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How to create Shared Value in mining organisations

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Purpose: The study investigated the perceptions of Shared Value (SV) and its antecedents and outcomes within the mining industry in South Africa.

Design/methodology/approach: After conducting a literature overview of the South African mining industry and theories linked to SV, a hypothesised model of the study was developed. This study used a quantitative research methodology. An explanatory hypothesis-generating approach was employed through an empirical investigation using the survey method. The survey items were self-developed based on hypothesised variables. The study's respondents were identified via non-probability sampling, namely convenience and snowball sampling. A total of 340 respondents participated in the study.

Results/Findings: The empirical results confirmed that automation and employment conditions are the antecedents of SV in the mining industry. The study illustrated three approaches of SV: reconceiving the products or services and markets, reimagining value chain productivity and development of the enabling environment. Furthermore, the study revealed competitive advantage and sustainability performance as the outcomes of SV in the mining industry in South Africa.

Practical implications: The study contributes by making practical recommendations to the mining industry role players on how to increase SV and improving competitiveness and sustainability performance whilst increasing economic prosperity by resolving social and environmental issues that are of mutual interest to stakeholders.

Originality/value: The study fills a knowledge gap on SV in South Africa because of limited national mining studies. Furthermore, as SV is a novel and significant advancement in management sciences, the study is a valuable resource for SV decision-making across industries.

Keywords: automation and innovation; competitive advantage; employment conditions; sustainability performance; Shared Value.

Introduction

Mining in South Africa has a diverse resource base, making it a cornerstone of the economy since its inception. Whilst in the 1980s, the industry was the second-largest contributor to South Africa's Gross Domestic Products (GDP) at 21% per annum, second to manufacturing which stood at 22% per annum, its contribution has steadily declined to 8.3% in 2019 (Statistics SA, 2021). Moreover, year-on-year comparison shows that the mining industry's contribution to GDP in 2019 was higher by 7.3% in nominal terms than in 2018 (however, in real terms, mining GDP contracted 1.9%). Despite economic challenges, legislative uncertainties and the COVID-19 pandemic, in 2019, mining contributed approximately R400 billion to GDP and employed 460 015 people whilst contributing over R36.9 billion in value-added taxes and R24.2 billion of corporate tax to the government (Mineral Council South Africa [MCSA], 2020).

The mining industry is undergoing significant changes as it integrates new technology whilst also dealing with climatic and social issues (Deloitte, 2018). Greater transparency and the promotion of environmental, social and governance (ESG) principles are now essential for mining organisations to operate successfully in the global marketplace (Harvey, 2021). Hence, stakeholders expect these organisations to create long-term value. However, despite these organisations' grasp of the need of improving ESG practices and the value of investments, mining organisations continue to fail to make a significant, bold pivot towards the future (PwC, 2021).

The declining mining production, combined with the rise of secondary and tertiary industries such as manufacturing, construction, chemical and automotive as well as information and communication technology industries, is one of the factors contributing to a decrease in direct mining contribution to GDP, employment and export sales.

Mining production decreased by 2% in 2019 compared with the previous year (2018), which was down by nearly the same amount from 2017 (MCSA, 2020). Furthermore, employment fell from a peak of 530 000 people employed by the industry in 2008 to 460 015 in 2019 (MCSA, 2020). McKinsey (2019) asserted that unless mining organisations unleash production revolution, deliver sustainable development in mining communities, stimulate technology adoption and unlock high-potential mining assets as a new path for competitiveness and growth, the industry could lose approximately 47% of its jobs and approximately 42% of its revenues by 2030.

Furthermore, South Africa's mining industry is significantly influenced by global trends, with macro-economic growth and international markets strongly influencing both the demand for resources and profitability (Lane, Guzek, & Van Antwerpen, 2015). For example, an increase in the awareness and use of renewable energy could influence demand for certain minerals. Locally, policymakers, communities and climate activists pressure the mining industry to transform South Africa's economy to provide a fair and sustainable distribution of wealth amongst South Africans and safeguard the environment (Cooper & Harvey, 2018). Hence, mining organisations must develop business strategies that balance creation of value for communities with increased profitability.

This study posits that the industry should embed environmental and social issues into organisational strategies and sustainability and competitive strategies to generate profits with purpose, thus Shared Value (SV). Porter and Kramer (2011) defined SV as the implementation of organisational policies and practices that establish and sustain an organisation's competitive edge over industry rivals and new entrants to the market whilst simultaneously advancing social and economic conditions in the communities in which it operates.

Limited studies have been conducted to understand SV strategies (Anglo American, 2021; Cooper & Harvey, 2018; Nicholson, 2017) and how South African mining organisations could navigate the environment in which they operate to create value for all stakeholders. Previous studies in the South African mining industry include a study on the impact of acid mine drainage (McCarthy, 2011), prospects and challenges for small-scale mining entrepreneurs (Mkubukeli & Tengeh, 2016), black economic empowerment in the industry (Fauconnier & Mathur-Helm, 2008), tough choices facing the industry (Lane et al., 2015) and sustainability (Zvarivadza, 2018). Similarly, one of the SV pioneering studies in South Africa focused on assessing SV created in tourism (Nicholson, 2017).

Literature shows that there is a need to invest in 'future-fit' skills, infrastructure, energy and water to provide an enabling environment for exploration, mining development and production (McKinsey, 2019; PwC, 2021) whilst delivering value to all stakeholders. Moreover, the struggle of converting mining wealth into more equitable prosperity has been a recurring and contentious issue in South Africa (World Bank, 2019). To that end, mining organisations' commitment to ethical practices and development is called into question (Frederiksen, 2019; Gardner, 2016).

