as well as measuring the volume of the minerals (Mutemeri & Petersen, 2002). This is because they do not have the necessary geological information nor do they have the technology and expertise to conduct the assessment for themselves (Hilson, 2002). In the White Paper on Minerals and Mining Policy; access to information was identified as one of the major stumbling blocks for ASMs (Ledwaba, 2017).

Training

The ASM sector attracts people with different skillsets; some are entrepreneurs wanting to fulfil a dream of owning and operating a mining operation, some are skilled miners who were previously employed by LSMs, while others are unskilled labourers with no alternative other than to join the ASM sector (Mutemeri & Ledwaba, 2017). What is common to both the skilled and unskilled miners is a lack of technical, financial and business management knowledge, which is required to ensure that the operations are profitable and sustainable (Amankwah & Anim-Sackey, 2003). This knowledge includes, but is not limited to an understanding of mining-related legislation, business management and marketing (Debrah et al., 2014; Hoadley & Limpitlaw, 2004). Based on the assessment done by Ledwaba (2017), ASM operators need education and training in order for them to acquire the knowledge and skills that are necessary to develop and improve their operations. This, however, needs time and money that ASMs typically do not have (Ledwaba, 2017).

2.1.5. Social issues

Security

The informality or illegality of ASMs means that they are largely unregulated, which results in poor and generally unsafe conditions (IGF, 2017b; Mutemeri & Ledwaba, 2017). The lack of rule and control in the majority of the sector means that all who wish to join the sector are free to do so. Areas with an abundance of high-value minerals attract a high influx of miners, resulting in conflict between the miners and indigenous communities (IGF, 2017a; Mallo, 2012).

Over the years, more women have become involved in the ASM sector (Mutemeri & Petersen, 2002). The women are mostly employees responsible for digging, loading and selling processed or unprocessed material (Hinton, Veiga, & Beinhoff, 2003; Mallo, 2012; Yakovleva, 2007). Alcoholism and substance abuse is a common thread among miners and within the surrounding communities and leads to a host of social problems, including the spread of communicable diseases such as HIV/AIDS (Mutemeri & Ledwaba, 2017).

Section summary

From the challenges identified in this section, which is based on the literature available, it appears that the top five challenges facing the ASM sector relate to: i) lack of financial resources; ii) limited access to markets; iii) regulatory requirements; iv) lack of knowledge and skills; v) lack of technology. It seems logical that the mining sub-sector would, therefore, benefit from interventions that target these challenges.

This list of challenges is consistent with the challenges identified by miners during the consultation process that aided the drafting of the White Paper on Minerals and Mining Policy released 20 years ago (Ledwaba, 2017). This indicates that the challenges that were raised two decades ago have either not been addressed or are reoccurring. No evidence of a consultative meeting similar to that which led to the drafting of the White Paper on Minerals and Mining Policy in 1998 exists in the existing body of literature. This suggests that there is a possible knowledge

gap regarding the challenges that miners face on the ground. An assessment of the challenges confronting the ASMs 'on the ground' therefore needs to be done, in order to determine whether or not these challenges are still relevant as well as to establish whether any new challenges have emerged in the last 20 years.

Research Question 1

What are the challenges experienced by ASMs 'on the ground'?

2.2. Support provided to ASMs in South Africa

The DMR, as the sole regulator of the mining industry, has championed the establishment of programmes aimed at supporting the ASM sector (Ledwaba & Nhlengetwa, 2016). The socio-political state of the country makes the sub-sector very attractive to the government because of its potential to alleviate poverty, eradicate marginalisation and contribute towards the country's economy (Legal Resources Centre, 2016; Maconachie, 2011; Mutemeri, 2017). This view is shared by private organisations that have also established programmes to support ASMs (Debrah, 2014). In this section, the support provided to ASMs, by both government and private organisations, will be identified and discussed.

Legislative framework

Although not explicit, the mining permit was developed to accommodate small miners and those who were previously excluded; it could, therefore, be seen as a form of support for ASMs (Ledwaba, 2017). This is because the application process is not as stringent as that of the mining right application and it is considered affordable when compared to the other types of authorisation (Debrah et al., 2014; Mutemeri & Ledwaba, 2017).

Government support

Regulatory requirements

The DMR's primary focus has been to help ASMs comply with regulatory requirements through the establishment of collaborative structures - mostly committees - over the years, with the sole purpose being to attend to the needs of ASMs (Debrah et al., 2014; Ledwaba, 2017). These include the Small-Scale Development Framework (SDF), the National Steering Committee of Service Providers to Small-scale Miners (NSC), the Small-Scale Mining Directorate (SSMD) and the Small-Scale Mining Board (SSMB) (Ledwaba & Nhlegetwa, 2016; Mutemeri & Ledwaba, 2017).

Institutional support

The DME (now DMR) identified institutional support as one of the areas that are crucial to the development of the ASM sector (Ledwaba, 2017). According to Ledwaba (2017), the DME (now DMR) recognised that, in order for the sector to grow, specific structures would have to be established and made responsible for supporting and attending to the needs of ASMs.

The Small-Scale Development Framework (SDF) was established in 1999 to help ASMs gain credibility and access to the capital investment they need to improve their operations (Ledwaba & Nhlegetwa, 2016). The SDF provided ASMs with technical and financial assistance, however, even with bankable documents, ASMs still did not gain the confidence of financial institutions that could provide the capital investment required (Mutemeri & Ledwaba, 2017). This means that the assistance provided by the SDF did not have the desired outcome (Ledwaba & Nhlengetwa, 2016).

In the year 2000, the National Steering Committee of Service Providers to Small-scale Miners (NSC) was established and took the form of a one-stop-shop that was to ensure that small miners had easy access to the services they needed (Mutemeri & Petersen, 2002). The NSC comprised the following organisations: “Mintek, Miningtek, the Council for Geosciences, Ntsika, the Industrial

Development Council (IDC) and Khula" (Mutemeri & Petersen, 2002, p. 290). Services provided to ASMs were also made available to first-time mining entrepreneurs and small-scale miners with under-performing operations (Mutemeri & Petersen, 2002). According to Mutemeri and Petersen (2002), the NSC's objective was to help ASMs move from artisanal to small-scale miners. The NSC provided 90 per cent of the funds needed by miners to kick-start their mining operations (in the form of a loan) (Ledwaba, 2017). The assistance offered by the NSC included help with: environmental health and safety compliance, technical expertise, and the establishment of a sustainable business (Dreschler, 2001; Mutemeri & Ledwaba, 2017; Mutemeri & Petersen, 2002). The NSC went as far as assisting with the development of a bankable feasibility study to help the miners raise the 10 per cent not provided by the programme (Mutemeri, 2017; Ledwaba, 2017). The programme was successful in ensuring that the mining operations were visible, but according to Ledwaba (2017), these operations did not produce the required results. The NSC was disbanded in 2005, due to failure to produce enough viable projects, after spending R15 million on 20 projects (Mutemeri & Ledwaba, 2017).

The Small-Scale Mining Directorate (SSMD) was established in 2004 to be the dedicated structure for ASM within the DMR (Mutemeri & Ledwaba, 2017). It is not clear how the SSMD delivers this support, but it continues to assist ASMs with the following: "establishment of a legal entity, provide guidance towards the identification of mineral deposits, assist them with legal and contractual arrangements, reserve estimation of the selected deposits, mining feasibility study and conduct market studies" (Mutemeri & Ledwaba, 2017, p. 19 & 20).

The Small-Scale Mining Board (SSMB) was established within the SSMD in 2006 to replace the NSC (Mutemeri & Ledwaba, 2017). According to Mutemeri and Ledwaba (2017), the SSMB had similar objectives and support programmes to the NSC. It is reported that the SSMB performed much better than the NSC, as it reportedly supported 171 projects, compared to the 20 projects supported by the NSC (Solomons, 2015). The SSMB ran out of funds, as the funded projects were unable to repay their loans (Ledwaba & Nhlengetwa, 2016).

