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Research Paper

Government policies, human resource management and the performance of artisanal small-scale mining for the sustainable livelihoods of employees

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Abstract: Given the economic momentum of the mining sector, the discovery of natural resources – most notably that of gold – is expected to revolutionize the economy, especially in developing nations. The current study sought to establish whether artisanal and small-scale mining, human resource management, and government policies influence sustainable livelihoods of employees within the mining sector. A cross-sectional survey of 377 employees was conducted among managerial employees from artisanal small-scale mining organisations. The results show that both government policies as well as artisanal and small-scale mining performance positively influence sustainable livelihood for mining workers. Similarly, human resource management moderates the relationship between sustainable livelihoods of employees within the mining sector and the performance of artisanal and small-scale mining. When developing plans for the sustainable livelihoods of employees, management should prioritise improving human resource management practices, including compensation, career development, training, wage and incentive aspects of employment and employee welfare. This study narrows the knowledge gap in the extant literature on business management through expanding literature on the moderating effect of human resource management on the relationship between artisanal and small-scale mining performance and sustainable livelihoods.

Keywords: artisanal mining, government policies, human resource management, small-scale mining, sustainable livelihoods

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1. Introduction

Artisanal and small-scale mining (ASM) is an important source of livelihood especially in developing nations (Hilson & Hu, 2022; Tajpour et al., 2023). Given the economic momentum of the mining sector, the discovery of natural resources, most notably that of gold, is expected to revolutionize the economy, especially in developing nations (Usaini & Chee, 2023). Around the world, small-scale and artisanal mining helps communities and mining industry workers maintain sustainable means of subsistence (Chuma, 2021). It is argued that while artisanal and small-scale mining contributes to the GDP and creates jobs, the industry as a whole does not significantly advance sustainable livelihoods unless certain legislative measures and frameworks for human resource management are implemented (Gukurume & Tombindo, 2023).

Furthermore, unless appropriate government policies are implemented to help employees, ASM will not contribute to sustainable lives on a larger scale in the future (Nyavaya, 2021). This is the result of the industry receiving little or no attention for a variety of reasons (Matsiwira, 2022). The effects of ASM are far fewer and have less influence than other, far more pressing global social and environmental issues when it comes to global governmental priorities (Camacho-Garza et al., 2022). In addition, ASM has not demonstrated the likelihood of improving socioeconomic circumstances; rather, it is a sign of restricted socioeconomic progress (Arhin et al., 2022). For a worldwide long-term sustainable development strategy, this makes the above situation an undesired opportunity. These higher-level problems trickle down to a national level, where the bad reputation of the mining industry,

the difficulties in trying to regulate it, and a clear bias in favour of easy money from large-scale extractive industries make it simple to ignore or completely avoid the problem (Singo et al., 2022).

The majority of consumers who purchase metals and minerals collected by artisanal operators have demonstrated that they have very little concern about the conditions under which the products are produced, especially when it comes to supply chains that connect ASM with the rest of the world (Paschal & Kauangal, 2023). Whilst policy has rarely kept pace with the rhetoric, scholars have, during this time, carried out several detailed studies that confirm this to be the case (Wegenast & Beck, 2020). Earlier conclusions and observations underscore that ASM's economic importance in Sub-Saharan Africa include the following: how it dovetails subsistence agriculture, how it has created hundreds of thousands of jobs for other unemployed people, and how it generates income that enables families to send children to school (Chipangura, 2019; Lawson & Lahiri-Dutt, 2020; Franks, 2020; Orleans-Boham et al., 2020; Brugger & Zanetti, 2020; Perks & Schneck, 2021; Mashapure et al., 2022).