Despite South Africa's substantial economic influence, particularly in the mining industry, there is a research gap in the South African mining industry, especially on SV (Anglo American, 2021; Khubana, 2021; McKinsey, 2019). Hence, the following important research question will be addressed in this study, given the scarcity of literature and empirical research on SV as well as the gap in related studies in the South African mining industry: What are the perceptions on SV and its antecedents and outcomes within mining organisations in South Africa?

Significance and contribution of the study

The main purpose of this study is to assess perceptions regarding the creation of SV within South African mines. Scholars posit that businesses in South Africa need to develop strategies that are underpinned by solving societal problems as a way of maximising commercial benefit (Hills, Russell, Borgonovi, Doty, & Iyer, 2012; Nicholson, 2017). This justifies the study's significance that is embedded in the fact that it fills a research gap in the SV mining literature. This study will contribute to the body of knowledge regarding SV and the development of SV-related strategies, particularly in the mining industry.

Research objectives

The primary objective of this study was to investigate how to create SV within the mining industry of South Africa. To achieve the primary objective, the following secondary objectives were formulated:

- To gather the current SV perceptions of stakeholders in the South African mining industry.
- To investigate relationships between selected SV antecedents and SV in the South African mining industry.
- To investigate relationships between SV in the South African mining industry and selected SV outcomes.

Literature review and hypotheses

Defining and implementing Shared Value

Businesses are depicted as the beneficiaries of societal failure of business activities (Wachira, Barnard, Lutseke, & Ger, 2020). Attempts to solve sustainability issues with Corporate Social Responsibility (CSR) and Triple Bottom Line have also failed because these are disconnected from the core business (Porter & Kramer, 2011). Hence, despite the efforts of governments, academics and activists, the majority of

'corporate scandals' expose unethical practices that organisations use to gain profits at any cost (Changing Markets Foundation, 2019; Menghwar & Daood, 2021). This has amplified concerns about how organisations reconcile their economic activities with the broader needs of the communities in which they operate. However, Porter and Kramer (2011) conceptualised a paradigm shift that integrates economic and social value, maximising profits whilst solving societal issues. Several corporate ethics academics have criticised the concept as it is based on existing paradigms, lacks empirical evidence and inhibits transformative innovation (De los Reyes, Scholz, & Smith, 2019; Dembek, Singh, & Bhakoo, 2016). Despite the critiques, substantial recent theoretical and empirical work on CSV has been conducted (Menghwar & Daood, 2021), with scholars extending versions of the SV framework (Moon, Parc, Yim, & Park, 2011). Without focusing on mining organisations, empirical evidence on potential strategies to implement SV has begun to emerge (Alberti & Belfanti, 2019; Menghwar & Daood, 2021). This study recognises SV as an umbrella concept for the creation of value for all stakeholders. Several researchers agreed with Porter and Kramer (2011) that SV is a superior form of capitalism that provides both social and economic benefits for stakeholders (Kim, Sainto, & Avvari, 2020; Wachira et al., 2020). Nestlé CSV (2014), Discovery Group (2019) and Rio Tinto (2021) are amongst the first organisations to implement SV, and their sustainability or SV reports show that these organisations increased not only their economic value but also societal value whilst tackling climate change.

Shared Value reflects on, systematises and promotes the perspective that organisations can positively contribute to society whilst achieving profitability (Wieland, 2017). In line with this thinking, Kim et al. (2020) asserted that SV can deliver economically beneficial strategies that simultaneously solve societal challenges and evolving forms of environmental issues such as climate change and other forms of environment deterioration. Moreover, SV illustrates three latent components in a value creation strategy: survival, ethical behaviour orientation and business-in-society interactions. The SV is premised on the principle that organisations cannot exist in isolation from society and the environment. Hence, organisations that understand and utilise the links between society and economic advancement may unleash global growth and reshape capitalism (Kim et al., 2020).

According to Porter and Kramer (2011), organisations should recognise that the SV concept requires organisations to integrate social needs into their value propositions; value creation thus goes beyond the linear measurement of revenue generated relative to costs incurred and instead conceptualises value more holistically by linking business performance with community progress over time. Christiansen (2014) cited environmental impact, business model innovation, value chain stakeholder participation and employment conditions as antecedents of SV creation in an organisation, whilst the Hourglass model (Network for Business Sustainability, 2016) incorporated infrastructure development and government regulatory and legislative conditions. The Nestlé CSV pyramid model also provided a basis for this study's SV and sustainability variables (Nestlé, 2014). Furthermore, Discovery Group (2019) and Rio Tinto (2021) claimed that by implementing SV strategies, organisations increase productivity and profitability whilst creating social benefits to communities and combating climate change. The literature suggests that organisations create SV by solving their environmental impact, improving employment conditions, innovating their value/supply chains, adopting automation and innovation, investing in infrastructure development and complying with legislative requirements. Porter and Kramer (2011) also posited that SV is about defining a new set of business practices that are integral to competitiveness, organisational performance and sustainability.

In general, whilst there is an increasing awareness of SV, evidence on its operationalisation in relation to organisational performance and social outcomes is still limited. Furthermore, no empirical research has been conducted on the antecedents and outcomes of SV operationalisation in the South African mining industry. As a result, this study contributes to the literature by providing insight into the ways (strategies) with which SV may be created and the possible outcomes thereof. It further provides valuable evidence that SV helps organisations generate profit for purpose.

Antecedents of Shared Value

Environmental impact

Environmental impact as a variable of the study refers to actions that an organisation takes to reduce its adverse impacts on ecosystems whilst also benefiting communities and the organisation, such as the efficient allocation of resources, eco-friendly packaging, pollution control, recycling and waste reduction, clean energy and water conservation (Khubana, 2021). Similarly, the European Commission (2015) explains that environmental impact management entails reducing consumption of natural resources, emission treatment and waste disposal in the most environmentally friendly manner possible to achieve advantages for communities and organisations. McGahan (2020) posited that organisations have the potential to create SV by producing products with reduced carbon footprints and reducing carbon footprints throughout their value chain. For example, Rio Tinto's (2018) investment in renewable energy reduced carbon emissions by 65% whilst increasing energy cost savings and energy supply reliability.