The available literature provides no evidence of any impact assessment being conducted; as a result, no information is available on whether the programmes were successful in assisting the ASM miners to establish a sustainable business (Ledwaba, 2017). The disbanding of the SSMB programme could indicate that the assisted miners did not make enough money to make the necessary repayments. The SSMB's objectives have since been absorbed by the SSMD, which, according to literature, is still active (Mutemeri & Ledwaba, 2017).

Some other government-related institutions such as the Mining Qualifications Authority (MQA), Mintek, Council for Scientific and Industrial Research (CSIR), the Council for Geoscience, have also provided support for ASMs through programmes designed to tackle specific needs (Dreschler, 2001) Ledwaba, 2017, p. 59). The MQA, for example, is the vehicle through which the National Skills Development Act of South Africa is implemented in the mining sector, through its Small-Scale Mining School that was established in 2004 (Mutemeri & Ledwaba, 2017). The MQA develops and provides accredited training programmes to miners and, upon completion, miners receive a certificate in their chosen programme; these are recognised throughout the sector and this, according to Mutemeri & Peterson (2002), is assisting small-scale mining to gain credibility in terms of skills. According to Mutemeri and Petersen (2002), Mintek has been instrumental in developing standards to be used for the training and skills development that is provided to ASMs. Mintek continues to; provide training on different commodities, conduct basic site assessment, testing and analysing samples mining reserves as well as research and development of mining technologies, for ASMs through its Small-Scale Mining and Beneficiation Division (Mutemeri & Ledwaba, 2017; Mintek, 2011). The downside to the support provided by these organisations is that some of the services such as training from the MQA is provided at a cost, which makes them inaccessible to ASMs (Ledwaba & Nhlengetwa, 2016).

Although not exclusively aimed at ASMs, some other government organisations have been able to support ASMs. These include the Department of Trade and Industry, The Department of Labour, The Regional Development Agencies, some

financial institutions as well as local and district municipalities (Mutemeri & Ledwaba, 2017). No details are available on the content of these programmes or the impact that these programmes have had on the recipients.

Private organisations

According to Dreschler (2001), over the years, LSMs such as De Beers and Samancor have been involved in the development and support of ASMs that mine the same minerals as they do. The support provided by these LSMs include mineral lease agreements, supply agreements, technical support, financial assistance and operations management (Dreschler, 2001).

Support summary and comparison

The literature reviewed in this section shows that, over the years, there have been many interventions and funding provided by the government and private organisations in support of the ASM sector (Hilson, 2007). The interventions include assistance with regulatory requirements, capital investments or assistance with accessing capital, technical information, and training aimed at enhancing both the technical and business management skills of ASMs (Dreschler, 2001; Mutemeri & Peterson, 2002; Ledwaba 2017).

Based on the literature review above, Table 1 below was constructed to indicate the support provided to ASMs in comparison to the challenges that have been identified. This will assist us in understanding if there are any discrepancies or gaps between the challenges and support. It is important to note that, while these programmes may have offered the required support, most of them no longer exist, which means that some of this support has fallen away and therefore no longer benefits the ASMs.

Table 1: Support provided compared to challenges in the ASM sector

	Programmes to support ASMs							
Challenges	**SDF (1999)**	**NSC (2000)**	**SSMB (2006)**	**SSMD (2004)**	**MQA**	**Mintek (2002)**	**CSIR**	**Support form LSMs**
Governance								
Regulatory framework (Hoadley & Limpitlaw, 2004; Mutemeri & Ledwaba, 2017)	✔							
Centralised governance (Hoadley & Limpitlaw, 2004)								
Regulatory requirements (Republic of South Africa, 2014)				✔				✔
Institutional support (Ledwaba, 2017)						✔		✔
Financial resources	✔							
Access to funding (Mutemeri & Petersen, 2002)		✔	✔	✔				
Inability to borrow funds (Mutemeri & Petersen, 2002)		✔	✔	✔				
Economic/Enterprise	✔							
Access to market (Ledwaba, 2017)				✔				
Business management skills and knowledge (Amankwah & Anim-Sackey, 2003)				✔				
Capacity building (Debrah et al., 2014; Hoadley & Limpitlaw, 2004)		✔	✔	✔				
Supply agreements (Ledwaba, 2017)								✔
Operational support (Ledwaba, 2017)								✔
Social								
Safety and Security (IGF, 2017; Mallo, 2012).								
Technical	✔	✔	✔	✔		✔	✔	
EHS compliance (Mutemeri & Ledwaba, 2017)		✔	✔			✔		
Mining-related qualifications/training (Mutemeri & Ledwaba, 2017)					✔	✔		
Geological information (Hilson, 2002)		✔	✔	✔				✔
Bankable feasibility studies (Debrah et al., 2014; Hoadley & Limpitlaw, 2004)	✔	✔	✔	✔				
Technology (Dreschler, 2001; Mutemeri & Ledwaba, 2017; Mutemeri & Petersen, 2002)						✔	✔	
Research and development (Debrah et al., 2014; Hoadley & Limpitlaw, 2004)	✔					✔		
Mining, processing and beneficiation methods (Mutemeri & Ledwaba, 2017)		✔	✔			✔	✔	✔
Programme impactful (Ledwaba, 2017)	⊘	⊘	⊘	⊘	✔	✔		
Programme still exists (Ledwaba, 2017)	✘	✘	✘	✔	✔	✔	✘	⊘
Key: ✔ =yes; ✘=no; ⊘=unknown								

Research Question 2

What support is provided to ASMs?

2.3. A conclusion of the Literature Review

Based on the literature available, it would appear that support provided for ASM is inadequate and does not address all the challenges in the sector, particularly since some of the programmes have fallen away (Hilson, 2007). It is, therefore, imperative that research is conducted to find out what the current situation is 'on the ground' in order to establish if there are indeed any gaps between the challenges they face and the support they receive.

Research Question 1:

What are the challenges faced by ASMs 'on the ground'?

Research Question 2:

What support is provided to ASMs?

3. Methodology

This chapter provides a map of the qualitative research methodology and strategy used during this study. Insight into the criteria used to select research participants as well as the rationale behind the sampling decisions is discussed. A detailed account of how the data was collected and analysed is also made apparent.

3.1. Research design

The purpose of the study was to get an understanding of the challenges faced by ASMs on the ground as well the support that is offered to them by the government and private organisations in order to establish whether there is any misalignment of the challenges experienced and supported provided. Due to the exploratory nature of this study, an exploratory qualitative research methodology was used. This is due to the fact that qualitative research enables the researcher to gain a deeper understanding of the problem, by focusing on the issues that contribute to the complexity of the situation (Creswell, 2003). To ensure that participants did not feel restricted in their responses; an interview schedule with open-ended questions was drawn up in order to aid the face-to-face semi-structured interviews.

3.2. Population

Since ASMs exploit minerals and metals across the entire range, the study was not restricted to any mineral or metal; however, only those ASMs operating surface mines will be included (Mutemeri & Ledwaba, 2017). This decision was based on the assumption that surface miners and underground miners may have vastly different challenges and also ensure the safety of the researcher.

A total of 83 ASMs were identified as potential candidates for interviews. This total comprised of 41 ASMs from the DMR's national database of artisanal and small-scale miners and 42 ASMs from the Mintek database of small-scale miners. The rationale behind selecting these two databases as the primary sources of

participants was a) the DMR is the sole regulator of the mining in South Africa and therefore the only issuer of mining authorisations; using their database would ensure that the researcher did not interact with illegal miners since they fall outside of the scope of this research, b) the DMRs' database and the Mintek database would provide the researcher with candidates from all provinces, since both organisations operate at a national level, and c) Mintek, according to literature, continues to support ASMs that seek support, this means that their database would have candidates that are actively looking for and welcome support as well as have the desire to optimise and grow their mining operations (Hoadley & Limpitlaw, 2004; Mintek, 2011; Muswaka, 2017).