In most countries in Sub-Saharan Africa, there has been inappropriate legal frameworks, policies and support services for the artisanal small-scale mining sector over the years, including interventions aimed at formalizing the activities of the sector (Wegenast & Beck, 2020). There are no quick fix solutions to this problem. Changes are unlikely to take place until government officials begin to recognize that ASM policies and regulations must be more responsive to the needs of a diverse workforce that features, at one extreme, poverty-driven persons and, at the other extreme, individuals who are indeed looking to get rich quickly (Wegenast & Beck, 2020). Therefore, there must be government policies that offer proper regulation of ASM (Hilson & Hu, 2022). However, owing to the greediness of government officials, especially in developing countries, such policies may not see the light of the day (Wegenast & Beck, 2020).

In addition, human resource frameworks should be established to safeguard the safety and motivation of ASM workers (Hilson & Hu, 2022). Once proper government policies are put in place and ASM owners observe human resource practices, there is likely to be more sustainable production and sustainable livelihoods of mining employees and the surrounding communities, and the nation at large will engage in the global economy (Paschal & Kauangal, 2023).

In Zimbabwe, there has been a lot of unregulated and unplanned artisanal and small-scale mining (Chuma, 2021). This has been coupled with inconsistent government policies (Chikazhe et al., 2022; Chikwere et al., 2023) in this industry and the lack of proper and formalized mining practices among artisanal and small-scale mining (Singo et al., 2022). This has resulted in underpayment of employees in the sector. Furthermore, workers in the artisanal and small-scale mining sector continue to endure a variety of challenges, such as diminished livelihoods, abject poverty, food insecurity, abuse of human rights, and violence (Nyavaya, 2021). This trend, coupled with the poor working conditions of artisanal and small-scale miners, shows the need for strategies to address these problems.

In addition, the performance of most artisanal and small-scale miners is low, and most fail to pay a decent wage to employees (Gukurume & Tombindo, 2023). This calls for the intervention of human resource management strategies as well as improved government policies (Chikazhe et al., 2023) so that the performance of artisanal and small-scale mining organizations may improve, which could result in sustainable livelihoods of employees. Furthermore, economy aspects are still unstable because many resource-rich communities are still struggling with issues such as crumbling livelihoods, extreme poverty, food insecurity, and human rights violations (Basson & Erdiaw-Kwasie, 2019; Camacho-Garza et al., 2022).

Additionally, most farming activities are disturbed in areas where ASM activities are common as there are no government policies in place to control ASM activities. In an effort to address similar problems, several studies on ASM have been conducted elsewhere (Chuma, 2021; Hilson & Maconachie, 2020; Clifford, 2022; Paschal & Kauangal, 2023; Yakovleva et al., 2022) with little attention paid on how sustainable livelihoods can be managed for artisanal and small-scale mining employees. Thus, there is a lack of empirical evidence on the moderating effects of human resource management on the relationship between artisanal and small-scale mining performance and sustainable livelihoods of employees. Hence, this study intends to close this literature gap in business management by establishing how human resource management can moderate the relationship between artisanal and small-scale mining performance and sustainable livelihoods of employees. In addition, the current topic is

vital to emerging economies, especially in the Sub-Saharan region, where mining is done on a small scale with most governments paying little attention to improvement on mining policies and employee welfare. The current study sought to remedy this research gap by answering these research questions:

How does artisanal and small-scale mining performance affect sustainable livelihoods of employees?

What effect do government policies for small-scale miners have on sustainable livelihoods of employees?

To what extent do government policies affect artisanal and small-scale mining performance?

Does human resource management moderate the relationship between artisanal and small-scale mining performance and sustainable livelihoods of employees?

The remainder of the paper is organised as follows: first the literature review section, to be followed by empirical evidence and research hypotheses development, methodology, results, discussion, conclusions and the section on implications.

2. Literature review

2.1 Theoretical underpinnings

The foundation of this study is the Harrod–Domar growth model, which characterizes the mining sector as a growth pole or pivot for economic development, around which other economic sectors will prosper. This assumes that the discovery of natural resources would lead to the abolition of many adverse socioeconomic circumstances and would increase prospects for growth in local and national economies (Paschal & Kauangal, 2023). Nevertheless, how much these really change citizens' expectations about the state of the economy is still unclear, given that many resource-rich areas are still struggling with declining standards of living, extreme poverty, food insecurity, and human rights abuses, among other things (Basson & Erdiaw-Kwasie, 2019; Camacho-Garza et al., 2022; Dinye & Erdiaw-Kwasie, 2012).