As such, beyond reducing resource consumption, with creative thinking, mining organisations can turn environmental concerns into SV opportunities through product innovation, value chain innovations or local community development initiatives that support business. Based on this discussion, the following is hypothesised:

H_1: There is a significant relationship between 'environmental impact' and SV.

Employment conditions

Employment conditions are aspects of a person's working environment that influence his or her quality of life, and these factors include contract terms, compensation and benefits, health and safety at work, inclusion and diversity, career progression and how tasks are assigned, as well as management of human resources (Khubana, 2021). Nilsen and Ringholm (2019) and Mustafa and Ali (2019), defined employment conditions as operating practices in which the workplace fosters certain characteristics that lead to employees performing better at work and fully utilising their potential to meet the needs of stakeholders and create a competitive advantage for the organisations. The deep infiltration of mining entrepreneurs and their reservation of job opportunities for expatriates contributes to rising unemployment (Wegenast, Krauser, Strüver, & Giesen, 2019) and dissatisfactions within the workforce. The equity policies introduced by the government have not translated to a 'real' transformation of employment conditions within the mining industry (World Bank, 2019). The Responsible Mining Index (2018) asserted that mining organisations that work to improve employment conditions contribute to development of communities by lowering unemployment, lowering poverty and raising the standard of living. Based on the discussion, the following hypothesis was developed:

H_2: There is a significant relationship between 'employment conditions' and SV.

Value chain considerations

The value chain is an organisational system (model) concerned with identifying social and environmental gaps within the value-creating network of activities that, when creatively reconfigured, would make a significant contribution to sustainable development and inclusive economic growth (Khubana, 2021). Porter (1985) defined the value chain as a framework for building an economic system that follows interconnected events from the raw material acquisition or idea to production and finally into the hands of users. As a result, organisations seeking competitive advantage and long-term performance can leverage the value chain to discover cost-cutting and differentiation possibilities across the production cycle (Porter & Kramer, 2011). Empirical evidence shows that through collaborations, Rio Tinto (2018), the world's second-largest metals and mining corporation, created employment and economic opportunities for local communities, recruiting 62% of workers from locals and sourcing 77% of goods from suppliers who participated in the capacity-building initiative. Based on this discussion, the following hypothesis is formulated:

H_3: There is a significant relationship between 'value and supply chain considerations' and SV.

Automation

Automation is described as the intelligent control of systems using suitable technologies to function without human input, whilst innovation is defined as the development of new solutions that address unmet needs which create a lasting impact (Ralston, Hargrave, & Dunn, 2017). The study defines automation and innovation as altering traditional ways of thinking and operating and identifying and utilising digital solutions and products/services that will provide social and economic benefits for all stakeholders. Hoerlsberger (2019) characterises digital transformation as the application of digital technologies to change a business model and generate new income and value-creating opportunities. Hence, the linkages between automation and innovation and the creation of SV and sustainability should be deliberate. According to Wachira et al. (2020), mining organisations can develop SV by rethinking new goods and services, markets, mining processes, supply of energy and water in addition to traditional mining products. The following hypothesis was developed based on the given discussions:

H_4: There is a significant relationship between 'automation and innovation' and SV.

Infrastructure development

Most experts agree that infrastructure investment is an important driver of development and economic growth, both of which are necessary for eliminating poverty and stimulating innovation (Saghir, 2017; World Bank, 2018). This study refers to infrastructure development as the quality, quantity and accessibility of utilities such as water and energy supply, transportation and any other conveniences that promote sustainable development (Khubana, 2021). Information technology innovation in Silicon Valley in Canada is an example of how SV was created through infrastructural development (Engel, 2015). Furthermore, collaboration amongst universities, government and entrepreneurs plays a role in transforming agricultural sectors into epicentres for innovation and entrepreneurial development (Ierapetritis, 2019). As such, infrastructure development is inextricably linked to inclusive development in any industry, mining included. The given discussion leads to the following hypothesis:

H_5: There is a significant relationship between 'infrastructure development' and SV.

Regulatory and legislative conditions

Regulatory and legislative conditions can be defined as government-enacted policy interventions that promote economic and social progress, including protection of natural resources (PwC, 2017) and commitments made to international agreements. To comply with international agreements, mining organisations must examine their obligations and any industry-specific laws and create a strategy for meeting such requirements whilst also recognising the need to address societal and environmental concerns profitably (Dufwa & Meconnen, 2016). For example, in Canada and Papua New Guinea, governments provide support grants for renewable energy and tax credits as incentives for reducing carbon emissions (Columbia Center on Sustainable Investment, 2018). These incentives eventually improved the lives of the local communities, thus creating SV. Deloitte (2019) asserted

that mining organisations have the potential to lead the way in bringing the industry, government and society closer together and creating SV beyond legal compliance, resulting in synergy between economic and social progress. As such, mining organisations should lead efforts to develop policies and strategies to go beyond regulatory decisions and create solutions that are unique to each society's needs (OECD, 2019). Therefore, the following is hypothesised:

H_6: There is a significant relationship between 'regulatory and legislative conditions' and SV.