The criteria for inclusion was; i) possession of a mining authorisation, ii) availability for a maximum of 45 minutes, iii) willingness to participate, and iv) an average annual turnover of below R10 million for fossil fuels and industrial minerals, and below R30 million for precious metals and gemstones.

3.3. Sample

According to Saunders, Lewis, & Thornhill (2009) and Sharma (2015), a sample is a small representative collection of units within a population; it is used to acquire information that will allow the researcher to infer judgements that can be applied to the entire population. With the project time constraints, financial constraints as well as the fact that the number of ASMs operating in the country is unknown, the researcher understood that it would be impossible to access all ASMs in the country; therefore, non-probabilistic sampling was used to select research participants for the study (Saunders et al., 2009). The sample of participants was consequently drawn from the broader population of ASMs listed on the databases mentioned above, all of which were eligible for support from the government, government-related organisations and private organisations.

The researcher was able to successfully interview a total of 12 miners, five participants from the Free State province and seven participants from the Gauteng

province. Both provinces produced interviewees that mined precious as well as non-precious minerals.

3.4. Data collection and analysis

The researcher decided to conduct individual interviews as this was anticipated to facilitate open and honest conversations with the interviewees. Through individual interviews, the researcher would also be able to avoid the undue influence of the interviewees by others and also be able to guarantee the confidentiality of the information provided by the miners. The planning and coordinating of interview appointments with individual interviewees was also more convenient for both the researcher and the interviewees when. All interviews, except one, were conducted at the miners place of business or close as close to it as possible as this, a) was convenient and saved time the miners' time, b) allowed the subject the freedom to reflect on information as the interview progresses, and c) allowed the researcher the opportunity to give immediate feedback and prompt for more information if necessary (Saunders et al., 2009; Taylor, Bogdan, & DeVault, 2015).

The data was collected using a semi-structured interviews format. The questions were divided into two categories; qualifying questions and exploration question. This structure aimed to ensure that the researcher did not interview miners that did not meet the inclusion criteria. Two participants did not make it past the qualifying questions.

The exploratory questions were open-ended. The researcher, from time-to-time, was compelled to ask follow up questions for clarity and to draw out richer responses from the interviews, these have not been included in the interview schedule (Saunders et al., 2009). See Appendix A for the interview schedule. For ease of reference, the researcher took notes during the interview and, with the permission of the interviewee, made audio recordings of the interview. This was to ensure that the researcher engages the interviewee in conversation instead of concentrating on writing the interviewees responses. It should be noted that some

of the interviewees did not give permission, forcing the researcher to rely squarely on her notes, which in these instances, the researcher ensured were detailed.

On completion of the data collection process, the researcher revisited the notes made during the interviews and listening to the available audio recordings. Thematic content analysis was then used to analyse data (Saunders et al., 2009). The thematic content analysis allows the researcher to pick out the emerging themes and patterns within the data enabling her to better interpretation data (Braun, 2006).

3.5. Limitations

Due to time and financial constraints, only two provinces out of the nine South African provinces were visited by the researcher. Financial and time constraints resulted in the selection of a relatively small sample in relation to the size of the population. With more resources, a larger sample could be sourced and used to make inferences about the whole ASM sector in SA.

3.6. Transferability and dependability

The researcher elected to confine the study to surface mining operations and exclude underground mining operations. This was intended to ensure transferability of the study by making sure that the results of the study are relevant to the ASM sector that work in surface mining operations (Rothwell, 2005). Subsequent research may be required to supplement the results of this study, in order to adequately apply this research to the whole ASM sectors. The outcome of this study could also be used as a guide by the DMR and other stakeholders who are hoping to plough resources into the ASM sector, as the research will: highlight the gaps in the support provided; recommend the areas that would benefit from intervention and which could potentially unleash the potential of the ASM sector (Ledwaba & Nhlengetwa, 2016; Ledwaba, 2017; Tracy, 2010). To ensure the dependability of

the study, the key phases of the research process such as data collection and data analysis phases were documented to facilitate cross-checking of participants' responses and subsequently stored (Lincoln & Guba, 1986; Ndofirepi & Rambe, 2018; Tracy, 2010).

3.7. Ethical considerations

According to Orb, Eisenhauer, and Wynaden (2001), ethical consideration is about avoiding harm. In qualitative research, ethical problems are of a subtle nature in that they revolve around the balance of power between the researcher and the participants (Orb et al., 2001). The researcher, as the research instrument, was mindful of her behaviour within the participants' environment.

No participants under the age of 18 were engaged during the data collection. The participants were all advised that their participation in the study would be entirely voluntary meaning that they would not be compensated for their time or the information provided as the data that was collected was for research purposes. No subjects were coerced or pressured to participate in this study; to this end, all were given the option to opt out of the study at any point during the interview. All participants who qualified to participate complete the interview with no reservations.

It was explicitly stated to all interviewees that the researcher's objective is merely to collect the information regarding the challenges and support provided and identify the gaps. It will be communicated to the participants that the outcomes of the research may be used by support providing organisations such as the Department of Mineral Resources to align their support programmes to the challenges on the ground. The researcher made explicitly stated that she would not and was not in a position to provide any support to the interviewees.

The anonymity of the participants cannot be guaranteed because data will be collected during face-to-face interviews, but in saving the data collected, no names were used as references. The researcher made sure that the participants

understood that while the information they provide would be used to draw generalisations about the ASM population, their identities would be kept strictly confidential. Only the researcher and the supervisor will be sworn to confidentiality as they would be the only individuals, outside of the participant, who are aware of individual responses.

The safety and security of the researcher and the participants was of utmost priority. To mitigate this the researcher made and confirmed appointments before the interviews with the subjects to avoid the element of surprise. The researcher advised her sister, classmate and a colleague of the scheduled interviews and location of the sites where the interviews would be conducted.

4. Results and discussion

The study sought to establish whether there is a misalignment between the challenges faced by ASMs and the support provided to them by government and private entities. This chapter presents and discusses the findings of the interviews conducted with the ASMs. In an effort to avoid repetition, the results and discussion chapters have been combined into one chapter. This means that the results are be presented and simultaneously discussed in relation to the existing literature in this one chapter (Ndofirepi & Rambe, 2018).

This chapter is divided into three sections. The first section presents and discusses the challenges experienced by the miners, the second section presents and discusses the support provided to these miners, and the third section compares and contrasts the results discussed in section one and two of this chapter.

4.1. Challenges experienced

During the analysis of the interviews, five themes emerged pertaining to the challenges faced by ASMs. These five themes, which in some instances are broken down into subthemes, have been discussed below in relation to the literature available regarding the challenges experienced by ASMs.

4.1.1. Theme 1: Government related issues

Government related challenges were dominant in this study as all respondents made reference to them. It seemed to be the first theme that surfaced in their minds when speaking about the challenges they experience. The responses were varied and spoke to multiple components of government related issues such as the mining authorisations, competent authorities and inspectors, existing legislation applicable to mining, regulations and compliance. These responses were assigned to two categories, namely; the legislative framework and the regulatory requirements.

Legislative framework

Respondent 1 stated that they had difficulty supplying their clients due to restrictions imposed on their operations by their “approved EMP, Water Use Licence and the new Mining Charter”. The pieces of legislation from which these restrictions are born include; the MPRDA, the NEMA, the NWA, the NEM:AQA, MHSA and the Broad-based Socio-Economic Empowerment Charter for the Mining and Mineral Industry, commonly referred to as the Mining Charter. These, according to Hoadley & Limpitlaw (2004), are generic and apply to all mining operations equally. Respondent 8 displayed a significant amount of frustration while listing all the pieces of legislation applicable to their operation. Additional to the frustration of a long list of legislation have been the staggered but continuous amendments to the Acts and regulations which have imposed more stringent rules on the mining industry. The new Mining Charter, for example, was gazetted in 2018, the third Mining Charter to be gazetted since the initial Mining Charter in 2004 (Deloitte, 2018; Republic of South Africa, 2018).