Theory is relevant to this study as the paper discusses mining activities fostering development that may arise from mining activities supported by the nature of government policies. Based on this theory, it is clear that having abundant natural resources such as mineral deposits may propel a country's fortunes, reduce poverty and create sustainable livelihoods. However, this is only possible if there is proper government policies and proper human resource framework to enhance the performance of mining organisations, which in turn create sustainable livelihoods.

2.2 Sustainable livelihoods

If a livelihood can withstand shocks and strain, can bounce back and support future generations, it is socially sustainable (Clifford, 2022). Furthermore, a livelihood is considered sustainable if it can withstand shocks and strain, become stronger, and preserve its resources without compromising the availability of natural resources (Yakovleva et al., 2022). Sustainable livelihoods are enhanced through mining if companies in the mining sector do not deprive people of their sources of livelihood, avoid widespread environmental hardship, and do not distort social structures (Clifford, 2022). Artisanal and small-scale mining are still touted as the engines of growth and have created jobs for miners and surrounding communities (Kansake et al., 2019; Kheng, 2023). However, many local farmers have lost their main source of income due to land degradation by the artisanal and small-scale mining activities, which have also forced them into unfavourable locations (Erdiaw-Kwasie et al., 2014; Korah et al., 2019).

2.3 Artisanal and small-scale mining

Workplace violence, extended working hours, and underground mining are common characteristics of small-scale mining (Nyavaya, 2021). Small-scale mining is frequently linked to crude and compromised mining techniques (Tajpour et al., 2023) with either very little or no risk control (Nyavaya, 2021). Increased numbers of occupational deaths and injuries are indicative of inadequate implementation of the hierarchy of controls (Singo et al., 2022). This is because small-scale miners lack appropriate human resource management (Nyavaya, 2021). Since most miners do not have collateral security, finance is another problem (Munyoro et al., 2017). As a result, low financing reduces output while raising the dangers to miners' health and safety and the state of the environment (Munyoro et al., 2017).

According to Clifford (2022), artisanal and small-scale mining refers to businesses or individuals that hire people to mine. However, these operations are typically still labour-intensive and involve the use of hand tools and subsistence techniques. Artisanal mining is subsistence mining that is not formally regulated. Miners operate independently and extract minerals using their own resources, they typically work manually (Yakovleva et al., 2022). Artisanal miners often undertake mining activities seasonally, and mining is pursued during the dry season and the post-cropping season (Yakovleva et al., 2022). Nevertheless, most artisanal mining is now performed throughout the year because of poverty (Paschal & Kauangal, 2023).

Low-tech, labour-intensive mineral extraction and processing are used in artisanal and small-scale mining for extended periods of time (Bansah, 2023; Dzimunya et al., 2018). Focusing more intently on the lives of those in an area who turn to artisanal and small-scale mining as a last resort for money presents nuanced assertions that the industry is primarily motivated by poverty (Hilson & Hu, 2022). Upon a deeper examination of these individuals' livelihood paths, it becomes evident that a large number of these persons have surmounted difficult working circumstances and are in a position to use small-scale and artisanal mining as a means of generating income (Chuma, 2021). An examination of these experiences sheds further light on the intricate nature of artisanal and small-scale mining, and highlights the industry's significant economic contribution to Sub-Saharan Africa (Matsiwira, 2022). Many who first sought employment in the artisanal and small-scale mining sector have succeeded in building wealth, which they used to launch their own companies or make communal investments (Nyavaya, 2021). A more thorough understanding of the livelihood paths of artisanal and small-scale miners would greatly strengthen the argument for formalizing and assisting the industry (Bansah et al., 2018). In general, this would make the industry a more central component of Sub-Saharan Africa's strategies for developing and reducing rural poverty, as well as a tool for establishing sustainable livelihoods (Paschal & Kauangal, 2023).