Outcomes of Shared Value

Organisational performance

Organisational performance can be defined as an interconnected strategy to measure performance through financial performance and the outcomes of ESG practices (Huang, 2021). Jyoti and Rani (2017) defined organisational performance as the economic outcomes, which include improved competitive position, profitability, sales growth, market share and organisations' reputation and the non-financial aspects such as employee performance, employee satisfaction, employee participation and operational efficiency. Empirical evidence also reveals that Nestlé (2020) improved profitability and quality of life for local communities and reduced the negative environmental impact of their operations as a result of the adoption of SV strategy. It can be argued that through SV, mining organisations would improve their performance. Based on this discussion, the following is hypothesised:

H_7: There is a significant relationship between SV and 'organisational performance' in the South African mining industry.

Competitive advantage

Competitive advantage is an organisation's ability to function at a superior level to competitors in the industry or market (Kang & Na, 2020). According to the study, competitive advantage assesses an organisation's unique, favourable position in a market compared with its competitors. An organisation's competitive advantage is characterised by retaining and expanding market share or entering new markets, continuously enhancing productivity, enhancing brand awareness and adopting cost and differentiation strategies (Jatmiko, Udin, Rahrti, Lara, & Ardhi, 2021). As SV has the potential to provide a competitive edge, Kanten, Kanten and Gürlek (2015) argued that mining organisations should focus on establishing ways to implement SV practices, initiatives and strategies. Therefore, organisations that integrate their business models with beneficial social and environmental consequences can improve their competitiveness, discover new revenue streams and increase profitability (Gürlek & Tuna, 2017). Considering this discussion, the following hypothesis was developed:

H_8: There is a significant relationship between SV and 'competitive advantage' in the South African mining industry.

Sustainability

Sustainability is more than environmentalism; it also includes concerns for social equity and economic development embedded in its definitions. Hence, the European Commission (2015) also contended that sustainability is not just about policy implementation but about the day-to-day choices made by organisations to create lasting value for stakeholders whilst addressing climate change. Sustainability means meeting own needs without compromising the ability of future generations to meet their own needs (Hallin, Karrbom-Gustavsson, & Dobers, 2021; Zvarivadza, 2018). Accordingly, this study defines sustainability as the achievement of economic, environmental and societal value in the delivery of core business activities beyond the boundaries of a single organisation, including the performance of both upstream and downstream suppliers and customers in the value chain. Therefore, integrating ESG practices into the core business will provide mining organisations with an alternative path to sustainability (Gürlek & Tuna, 2017). For all these reasons, the following hypothesis was developed:

H_9: There is a significant relationship between SV and 'sustainability' in the South African industry.

Hypothesised model

This hypothesised model of SV is based on a thorough review of the current literature. Figure 1 depicts the hypothesised linkages between variables of this study as defined in the literature review.

Research methodology

This exploratory study adopted a quantitative research design. Hence, a survey questionnaire was utilised to gather primary data. The quantitative research design was considered most appropriate because it used a structured questionnaire to collect responses from a large sample to statistically evaluate the set hypotheses (Sheard, 2018). Furthermore, this methodology was chosen because the study variables could be easily measured statistically.

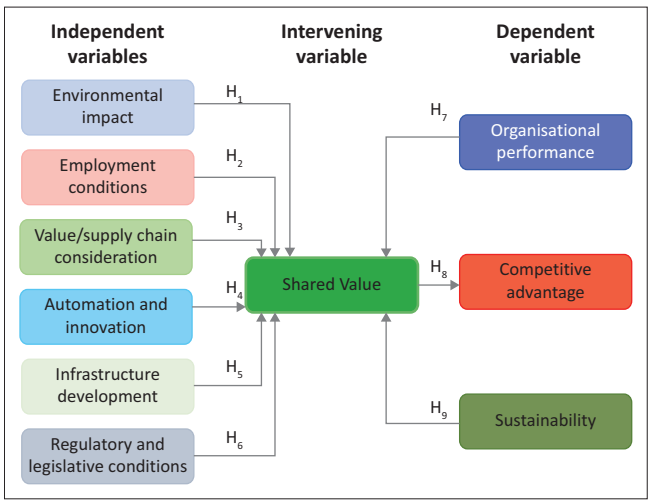

FIGURE 1: Hypothesised model of Shared Value within the South African mining industry.

Managers of the mining organisations affiliated with the Mineral Council of South Africa made up the population. The managers were considered knowledgeable about stakeholders, decision-making and the impact of mining practices. As a result of geographic constraints and lack of a sampling frame, the sample was limited to mining organisations operating in Limpopo, Mpumalanga, North West and Gauteng provinces. Non-probability convenience sampling was utilised to preserve resources and time (Struwig & Stead, 2013). A sample of 450 managers was considered statistically representative of the target population and large enough to test hypotheses (Majid, 2018; Sheard, 2018). As a result of the COVID-19 pandemic, the participating organisations and respondents were approached electronically. The institutional ethics clearance was received before the commencement of the survey. Before completing the survey, respondents were informed of the study's purpose, that their participation was voluntary and anonymous, and that all data would be kept confidential. Furthermore, consent to participate in the study was obtained from the organisations and the respondents.

The questionnaire was self-developed, with other items derived from literature review. Using nominal scales, section A of the self-administered questionnaire collected respondents' biographic and demographic data such as gender, age, education level and commodities. The instrument used a seven-point Likert-type scale ranging from 'strongly disagree' (1) to 'strongly agree' (7) for the subsequent sections. Section B comprised 30 items, which measured the study's independent variables (environmental impact, employment conditions, value/supply chain considerations, automation and innovation, infrastructure development, legislative and regulatory conditions), whilst Section C comprised 15 items measuring the intervening variable (SV) and Section D had 15 items measuring operational performance, competitive advantage and sustainability. The questionnaire was assessed and examined for face validity by academic experts in business management. A pilot survey of 20 potential respondents was conducted to pre-test the measuring instrument for content validity and no revisions were required.