Republic of South Africa (2018), states that no new mining authorisations will be issued to entities that do not meet the requirements of the new Mining Charter (III). Respondent 6 and 10, expressed relieve for the fact that their mining operations were still able to mine. This because the Mining Charter (III) stipulates that all existing mining authorisations that meet the requirements of the Mining Charter (II) are valid for a period of 5 years post the promulgation of Mining Charter (III) (Republic of South Africa, 2018). The respondents, however, expressed concern over the requirement to increase their Black Economic Empowerment (BEE) shareholding to a minimum of 30% because according to Republic of South Africa (2018), an application for a new mining authorisation or a renewal of an existing mining authorisation would be subject to the requirements of the Mining Charter (III). Respondent 5 stated that "we find some of the new requirements by the new Mining Charter unreasonable for small and scattered operations like ours…this may be feasible for LSMs but for ASMs this is crippling". Respondent 6 further stated

that “we did this in 2014 and now we must do it again, this is very expensive and we cannot afford it".

The process changes or system improvements were also a challenge for ASMs. An example given by respondent 7 was “the change from the written mining authorisation applications to the online SAMRAD system”. The implementation of this system, although forward looking and convenient did not consider ASMs without access to the internet nor did it consider the cost implications of the changes on ASMs. Respondent 12 agreed with this stating that “we imagine it is convenient for other mines, but it definitely does not make it easier for us”. According to respondent 7 “now that we are doing applications online, it is very difficult for us and very expensive because consultants are required,

The structure or design of the legislative framework, particularly the flow of information and resources through the different components of the structure, both within and outwards towards the public, was highlighted as extremely confused and inefficient by respondent 4. Hoadley and Limpitlaw (2004) attributed this to limited capacity within the departments as well as a general lack of efficiency within state departments.

It is understood by ASMs that the DMR is the sole regulator of the mining industry with supported from other government departments such as DWS, DEA and the municipalities (Hoadley & Limpitlaw, 2004; Muswaka, 2017). However, ASMs, as stated by respondent 3 and 8, reported that they lacked clarity on roles and responsibilities of the different state entities towards them. Muswaka (2017), attributed this to the DMRs’ challenge with practicing co-operative governance which has resulted in a lack of clarity on the roles and responsibilities of other government departments. Respondent 2 and 4 highlighted the slow turnaround time of government departments as a major challenge for ASMs. According to respondent 4, the DWS took six years to issue a water use license while respondent 2 simply stated that the departments “take too long” to process applications and queries. This has caused major delays and has even led to us missing opportunities

and hindering our productivity. Respondent 7, revealed that the municipality had not been interested in assisting him in getting the relevant documentation in order for him to get assistance from the DMR. Respondent 7's testimony, supported the concerns raised by respondents 3 and 8 as well as view of both Hoadley & Limpitlaw (2004) and Muswaka (2017).

In summary, this subtheme highlighted the following challenges faced by ASMs; i) a long list of legislation to comply to with staggered but continuous amendments of the acts, ii) the requirement by the new Mining Charter to reconfigure the structure their entities, iii) the change from the written mining authorisation applications process to the online SAMRAD system iv) confused and inefficient composition of the legislative communication and resource flow framework, v) the slow response time of government departments and, vi) the disregard for the impact of delays on ASMs by officials.

Regulatory requirements

All respondent cited regulatory requirements as a major challenge to operating their mines. Respondent 4, 5, 8, and 9 all mentioned that the regulatory requirements related to health and safety and the cost implications of complying. Respondent 4 agreed with respondent 9 who stated that "compliance to legal requirements, particularly environmental health and safety was heavy on the pocket". Respondent 9 went on to say that "the frequency of the reports required by the DMR was a bit ridiculous". Environmental health and safety compliance requirements were not the only regulatory requirements. Respondent 4 stated that, Sector Education & Training Authority (SETA) reporting, which included annual training reports and skills plans were detailed and onerous and as a result required the appointment of an additional skills development facilitators due to complexity of the requirements of the report. Respondent 7 and 8 agreed with this, with respondent 7 quoted as saying "compliance is very expensive".

This requirement to comply to all the above legislation in the same way that other licence holder spoke to the "blanket approach" identified by respondent 4. This

sentiment, which was also noted by Hoadley & Limpitlaw (2004), was shared by respondent 5, 6, and 9.

The ASMs voiced dissatisfaction at the manner in which legislation was enforced. Respondent 3 mentioned stated that “the main problem is the box ticking approach taken by the inspectors where they offer no guidance but are quick to punish”. This was in line with the view expressed by Booysen & Spalding (2019) and Dreschler (2001) about the “blanket approach” taken by law makers and inspectors when developing and enforcing the law respectively.

Respondent 5 stressed that the “requirements by the DMR were very stringent and sometimes difficult to meet for small mine”. According to Respondent 2, “there is also a general over prosecution of miners that are trying to be legal, while those that do not bother get away with murder”. Muswaka (2017, p. 37) supported this, stating that “one of the challenges facing South Africa with regard to mining was that detection of mining violations did not always lead to action”. According to respondent 1 and supported by Hentschel (2003), Ledwaba (2017), Maconachie & Hilson (2011) and (Nel et al., 2014), there is no incentive for ASMs to operate within the legal framework, particularly at the scale at which they mine. As a result, the formal ASM sector has remained small, even though the sector itself is said to have grown (Buxton, 2013; Mutemeri, 2017; Ledwaba, 2017).

This section highlighted the following challenges for ASMs related to regulatory requirement; i) the cost implications of complying ii) the high frequency rate of the reports required by the DMR, iii) the box-ticking and blanket approach taken by the inspectors when enforcing the law, and iv) the over prosecution of miners that are trying to be legal.

4.1.2. Theme 2: Financial Resources

Funding

Respondent 2 and 5 both stated that they mined low grade material and that in order to make money, high volumes of material needed to be mined. In order to mine effectively, the miners needed to invest in equipment (Mkubukeli & Tengeh, 2015). Mining is typically a capital-intensive industry with large, high tech equipment and processing plants (Ledwaba & Nhlengelwa, 2016). ASMs operate at the lower end of the spectrum, using rudimentary to low-tech equipment to extract and process minerals (Mkubukeli & Tengeh, 2015; Mutemeri & Ledwaba, 2017). The lack of capital invested in equipment as a result was identified as a challenge for ASMs. Respondent 1 frustratedly stated that “we cannot supply all our customers because we don’t have the capacity”. Respondent 6 shared this frustration revealing that the lack of capital to invest equipment and the human capital with the expertise was the reason they did beneficiate their product.

This frustration was exacerbated by the lack of support or assistance from traditional and non-traditional financial institutions. According to respondent 2 “no institution/bank are willing to offer loans to us because we are still small and growing”. This supported the finding by Mutemeri & Petersen (2002), which stated that traditional financial institutions were unwilling to give large long-term loans to ASMs because they were considered to be risky borrowers. Respondent 2 and 8 mentioned that traditional financial institutions as well as the Industrial Development Corporation of South Africa (IDC) require bankable feasibility studies in order to consider funding a mining operation. According to respondent 8, “these studies cost millions to develop” meaning that ASMs were not likely to receive funding from any financial institutions as they could not afford to develop the bankable feasibility studies. The DMR, according to respondent 8, had also not been able to assist miners with funding, stating that “we applied for a grant, but after 5 years of trying, we gave up”.

This section revealed the following funding challenges, i) a lack of capital to invest in equipment, ii) the lack of support or assistance from traditional and non-traditional financial institutions and iii) a lack of response to funding applications for support from the DMR.

Costs

Respondent 1, 4 and 6 revealed that operating costs in the mining industry were very high and difficult to control. This, according to respondent 4 and 5, was a result of the fluctuating fuel prices, rising prices electricity, labour as well as other operational expenses such as the maintenance of equipment. Respondent 4 explained that the sub-sector relies heavily on fuel and electricity and as a result, any changes in the prices affected the operations immediately. Adding fuel to the fire was the fact that the supply of some production inputs, such as electricity, were unreliable. Respondent 7 confirmed this view, stating that “our municipality is poor when it comes to providing resources such as electricity and this tempers with our business operations”. Respondent 4 recognised that this made planning for growth and expansion nearly impossible because any profit generated would need to be set aside as contingency to finance the production input alternatives. These, according to respondent 2 and 9, “eat away at our cash flow, which already is a major challenge for us”.

Regulatory requirements were identified as a major challenge in the previous theme, however in this theme, the challenge identified by ASM was the financial implications of compliance for ASMs as mentioned by respondent 3, 4, 5, 8 and 12. According to respondent 5, the “DMR does not differentiate between big operations and small operations because some of the requirements want us to spend money, which is a challenge for us”. This supported Heemskerk’s (2005) view that regulatory requirements were financially taxing for ASMs. As pointed out by Ledwaba (2017) and IGF (2017b), ASMs barely made enough money to sustain themselves and their families. Respondent 5 was quoted saying “we wish small miners could be exempted from these requirements because some of these

conditions that we need to comply to do not really apply to small mines" (Respondent 5). The requirement to provide proof of availability of funds for rehabilitation prior to getting an authorisation to mine surfaced and was mentioned, by respondent 6, as one of the requirements that ASMs should be exempted from (Muswaka, 2017; Republic of South Africa, 2014).

From this subtheme, the following challenges were highlighted; i) high operating expenses, ii) lack of cashflow, and iii) the cost of environmental, health and safety compliance, and iv) the requirement to have finances set aside future rehabilitation prior to mining.

4.1.3. Theme 3: Technical capabilities

Technology

Respondent 6, 11 and 12 revealed that they had small operations which employed labour-intensive method of mining and used basic tools, such as shovels and buckets. According to respondent 6, labour made up about 30% of the costs of production. Coupled with the lack of capital to invest in equipment, the labour-intensive nature of ASMs made scaling up production difficult (Dreschler, 2001; Mutemeri & Ledwaba, 2017; Mutemeri & Petersen, 2002). Respondent 6 expressed a desire to upscale but this desire had not been realised. Respondent 2, 7, 11 and 12 also expressed the limitations that were associated with a lack of the necessary equipment to optimise production. As stated by respondent 2 "we need help with getting equipment for processing our material because taking material resources to bigger plants for processing depletes our finances". This was a major challenge for ASMs.

As all the ASMs interviewed operated surface mines, all are affected by weather conditions. Respondent 6, however was particularly affected by the weather, especially the rain, as it diluted their mineral and thus increases the cost of production by increasing time spent between extraction and selling. Droughts,

according to respondent 6 had also had an impact on the cost of production because this meant that the resource needed be extracted from further down in the boreholes. Water, for respondent 7, was an intrinsic input component of the production process. “There is nothing that we can do without water” (respondent 7). In the case of both respondent 6 and 7, there was a requirement for capital intensive technologies to mitigate these risks. Sourcing water during a drought, according to respondent 7, require a drilling rig that goes deeper into the earth. At the scale at which these ASMs operated, such technologies were inaccessible to them (Nel et al., 2014).

Respondent 7 also expressed a challenge with sourcing some of the equipment that was used in the production process as the donors did not reveal their supplier to the ASMs when they delivered the equipment. Respondent 7 was worried that without this technology, they would have to stop production or find suboptimal alternatives.

Respondent 2, 6 and 9 expressed a challenge with calculating and understanding the reserves available for them to mine. Respondent 6 expressed a desire to understand the quantities available to be mined while respondent 9 highlighted the geological composition of the resource as the primary concern as this heavily influences the cost of mining the material. According to respondent 6, ASM simply did not have the technology or expertise needed to conduct these calculations themselves and outsourcing these services came at a very high cost. According to respondent 2, without this technology, the miners would not be able to determine the lifespan of their mines. The lack of technology and financial resources to conduct these studies ironically was the reason why ASMs could not produce bankable feasibility studies that would ensure that they got the funding and the technology they need to growth their mining operations (Mutemeri & Ledwaba, 2017).

In summary the challenges revealed in this section were; i) labour-intensive mining methods, ii) lack of equipment and technology to optimise production, iii) lack of

knowledge about the source of existing equipment and technology, and iv) lack of technology and resources to conduct resource reserve calculations.

4.1.4. Theme 4: Enterprise and capacity building

As stated by Dreschler (2001) and Hilson (2002), the technology available for mining in Southern Africa cater to medium and large-scale mining. ASMs sometimes inherit these technologies and adapt it to their operations, however as most of the equipment is old ASMs experience a lot of breakdowns. Respondent 2, 6 and 9, reported that the lack of operating cashflow made it difficult for them to continue production when there were unexpected expenses or stoppages. This, according to respondent 2, affected production and the capacity to supply customers.

With production issues and limited equipment, respondent 1, 2, 7 and 8 reported that they were unable to supply existing customers and furthermore could not source new customers fearing that they would not be able to supply. Respondent 6 and 12, expressed a desire to increase, expand and diversify their customer base, but lacked the resources and support to turn their desires into action. According to respondent 6, “we need help to expand our market because in dry seasons we lose money as most farmers sell their cattle and they do not need the salt anymore”. Further to this, respondent 7 and 12 revealed that they lack the knowledge to grow and sustain their operations independently. Respondent 7 explained that Mintek, an organisation that assisted the ASM with equipment, did not provide the details of the suppliers, leaving the ASM stuck when the equipment needed to be replaced. Respondent 12 stated they needed mentorship on how to grow the business into something they can leave as a legacy for their children.

In summary, ASMs revealed the following challenges with regard to enterprise and capacity building; i) lack of operating cashflow, ii) production issues as a result of breakdowns and a lack of equipment, iii) inability to supply customers due to limited

capacity, iv) lack of resources and support to grow, v) limited customer base and vi) lack of guidance and mentorship.

4.1.5. Theme 5: Social

Community

According to respondent 5, the new Mining Charter awakened the communities in and around mining areas to their rights and obligations of the mining companies. Unfortunately, as stated by respondent 3, the communities, did not differentiate between low value and high value minerals that were mined by the different operations. With this limited understanding of the different minerals, mining methods and mining operations, members of the local community made high demands and threaten to halt operations if their demands were not met (Respondent 11). This was identified as a challenge by respondents 3, 5 and 8.

According to respondent 9, the lack of support from the DMR and corporation from ward councillors in engaging with the communities exacerbated the friction between the miners and the communities. Respondent 5 and 9 both mined in close proximity to communities and like all mining right holders, had made commitments to do their bit to improve the standard of living in their surrounding communities (Hoadley & Limpitlaw, 2004). Without the assistance of both the DMR, local municipalities and local leaders, mining right holders found these commitments difficult to implement.

From this above subtheme, the challenges experienced by ASMs could be summarised as; i) demands and threats made by communities to halt operations if their demands are not met, ii) lack of support from the DMR and ward councillors in engaging with the communities, and iii) difficulty in implementing commitments of the SLPs.

Safety and Security

Respondent 5 and 9 revealed that they experienced a lot of theft in their mining operation. According respondent 5, “our infrastructure does not last, even with security on site”. Respondent 9, as a result, resolved remove and lock away all equipment at the end of each day shift. This according to respondent 9 came at quite a significant cost. The respondents identified this as a major challenge as, over and above the expense of moving and storing away the equipment on a daily basis, this activity increased the rate of wear and tear on the equipment.