This study utilised Statistica for data analysis. The measuring instrument's validity and reliability were evaluated. As some items were derived from earlier scales and others were self-developed, therefore an exploratory factor analysis (EFA) was used to assess the questionnaire's construct validity. Items of EFA factor loadings with at least 0.4 were deemed satisfactory (Hair, Black, Babin & Anderson, 2014). The Cronbach's alpha correlation coefficients were used to evaluate the questionnaire's reliability and all coefficients of 0.7 and above were regarded as showing reliability of factors (Hair et al., 2014).

Pearson's product-moment correlation coefficients were computed to identify whether relationships exist between the variables, whilst multiple regression analyses were performed to assess the statistically significant relationships between variables (Hair et al., 2014).

Empirical results

Demographic profile of respondents

Questionnaires were distributed to 450 potential respondents, with 340 (75.6% response rate) valid for analysis. Table 1 summaries the demographic data of the response.

Majority of respondents were male (59.7%), people of age between 30 and 39 (39.8%) and people holding postgraduate qualifications (61.8%), as well as managers employed in coal mines (20.4%).

Validity and reliability results

Exploratory factor analyses (EFA) were performed to assess the validity of the scales measuring study variables and to reduce the number of variables to smaller subsets establishing construct validity (Sürücü & Maslakçi, 2020). Furthermore, internal consistency (Cronbach's alpha coefficients) of the measuring instrument was assessed for reliability (Hair et al., 2014). Table 2 presents a summary of EFA and Cronbach's alpha coefficients.

TABLE 2: Summary of validity and reliability results.

Variables	Exploratory factor analysis			Cronbach's alpha coefficients
	Items	Min	Max	
Independent variables				
Automation and innovation (AI)	17	0.54	0.75	0.97
Mineral resource governance (MG)	7	0.44	0.66	0.87
Employment conditions (EC)	7	0.48	0.69	0.85
Intervening variable				
Shared Value (SV)	15	0.68	0.87	0.96
Dependent variables				
Competitive advantage (CA)	9	0.68	0.87	0.95
Sustainability performance (SP)	6	0.51	0.66	0.80

TABLE 1: Sample description.

Gender	Frequency		Age (in years)	Frequency		Education	Frequency		Commodity	Frequency	
	N	%		*N*	%		*N*	%		*N*	%
Female	134	39.4	18–19	0	0	No formal education	0	0	Base minerals	62	18.3
Male	203	59.7	20–29	19.5	66	Senior certificate/Matric	9	2.7	Coal	69	20.4
Undisclosed	3	0.9	30–39	39.8	135	Higher certificate/Diploma/ Bachelor's degree	121	35.6	Diamond	42	12.4
-	-	-	40–49	21.8	74	Postgraduate qualification	210	61.8	Gold	52	15.3
-	-	-	50–59	17.9	61	-	-	-	Platinum	61	18.0
-	-	-	60+	1	3	-	-	-	Industry contractor	53	15.6

The results of the EFA (Table 2) of the independent variables consisted of the constructs of environmental impact, employment conditions, value or supplychain considerations, automation and innovation, infrastructure development and regulatory and legislative conditions. To identify possible antecedents of SV, an EFA was conducted on 30 items designed to measure the independent variables and three unique independent variables emerged, namely 'automation and innovation', 'mineral resource governance' and 'employment conditions' (Table 2):

- *Automation and innovation* emerged from the EFA as an antecedent of SV in the hypothesised model. The first EFA revealed that 17 items intended to measure automation and business model innovation, value/supply chain considerations and infrastructure development loaded onto a single unique factor, which was labelled 'automation and innovation' based on the content of the items that loaded (Table 2). The factor loadings ranged between 0.54 and 0.75 and the Cronbach's alpha coefficient of 'automation and innovation' was 0.97, showing validity and reliability of this factor. Therefore, 'automation and innovation' refer to changes in traditional ways of thinking and operating, identifying and leveraging digital solutions and services to reimagine value chain and infrastructural development in ways that facilitate the collaboration, innovation, agility and flexibility required to promote inclusive growth and protection of the environment.
- *Mineral resource governance* emerged with the loading of six items, as a second independent factor revealed by the EFA. Items that loaded into this factor relate to environmental and mining legislation, Broad-Based Black Economic Empowerment/Mineral Charter and employment legislation and sustainable development policies. As all six items were evaluating governance mechanisms, hence the factor was termed 'mineral resource governance'. The validity of the 'mineral resource governance' was established by loadings ranging from 0.44 to 0.65, with a Cronbach's alpha coefficient of 0.87, indicating the construct's reliability. Based on EFA results, 'mineral resource governance' is defined as the governance system required to improve the mining industry's ESG practices.
- A collection of seven items measuring 'employment conditions' formed the third independent factor resulting from EFA. The construct validity was demonstrated by factor loadings ranging from 0.483 to 0.691, and the construct's reliability was revealed by Cronbach's alpha of 0.85. Therefore, 'employment conditions' entailed training and development of employees, health and safety, job security, sustainable prospecting and exploration programmes that ensure the commercial viability of the mines, investment in community development projects and the ownership of the shares.

The second EFA revealed that all 15 items designed to assess SV as the hypothesised model's intervening variable loaded together as expected, with factor loadings ranging from 0.68 to 0.87 (for construct validity) and a Cronbach's alpha of 0.96 indicating reliability (Table 2). Hence, the intervening variable, *SV*, stayed unchanged. In this study, SV is defined as a strategy/model for organisations to generate profit with a purpose by aligning broader community needs with economic value creation activities.