Respondents 2, 8 and 10 both operated surface mines that mine high value minerals. As a result, illegal miners (Zama-zamas) were prevalent in their areas. The presence of Zama-zamas brought to the surface a number of challenges for the legal miners. Firstly, Zama-zamas damaged property in order gain access to the areas that appeared to have the greatest reserves and then proceeded to mine the easily accessible resources leaving the right holders with the challenge and costs of mining the difficult to reach minerals. Secondly, the illegal miners employed mining methods that contaminated the left-over resource, which again left the legal right holder with the expense of having to decontaminate or abandon the reserves. Thirdly, and perhaps the biggest challenge for legal miners were the dangerous conditions created by presence of illegal miners. According to respondents 8 “they entered the mine with AK47 and heavy artillery and made it very difficult to mine certain areas”. Respondent 2 went on to state that “the police and the DMR turned a blind eye to these activities”.

In summary, the challenges pertaining to security were; i) theft of equipment, ii) presence of illegal miners, iii) dangerous working conditions, and iv) resources theft and contamination.

4.2. Support offered

The analysis of the data collected revealed that the support provided to ASMs can be divided into four main themes. These themes were, in some instances be broken down into subthemes and discussed in relation to the literature available regarding the support provided to ASMs.

4.2.1. Theme 1: Government related issues

All respondents except respondent 2 and 4 reported to have had some level of support when it comes to government related issues. The support came from a number of agents, which included government departments, state-owned entities, lobbyist, consulting firms, private companies as well as fellow ASMs.

Respondent 1, 4 and 5, belonged to a lobbying organisation known as the Aggregate & Sand Producers' Association of South Africa (ASPASA). The respondents paid an annual membership fee to this organisation. This organisation, according to these respondents assisted with issues related to compliance with environment, health and safety in the mines. According to respondent 1, ASPASA conducted baseline audits that assessed the compliance status of the client. After identifying the gaps, ASPASA provided guidance on how compliance could be improved. The guidance, according to respondent 1 came in the form of a system that the ASM/SSM could implement, access to documents that had been developed and given the nod (never officially approved) by the competent authorities along with checklists for self-audit. The organisation used its muscles to lobby for SSMs, which included ASMs. The lobbying done by ASPASA was focussed on influencing the legislative framework through the inclusion of SSMs in decision making as well as the consideration of the SSM mining sub-sector in legislation amendments (ASPASA, 2018).

Respondent 9 expressed gratitude for the assistance provided by the National Occupational Safety and Health Consultancy (NOSHCON) in their mining

operation. Unlike ASPASA, NOSHCON was not a lobbying organisation, but assisted the mining right holder correct findings or implement systems to prevent nonconformances (NOSHCON, 2019). Like ASPASA, one needed to pay an annual fee to be a member of NOSHCON. NOSHCON, unlike ASPASA did not restrict its services to members, but also had a consulting wing that allowed the organisation to help non-members at a fee (NOSHCON, 2019).

Although they appeared to be punishing in their methods, respondent 4, 5, 6, 9 and 12 recognised the visits by the inspectors as assistance from the government. According to respondent 9, “the DMR helps us keep our mining right by constantly checking on us”. Respondent 4 emphasised the importance of good relationship with the DMR, both directly and through the tripartite forums, where government, industry and the public engaged on a quarterly basis. According to respondent 4, inspectors provided a lot of direct guidance, particularly when there was a lack of clarity on legislative or regulatory issues.

The greatest support, according to respondent 4, 5 and 10 came through the tripartite forum from other mining companies. The tripartite meeting according to respondent 10 was a safe space for SSMs to struggles and frustrations were shared and learning occurred through information sharing. According to respondent 4 “there is a culture of sharing” and respondent 5 concurred. Based on these responses, the DMR had been successful in establishing collaborative structures where the department, industry and the public could learn from one another (Debrah et al., 2014; Ledwaba, 2017). Respondent 6, praised the department of agriculture, for the support through frequent visits their operations as well as the assistance with the renewal of their trading permits.

In summary, ASMs revealed that they had the following support to overcome government related issues; i) government liaison and lobbying ii) update on changes in legislation from ASPASA, iii) guidance on how to achieve compliance to environmental, health and safety iv) visits from government inspectors to check on compliance, v) guidance on the interpretation of the law, and vi) tripartite forums.

4.2.2. Theme 2: Financial resources

Respondent 3 and 5 appeared to have the same strategy, or sold to customers with similar business models as both revealed that they had good relationships with their customers. Both respondent 3 and 5 received assistance from their customers. This support was in the form of funding in capital-intensive projects for projects that potential to benefit the customers directly. This funding, according to both respondents, had helped the mining operations expand as the ASMs were able to purchase equipment and paying for some aspects of the raw material sourcing process. Respondent 5 revealed the funding sometimes was in the form of a loan, but admitted that the payment terms were favourable. Although not directly technical, the financial assistance helped improve the technical capabilities and production efficiencies of these two ASMs. Respondent 8 revealed that the ASM received capital investment from private shareholders when there was a legitimate need.

Respondent 2 and 9 did not get assistance in terms of funding from their customers, but acknowledged the efforts by their customers to process invoices and make payments almost immediately. These efforts helped the ASMs with cashflow.

In terms of financial support, ASMS revealed that some of them, in summary, had; i) access to funding from their customers to purchase of equipment and to pay for resource exploration, ii) favourable loan repayment terms, iii) capital investments from private shareholders, and iv) preferential payment of invoices.

4.2.3. Theme 3: Technical capabilities

Technologies and technical assistance

Respondent 5 and 7 revealed that they had support with regard to technical equipment. This assistance, according to respondent 5, included access to the services of a drilling rig when they needed to drill the earth looking for new reserves while respondent 7 received stone cutting blades from Mintek, a state-owned entity.

Respondents 5, 7 and 9 were also pleased to reveal that they had access to technical services that assist them in their mining activities. Respondent 5, for instance had access to a lab that was operated by a supplier of one of the customers where samples that had been extracted by the drilling rig were taken for testing. This helped both the ASM and the customer as it ensured that the quality of raw material supplied by the ASM met the criteria set by the customer. Respondent 9, had the fortune of having quality obsessive subcontractors who appointed a geologist when the need arose to help ensure that they mine optimally and get the best quality for the customer. This came at a cost, but this cost was passed on to the customer.

Additional to the regulatory and legislative support, ASPASA also conducted research within the industry on the best practices for ensuring safe and sustainably productive work environments which were subsequently shared with its members (ASPASA, 2018). This research, according to respondent 1, was also used in lobbying activities and helped the members of ASPASA improve operational efficiency. Respondent 7, also mentioned during the interview that they receive students from the local tertiary education institutions. These students were sent to the miners for experimental training as part of the requirement to complete their studies, the miners trained the student and in return the students passed on some of the knowledge they have acquired from school and educated the miners on faster and more innovative ways of doing things (Respondent 7).

To summarise, in terms of technical support, ASMs had; i) access to technical equipment and services, ii) advice on best practice methods to improve operating efficiency, iii) education from students doing learnerships on faster and more innovative ways of doing things.

Training and skills transfer

Respondent 4 revealed that they received training from ASPASA. Most of the training was part and parcel of the membership but some of it required extra payment. According to respondent 4, the MQA also offers training, but this training

was not free. Respondent 7 happily announced that the operation hosted graduates when it could afford to as they believe that “the youngers that came out of varsity needed the practical experience”. Similarly, respondent 2 expressed a desire to host graduates and expose them to the operations. Both respondent 2 and 7, however, emphasised that the skills transfer process should not be at their expense. Admittedly, both respondents wished to also gain new knowledge, skills and innovative ways from these students therefore making sure that the process is mutually beneficial.

4.2.4. Theme 4: Enterprise and capacity building

According to respondent 2, 8 and 10, LSMs occasionally provided support to ASMs. This support came in the form of access to old mine footprint that LSMs declared uneconomical to mine. These pockets of reserves, according to respondent 8, were easy for ASMs to mine. Responded 2 revealed that some LSMs demand a portion of the profits made from minerals retrieved from the old mining area, but with respondent 10, this is not the case.

Respondent 6 revealed that they formed a local organisation to help the small miners in the area with supporting functions. According to respondent 6, the organisation provided support to the mining companies in the area by offering to support functions such as; invoicing, marketing and other administrative work. This was similar to the support provided to respondent 5 which include administrative function, payroll, human resource management and financial services such as invoicing, collection of payments and payment of debts by their main customer. Without this support, the cost of these functions would need to be covered by ASMs, through additional resources or by sacrificing production to get these support functions done.

The providers of financial support employ different payback models. The financial support provided to respondent 5, for instance, came with one condition attached, and that was to prioritise supply, at discounted prices, to the particular customer over others at all times. The financial assistance provided to respondent 3, on the

other hand, was in the form of a loan. Respondent 3 revealed that the loan repayment terms were more favourable than those of traditional financial institution and this helps with increase the cashflow available for operational expenses. Additionally, customer understood that the operation struggled with cashflow and assisted by making sure that invoices are processed with great speed.

In summary, the enterprise support for ASMs comprises of; i) access to abandoned LSM mining areas, ii) assistance with supporting functions through shared services models, iii) loan repayment terms that guarantee offtake of product, and iv) speedy processing of invoices by customers.

4.3. Challenges versus support provided

Table 2 below provides a summary of the findings discussed in section 4.2 above. In this section, the different gaps and misalignment between the challenges faced by miners and the support provided to them are highlighted and compared to the gaps and misalignments that were identified during the review of the literature. For ease of reference, Table 1, which presents a summary of the findings from literature on challenges experienced and support provided to ASMs, has been repeated below.

Table 2: Alignment between challenges and support provided on the ground.

Challenges	support available	Support	support accessible to all
Theme 1: Government related issues		***Theme 1: Government***	
1.1. Legislative framework			
Long list of legislation to comply to	✗		
Staggered but continuous amendments to legislation that imposes stricter requirements on all mining operations	✔	visits from the DMR inspectors to check on compliance and give guidance on nonconformities as well as provide guidance on the interpretation of the law [visits not viewed as support by all]	⃠
	✔	guidance by ASPASA on how to achieve compliance to environmental, health and safety issues through audits and training [Available to ASPASA members only]	✗
	✔	update on changes in legislation by ASPASA [Available to ASPASA members only]	✗

	✔	tripartite forums where government, industry and the public meet to discuss issues of concern and share information	✔
the requirement by the new mining charter to reconfigure the structure of their registered entities	✔	access to abandoned LSM mining areas where LSMs still hold the mining right [To only those in close proximity to LSMs]	✕
the change from the written mining authorisation applications process to the online SAMRAD system that did not consider ASMs without access to the internet nor did it consider the cost implications of the changes on ASMs	✔	government liaison and lobbying by ASPASA to ensure that surface ASMs and SSMs are considered in the development and enforcement of mining legislation	⃠
confused and inefficient composition of the legislative communication and resource flow framework	✕		
slow response time of government departments	✕		
the disregard for the impact of delays by officials	✕		
1.2. Regulatory requirements			
the cost implications of complying, particularly to environmental health and safety requirements is very high,	✕		
the high frequency rate of the reports required by the DMR	✕		

requirement to comply to all the above legislation in the same way that other licence holder	✔	visits from the DMR inspectors to check on compliance and give guidance on nonconformities as well as provide guidance on the interpretation of the law [visits not viewed as support by all]	□
	✔	assistance from ASPASA and NOSHCON [members only]	✕
	✔	local organisation formed to assist with supporting functions [only for salt miners in the Free State]	✕
putting up financial guarantees for future rehabilitation prior to mining,	✕		
the box-ticking and blanket approach taken by the inspectors when enforcing the law, offering no guidance but quick to punish nonconformities,	✔	government liaison and lobbying by ASPASA to ensure that surface ASMs and SSMs are considered in the development and enforcement of mining legislation,	?
	✔	Mintek support through government liaison	?
over prosecution of miners that are trying to be legal, while those that do not bother get away with murder	✕		
Theme 2: Financial Resources		***Theme 2: Financial Resources***	

2.1. Funding		**2.1. Funding**	
The lack of capital to invest in equipment is a challenge for ASMs	✔	access to funding from their customers to purchase of equipment and to pay for resource exploration [model employed for only 2 out of the 12 respondents]	✕
	✔	favourable loan repayment terms [model employed for only 1 out of the 12 respondents]	✕
the lack of support or assistance from traditional financial institutions due to a lack of bankable feasibility studies	✕		
a lack of response to applications for support from the DMR	✕		
2.2. Costs			
high operating expenses,	✕		
lack of cashflow	✔	immediate payment of invoices to assist with cashflow [model employed for only 1 out of the 12 respondents]	✕
the cost of environmental, health and safety compliance	✕		
Theme 3: Technical capabilities		***Theme 3: Technical***	
3.1 Technologies and technical assistance		**3.1 Technology**	

lack of equipment and technology to optimise production resulting in labour-intensive mining methods leading to high labour cost	✔	access to technical equipment and services	✕
lack of knowledge about the source of existing equipment and technology	✕		
lack of technology and resources to conduct resource reserve calculations	✕		
3.2. Training and Skills transfer			
	✔	advice on best practice methods to improve operating efficiency based on industry research conducted by ASPASA [Available to ASPASA members only]	✕
	✔	Training available from the MQA at a fee	✔
	✔	education from students doing learnerships on faster and more innovative ways of doing things	✕
	✔	ASMs willing to host graduates and/or candidates of mining related studies who wish to be exposed to the mining industry	✕
Theme 4: Enterprise and capacity building		***Theme 4: Enterprise***	

lack of operating cashflow	✔	immediate payment of invoices to assist with cashflow [model employed for only 1 out of the 12 respondents]	✕
production issues due to breakdowns	✕		
inability to supply due to lack of capacity	✔	access to old mining areas and old processing plants [only ASMs in close proximity to LSMs]	✕
lack of resources and support to expand and grow	✔	assistance with supporting functions through a shared services model.	✕
limited and undiversified customer base	✔	loan repayment terms that guarantee offtake of product [model employed for only 1 out of the 12 respondents]	✕
lack of guidance and mentorship to grow	✕		
Theme 5: Social issues		***Theme 5: Social***	
5.1. Community			
demands and threats made by communities to halt operations if their demands are not met,	✕		
lack of support from the DMR and ward councillors in engaging with the communities	✕		

difficulty to implement commitments of the SLPs	✗		
5.2. Security			
theft of equipment	✗		
presence of illegal miners who create dangerous working conditions, steal resources and contaminate the remaining reserves and thus increase the cost of mining for legal miners	✗		
Legend: **✔ = yes;** **✗ = no;** **⃠ = benefits all by default** **? = luck of the draw**			