The third EFA focused on three dependent variables, which were predicted to be SV outcomes, namely organisational performance, competitive advantage and sustainability, and two factors emerged from 15 items:

- *Competitive advantage* emerged as dependent variable with loading of nine items, which focused on measuring organisational performance and competitiveness. The factor validity was confirmed by factor loadings ranging from 0.68 to 0.87 and the reliability was confirmed by Cronbach's alpha coefficient of 0.95. Based on the EFA results, the 'competitive advantage' variable is operationalised as the situation wherein an organisation develops and maintains a 'competitive advantage' over rival organisations by maintaining lower input costs, gaining global recognition for expertise and high-quality products and leading innovation.
- *Sustainability performance* also emerged as a dependent variable of the study. This factor was made up of three items designed to measure organisational performance and three items that measure sustainability as dependent variables. Factor loadings ranged from 0.51 to 0.66, whilst the Cronbach's alpha coefficient for 'sustainability performance' was 0.80, thus confirming the factor's validity and reliability. Based on EFA results, 'sustainability performance' is when organisations achieve economic value and social prosperity without negatively affecting the environment.

Based on the results from EFAs and Cronbach's alpha coefficients, the validity and reliability of all three ('automation and innovation', 'mineral resource governance' and 'employment conditions') independent variables, SV (intervening variable) and two ('competitive advantage' and 'sustainability performance') dependent variables were confirmed. The measuring instrument was thus regarded as valid and reliable.

Based on EFA results, the revised hypothesised model is presented in Figure 2.

As evident in Figure 2, the revised hypotheses are:

H_1: There is a significant relationship between 'automation and innovation' and SV in the mining industry in South Africa.

H_2: There is a significant relationship between 'mineral resource governance' and SV in the mining industry in South Africa.

H_3: There is a significant relationship between 'employment conditions' and SV in the mining industry in South Africa.

H_4: There is a significant relationship between SV and 'competitive advantage' in the mining industry in South Africa.

H_5: There is a significant relationship between SV and 'sustainability performance' in the mining industry in South Africa.

Descriptive statistics

The descriptive statistics of the variables as measured using a seven-point Likert-type scale is summarised in Table 3.

The mean scores for all the factors, as presented in Table 3, reveal that the respondents agreed or agreed somewhat with the statements across the factors of the study (means ranged between 4.23 for automation and innovation and 5.49 for employment conditions). Furthermore, standard deviations above one confirm the existence of slight variation between the responses.

Automation and innovation within South Africa's mining organisations had a mean score of 4.23 (neutral). This implies that managers in the mining industry are neutral regarding the existence of 'automation and innovation' in the mining industry. *Mineral resource governance* had a mean of 4.96 (agree somewhat). This means that managers agree somewhat on the existence of 'mineral resource governance' within the mining organisations of South Africa. In addition, *employment conditions* had the highest mean of 5.49 amongst the independent variables. This showed that managers of mining organisations are somewhat agreeable (and more so when compared with views regarding the other independent variables) on the importance of conducive 'employment conditions' within the mining organisations of South Africa. The 4.53 (neutral) mean for SV shows that mining organisations are not entirely focused on SV as an organisational strategy.

Moreover, the results in Table 2 also show that of all variables, 'sustainability performance' had the highest mean score of 5.53 (agree) and a standard deviation of 0.93 (not much dispersion around mean score). In contrast, 'competitive advantage', another outcome of SV, had a mean of 4.69 (agree somewhat) and a standard deviation of 1.61 (much variation around mean score). Thus, the results confirm that most respondents agreed that 'sustainability performance' is a focus area that could be an outcome of the implementation of SV in the South African mining industry, whilst some also somewhat agreed that 'competitive advantage' is of importance and could be an outcome of SV in the mining industry.

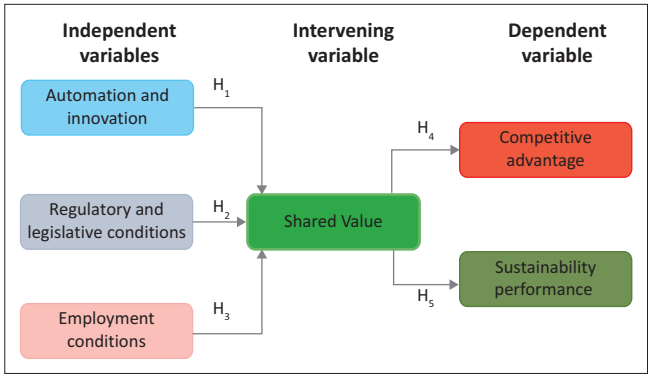

FIGURE 2: Revised hypothesised model of the impact of Shared Value within the South African mining industry.

TABLE 3: Descriptive statistics of the independent, intervening and dependent variables.

Variables	Means	Standard deviations
Automation and innovation	4.23	1.58
Mineral resource governance	4.96	1.43
Employment conditions	5.49	1.04
Shared Value	4.53	1.39
Competitive advantage	4.69	1.61
Sustainability performance	5.53	0.93

Correlation analysis results

Pearson's product-moment correlations were used to analyse the relationship between the variables of the study. Correlation coefficient ideal values vary but variables with correlation values less than 0.30 are weak (Schober, Boer & Schwarte, 2018). Table 4 demonstrates that all the relationships between variables are positive and mostly strong.

In line with Table 4, 'automation and innovation', 'mineral resource governance' and 'employment conditions' positively correlate with SV with correlation coefficient scores above 0.70. Furthermore, the perceptions regarding SV also positively correlated with 'competitive advantage' with a coefficient score above 0.70, thus indicating a strong relationship. Shared Value exhibited a moderate link with 'sustainability performance' (correlation coefficient of 0.62).