Table 2: Support provided compared to challenges in the ASM sector

	Programmes to support ASMs							
Challenges	**SDF (1999)**	**NSC (2000)**	**SSMB (2006)**	**SSMD (2004)**	**MQA**	**Mintek (2002)**	**CSIR**	**Support form LSMs**
Governance								
Regulatory framework (Hoadley & Limpitlaw, 2004; Mutemeri & Ledwaba, 2017)	✔							
Centralised governance (Hoadley & Limpitlaw, 2004)								
Regulatory requirements (Republic of South Africa, 2014)				✔				✔
Institutional support (Ledwaba, 2017)						✔		✔
Financial resources	✔							
Access to funding (Mutemeri & Petersen, 2002)		✔	✔	✔				
Inability to borrow funds (Mutemeri & Petersen, 2002)		✔	✔	✔				
Economic/Enterprise	✔							
Access to market (Ledwaba, 2017)				✔				
Business management skills and knowledge (Amankwah & Anim-Sackey, 2003)				✔				
Capacity building (Debrah et al., 2014; Hoadley & Limpitlaw, 2004)		✔	✔	✔				
Supply agreements (Ledwaba, 2017)								✔
Operational support (Ledwaba, 2017)								✔
Social								
Safety and Security (IGF, 2017; Mallo, 2012).								
Technical	✔	✔	✔	✔		✔	✔	
EHS compliance (Mutemeri & Ledwaba, 2017)		✔	✔			✔		
Mining-related qualifications/training (Mutemeri & Ledwaba, 2017)					✔	✔		
Geological information (Hilson, 2002)		✔	✔	✔				✔
Bankable feasibility studies (Debrah et al., 2014; Hoadley & Limpitlaw, 2004)	✔	✔	✔	✔				
Technology (Dreschler, 2001; Mutemeri & Ledwaba, 2017; Mutemeri & Petersen, 2002)						✔	✔	
Research and development (Debrah et al., 2014; Hoadley & Limpitlaw, 2004)	✔					✔		
Mining, processing and beneficiation methods (Mutemeri & Ledwaba, 2017)		✔	✔			✔	✔	✔
Programme impactful (Ledwaba, 2017)	⊘	⊘	⊘	⊘	✔	✔		
Programme still exists (Ledwaba, 2017)	✘	✘	✘	✔	✔	✔	✘	⊘
Key: ✔ =yes; ✘=no; ⊘=unknown								

The study, contrary to the literature, revealed that there was some support available for government related issues where the legislative framework was concerned, however this support was not always available to all ASMs. It appeared as though, outside of the occasional DMR inspections, the only time all miners had access to this support was through the tripartite forum meetings which were held only four times a year.

Table 2 presented the support that was available for some aspects of regulatory requirements from government, state-owned entities as well as private organisations. The findings of the study were consistent with the literature as they revealed that the DMR did provide support to ASM with the interpretation of the law and guidance on how to comply, however this was not uniform as some of the ASMs in this study did not get the necessary assistance from the inspectors, but instead received heavy punishments for minor nonconformities. This led some ASMs to seek external assistance from organisations such as ASPASA and NOSHCON to safeguard themselves against the agents of the state. Other ASMs, that could not afford the membership fees of the lobbyists and consulting firms assisted each other by sharing best practices through local organisations.

From the study, it was clear that no funding was available from traditional financial institutions. This was in contrast to the literature, which revealed that ASMs had access to funding through the DMR. Additionally, Table 2 exposed that ASMs did not have assistance with drafting bankable feasibility studies, which the literature in Table 1 revealed was one of the services that were provided by the SSMD, a division within the DMR. Table 2 revealed that there was support that was available from private organisations, but this appeared to be a special arrangement and therefore could not be easily accessed by ASMs.

Under the technical capabilities theme, Table 2 gave the impression that there was support for ASMs in terms of access to technical equipment and services. This support however was not available to all ASMs, but only to those that appeared to be an integral part of the supply chain in the eyes of their customers.

From a training and skills transfer perspective, no specific challenges were highlighted by the miners on training required, hence it was not identified as a subtheme under the challenges faced by ASM. It was deduced however from the challenges related to; the legislative framework, the regulatory requirements, lack of knowledge on items related to

commodity resources and technology as well as planning and building operations capacity that training was a need. Interestingly, training was also not identified as a challenge that requires support in literature summarised in Table 1. Table 2 revealed that ASPASA offered training, but the training was exclusive to members, while the training was offered to non-members, it came at a fee. Interestingly, some of the ASMs offered to provide training to graduates and other students in order to expose them to the industry.

Table 2, under the enterprise and capacity building theme, demonstrated that ASMs had operational and capacity challenges. The ASMs highlighted a lack of cashflow to fix machines during breakdowns, a lack of resources to source customer as well as limited production capacity which was exacerbated by the lack of knowledge on how to increase capacity. Table 2 revealed that support for these challenges was available, but like most of the support discovered in this study, it was not accessible to many of the ASMs or matched to those who need it. The literature summarised in Table 1 revealed that there was no support in terms of supplier agreements for ASMs, but Table 2 demonstrated that there was support for one out of the 12 respondents as a method of repaying a loan.

Identical to the what is shown in Table 1, Table 2 exposed that there was absolutely no support offered to ASMs for any of the challenges identified under social issues.

The misalignments under the government related issues and the financial resources themes, appeared to be triggers for some of the challenges under the other themes. The lack of financial support, for instance, hindered the technical as well as enterprise and capacity building capabilities of ASMs as the majority of them could not afford the technologies needed in their operations in order to optimise production and increase capacity and expand into new markets. The lack of support from government department, such as the DMR and police, left ASMs prey to demanding communities, theft and at the mercy of armed illegal.

Table 2 served to create a visual demonstration of the results of the study. The Table exposed the gaps that exist in the support provided to ASMs as well as significant misalignment between the challenges and support. Some challenges had no direct support while some support was not linked to any challenge. Where support was offered it was not accessible to most of the ASMs and was not always linked to those who needed it.

5. Conclusion and Recommendations

5.1. Conclusion

This study provided some insight into the challenges experienced by ASM and the support that was provided to them. This study revealed that gaps exist in the support provided and that there are significant misalignments between the support offered and the challenges experienced on the ground.

5.2. Recommendations

Firstly, the study revealed that a number of entities were available and willing to assist ASMs. In an effort to resolve the mismatch and close the gaps in the support provided to ASMs, the researcher recommends that the different organisation stop working in silos and consolidate their effort in order to ensure that the support provided has an impact on the ASMs. A collaborative approach that allows each entity to focus on their designated support function would ensure that the support became more holistic. The researcher recommends that this collaborative approach be driven by the DMR or Mintek as both these state entities have done extensive work with ASMs.

Secondly, the findings of the study revealed that the DMR employed a “blanket approach’ to the development of legislation and the enforcement of rules and regulations in the mining industry. The study also revealed that this approach put the ASMs at a disadvantage as they could not afford the compliance requirement. It is recommended therefore that the DMR, as the competent authority, conduct an exercise in collaboration with ASMs and lobbyist to comb through the legislation, pick out what is applicable and not applicable to ASMs and assess whether any exemptions can be made to reduce the burden of compliance to ASM and thus facilitate their growth.

Thirdly, the study revealed that in order to be considered and get financial assistance from traditional and sometimes non-traditional financial institutions, ASMs were required to

produce bankable feasibility studies which cost millions of Rands. It is recommended that these institutions relook at and amend this as, according to the results of the study, ASMs could not afford this. Instead, financial institution in collaboration with the ASMs could devise a funding model that makes access to funding easier with creative but strict repayment term that could be beneficial to both parties.

Finally, the study revealed that the promulgation of the Mining Charter (III) awakened the communities around mining areas to their rights and the obligations of all mining companies. The communities, however do not appear to have been educated on the different types of mining activities, types of mining operations or mining methods employed in the industry. The researcher believes that a community education campaign on the industry, rights and responsibilities of the affected community would be beneficial to both the communities and ASMs. The information sessions would hopefully allow all stakeholders to gain a better understanding of each other and thus reduce the friction that currently exists in many mining areas.

5.2.1 Areas for further research

This research served to take a step towards understanding the appropriateness of the support provided to ASMs by highlighting misalignments between the challenges faced and the support provided. Further research into the appropriateness and impact of the support that aligns to the challenges faced is needed (Mutemeri & Ledwaba, 2017). This would assist in determining whether this support should be extended to other ASMs. Based on the findings of this research, further research into a funding model that would simultaneously help ASMs unleash their potential and reduce the risk to financial institutions is crucial.

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