Multiple regression analysis results

This study conducted multiple regression analyses on the modified hypothetical model to establish whether the identified independent variables significantly influence SV in the mining industry. The multiple regression results revealed the following:

- *Automation and innovation* ($b = 0.606$, $p < 0.001$) positively and statistically related to SV in the mining industry of South Africa, and this relationship is confirmed by a regression b-value of 0.606 and a p-value that is < 0.001. Ralston et al. (2017) and the World Bank (2018) discovered that by incorporating innovative technology and automation into mining processes, mining organisations could increase their profitability and sustainability.

TABLE 4: Correlation's analysis matrix.

Variables	AI	MG	EC	SV	CA	SP
Automation and innovation	1					
Mineral resource governance	0.879**	1				
Employment conditions	0.727**	0.742**	1			
Shared Value	0.865**	0.785**	0.743**	1		
Competitive advantage	0.804**	0.789**	0.667**	0.864**	1	
Sustainability performance	0.545**	0.542**	0.699**	0.620**	0.614**	1

AI, automation and innovation; MG, mineral resource governance; EC, employment conditions; SV, Shared Value; CA, competitive advantage; SP, sustainability performance.
**, Correlation is significant at the 0.01 level (2-tailed).

- *Mineral resource governance* (b = –0.007, t = –0.120, p = 0.905) has a negative regression on the successful operationalisation of SV in the mining industry and shows an insignificant correlation coefficient of 0.784. This implies that 'mineral resource governance' influences the creation of SV in the mining industry but not significantly. It is known that SV depends on 'mineral resource governance'. However, inverse relationship is attributed to over-regulation, which frequently has the opposite impact (Hayes & Cloete, 2019). Corrigan (2019) discovered that whilst mining regulation increased entry points for government involvement, it also increased 'corporate social' spending and undermined the concept of 'corporate citizenship and innovation' by focusing on mandatory compliance.
- *Employment conditions* (b = 0.321, $p < 0.001$) positively and statistically related to SV in the mining industry of South Africa. This implies that the respondents believe that 'employment conditions' positively influence the organisation's SV strategy and operationalisation thereof. Camilleri (2016) discovered that economic performance improves when organisations focus on local economic development, the creation of decent employment and enterprise opportunities in the tourism industry.

The regression analysis results of the influence of SV within the South African mining industry on the dependent variables showed that 'competitive advantage' and 'sustainability performance' are both significantly influenced by SV:

- The empirical results reveal that SV in the mining industry has a statistically significant positive influence on 'competitive advantage' (CA) (b = 0.940, $p < 0.000$). The 75% (R2 of 0.746) variation in 'competitive advantage' is how much of the dependent variable (CA) is explained by the intervening variable SV. This implies that the management of mining organisations regard SV strategies as influencing an organisation's 'competitive advantage'. The World Bank (2018) agreed with this assertion, stating that the mining industry can help a host country's economic growth by increasing competitiveness, which improves productivity, lower costs and increases efficiency.
- Finally, the influence of perceptions regarding SV on 'sustainability performance' (SP) is confirmed by 38% (R2 of 0.384) of variance in 'sustainability performance', which shows how much of the dependent variable (SP) is explained by the intervening variable SV. This means that SV in mining organisations has a statistically significant positive influence on 'sustainability performance' (b = 0.417, $p < 0.000$). This further implies that an organisation's SV strategy positively influences the broader 'sustainability performance' of the mining organisations through increased profitability, improved productivity and efficiencies whilst optimising positive impact on the environment and sustainable development of the local communities. Bocken (2017) and Schroeder, Anggraeni and Weber (2018, p. 79) found that SV implementation improves organisational performance, innovation and sustainability. Fraser (2019) also discovered that in order to advance the SDGs, mining organisations needed to adopt SV as their new business strategy.

Based on the results of the inferential statistics, Hypothesis H_1 and Hypothesis H_3 are accepted ($p < 0.0001$), as 'automation and innovation' (which includes aspects such as inclusive value chains, automation/technology and innovative business models and infrastructure development) and 'employment conditions' have a significant influence on SV in the mining industry of South Africa whilst hypothesis H_2 is rejected ($p > 0.05$), as 'mineral resource governance' in the mining industry of South Africa has an insignificant influence on SV. Furthermore, Hypotheses H_4 and Hypothesis H_5 are accepted ($p < 0.001$), as SV significantly influences 'competitive advantage' and 'sustainability performance' in the mining industry of South Africa.

Managerial implications

The empirical results of this study show that in the South African mining industry, 'automation and innovation' and employment conditions are antecedents of SV, and 'competitive advantage' and 'sustainability performance' are the outcomes of SV. As a result, this study presents various recommendations that organisations may adopt to create SV and the resultant positive outcomes.

Recommendations regarding antecedents to improve Shared Value

Increasing focus on improving automation, innovation and employment conditions present the South African mining industry with significant opportunities for long-term value creation, building trust with all stakeholders and transitioning to a low-carbon, sustainable economy.

Automation and innovation

Automation and innovation were found to be an antecedent of SV within the mining industry. The World Bank (2018) concurred that mining is driven by value chain innovation, automation/technology innovation and infrastructure development. Therefore, organisations could focus on the following:

- Promote inclusive value chain development that goes beyond compliance.
- Adopt an asset-based model for community/enterprise capacity-building initiatives, including technical, business and financial services support.
- Implement multimodal transport solutions, including shared transport infrastructure.
- Prioritise technology and human resource modernisation.
- Prioritise research and development (Mining Center of Excellence) to influence curriculum development, stimulate innovation, artificial intelligence and sustainability.
- Adopt a new digitally enabled business model, such as 'Intelligent Digital Mines'.
- Expand to mineral beneficiation and industrialisation.

- Invest in collaborative infrastructure development for community projects.
- Develop Special Economic Zones around mining operations to stimulate the local economy and value chain localisation.
- Adopt a green supply chain.

Employment conditions

Employment conditions variable was confirmed by the results of this study to be one of the antecedents of SV in the mining industry. 'Employment conditions' should align philosophies and operating practices with the expectations and beliefs of employees and employers. To ensure that employees' attitudes and productivity positively affect the creation of SV, organisations should consider the following recommendations:

- Develop a 'future-fit' socially focused local employment strategy.
- Integrate sustainability planning and innovation training.
- Implement innovative performance management and reward systems for good performance and incident/safety bonuses.
- Collaborate with civil society and trade unions.
- Improve sustainable prospecting and exploration to guarantee job security.
- Implement smart portable devices that monitor employees' immediate environment and fatigue and deliver real-time health and safety data.
- Increase employee participation in decision making.

Recommendations linked to the Shared Value approach for the South African mining industry

The empirical results revealed that South African mining organisations can promoted SV through implementation of three approaches, namely reimagining the needs, products/services and markets, redefining productivity in the value chain and improving the local enabling business environment (McGahan, 2020).

Table 5 presents recommendations on how mining organisations can implement SV.

The three SV approaches (Table 5) are all focused on building new capacities to meet underserved community needs and addressing value chain gaps through innovation. Therefore, organisations that focus on any of the approaches have a superior opportunity to deliver social value whilst establishing a 'competitive advantage' and achieving 'sustainability performance'.

Recommendations regarding outcomes of Shared Value

Competitive advantage

The study's empirical results show that SV significantly and positively influences the 'competitive advantage' of mining organisations. An increased focus on SV approaches will thus lead to a competitive edge. Accordingly, the following recommendations are provided:

- Develop a secure and flexible supply chain.
- Promote continuous organisational learning.
- Redefine mines' socio-economic role as a development mechanism for the communities and alternative industries.
- Unlock high-potential mining assets, which include untapped mineral reserves.
- Adopt disruptive technology that will drive integration of advanced data analytics, mining equipment technology, people and digital infrastructure to improve access to the quality and quantities of natural deposits and overall sustainability.
- Adopt a systems approach to mine management to build resilience and continuity.

Sustainability performance

The results of the study reveal that SV significantly and positively influences 'sustainability performance'. Integrating environmental and societal issues to the core of organisational strategies provides the mining industry with the most significant opportunities for long-term value creation, trust-building and sustainable growth. Therefore, organisations should increase their focus on SV by implementing the following recommendations:

- Maintain the social license to operate by expanding economic opportunities and promoting healthy living in the communities affected by operational activities.
- Align mining operations, policies and strategies to Sustainable Development Goals.
- Implement a 'green supply chain' encompassing sustainable product design, green material procurement,

TABLE 5: Recommendations linked to Shared Value strategies in the South African mining industry.

Reimagining needs, products/services, and markets	Redefining value chain productivity	Enabling local cluster development
Identify water management solutions.	Focus on infrastructure connectivity (digital mine platforms, precision/automated cutting and grinding equipment).	Collaborate with suppliers, competitors and equipment manufacturers.
View mining assets in the context of climate risk. Venture into renewable energy as an independent power producer/private–public partner.	Ramp up data analytics, AI and innovation to eliminate negative environmental activities, for example, through green supply, electric and hydrogen-powered vehicles, etc.	Invest in cross-industry collaborations with NGOs, government, innovation and technology corporations and institutions of higher learning.
Develop complementary products such as GIS technological equipment, chemicals and community-oriented (intermediate) products.	Provide inclusive business deals for emerging entrepreneurs.	Actively engage in the regional economy, for example, special economic zones.
Invest in mineral beneficiation and industrialisation (value chain linkages).	Develop strategic local suppliers and enterprise development programmes.	Develop the employment policy to localise expertise, skills and technology.
Improve measurements of ESG.	Enhance value chain governance (participation, equity and accountability).	Participate in regional, continental and global partnerships to create long-term ESG benefits.

NGO, Non-Governmental Organisations; GIS, Geographic Information System; ESG, environmental, social, and governance; AI, automation and innovation.

environmentally safe mining and manufacturing processes and reverse logistics of the product after its life cycle.
- Invest in developing and localising core competencies, rare skills and expertise.
- Unbundle contracts with high economic inclusion potential for economic participation of women, youth and indigenous people.
- Uphold human rights across the value chain.
- Build up local industries aligned with mining activities.

Conclusion

This study contributes to the practice of SV by identifying the variables, which could drive SV operationalisation in the mining organisations of South Africa. 'Automation and innovation' (through three pillars, namely innovation for value chain inclusivity, automation and business model innovation, infrastructure development) and 'employment conditions' are the antecedents of SV. The study also revealed 'competitive advantage' and 'sustainability performance' as the outcomes of SV. 'Competitive advantage' generates greater value for the organisation and its stakeholders because of unique advantages or capabilities that set it apart from competitors, whilst 'sustainability performance' encourages economic growth and also creates societal benefits and reduces carbon emissions. Therefore, SV could be considered by organisations and government as a catalyst for answers to profitability and community problems, especially in the mining industry.

Limitations and future research

This study gathered perceptions of managers of large mining organisations. Deeper insights could have been gained by studying perceptions of boards of directors of mining organisations. Although the study made preliminary attempts to identify the antecedents and outcomes of SV, to establish how organisations can create SV by combining it with their business strategies, the study does not indicate how to measure SV. Moreover, empirical research on SV in academia is still at an infancy stage. With in-depth conceptual and empirical development in future studies, SV will receive more recognition to help organisations make informed decisions that will maximise profitability and social value.

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Competing interests

The authors have declared that no competing interests exist.

Authors' contributions

All authors contributed equally to this work.

Ethical considerations

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Data availability

The authors confirm that the data supporting the results of this study are available on request.

Disclaimer

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