Prior studies have been carried out to establish how sustainable livelihoods can be influenced by small-scale mining performance (Hilson & Maconachie, 2020; Clifford, 2022; Paschal & Kauangal, 2023; Yakovleva et al., 2022). In a study on how prepared stakeholders are for the adoption of autonomous mining systems, Kansake et al. (2019) established that artisanal and small-scale mining are the engines of growth and enhance the sustainable livelihood of mining employees in a community. In a study on artisanal and small-scale mining and sustainable development goals, Clifford (2022) established that artisanal and small-scale mining performance influences the sustainable livelihoods of employees. In addition, Arhin et al. (2022) studied displacement and livelihood resilience and established that artisanal and small-scale mining have a positive effect on sustainable livelihoods. Likewise, in a study on reframing artisanal and small-scale gold mining as a livelihood strategy and the role of law in constituting livelihood assets, Chuma (2021) established that artisanal and small-scale mining performance has a positive effect on sustainable livelihoods. Most of these studies were not conducted in Sub-Saharan Africa, and some of them, such as ones by Orleans-Boham et al. (2020) and Paschal and Kauangal (2023), focused on women in artisanal and small-scale mining. The discussion above shows that the purpose of small-scale mining is mainly to improve the livelihoods of employees and miners. Based on the above conclusions, it can be hypothesised that:

H1: Artisanal and small-scale mining performance has a positive effect on sustainable livelihoods of employees.

2.4 The influence of government policies on sustainable livelihoods of employees

Government policies refer to rules or principles that better support decisions, which results in positive outcomes that enhance the community or unit in question (Chikwere et al., 2022; Febrianti et al., 2020). Government policies contain things are done in a certain way (Singo et al., 2022). Government policies influence all industries, and the mining industry is not an exception, either. The type of policies communicated by a government influences the type of decisions and the performance of organizations in the given industry (Zvarivadza, 2018). Government policies may help organizations to thrive or otherwise they will find it difficult to operate (Nyavaya, 2021). It is postulated that key issues that impede artisanal and small-scale mining include a lack of adequate resources and weak institutional capacity, which include a lack of consistency in government policies. Weak and inconsistent government policies, poor capacity, and financial constraints have contributed to illegal activities, particularly mining activities, which remain largely uncontrolled simply because government institutions lack the capacity to enforce the relevant laws of their states. Such policies, if implemented properly, may propel the mining industry to greater heights (Mkodzongi & Spiegel, 2019).

Literature established the relationship between government policies and sustainable livelihoods. Thus, earlier scholars investigated and confirmed that government policies influence sustainable livelihoods of employees (Febrianti et al., 2020; Singo et al., 2022; Zvarivadza, 2018). In a study on Zimbabwe's rugged artisanal and small-scale mining sector, Nyavaya (2021) proved that government policies could help miners thrive and foster sustainable livelihoods for the community. In addition, in a related study on the mining industry in Zimbabwe focusing on challenges for sustainable development, Mapira (2017) concluded that government policies positively influence sustainable livelihoods of employers. In addition, Dzimunya et al. (2018) studied the formalization of a roadmap to maximize the contribution of artisanal and small-scale mining in Zimbabwe, and established that government policies play a significant role in influencing sustainable livelihoods of miners. Most of these studies, such as Zvarivadza (2018), have focused on government policies and the sustainable development of employers in the mining sector. This study extended focused on government policies, artisanal and small-scale mining performance, and sustainable livelihoods of employees in the mining sector. Considering the above, it is understood that applying effective government policies in the mining sector can lead to sustainable livelihoods of employees. Based on the discussion above, we propose the following:

H2: Government policies have a positive effect on sustainable livelihoods of employees.

Various scholars have studied and confirmed the relationship between government policies and artisanal and small-scale mining performance (Chuma, 2021; Clifford, 2022; Paschal & Kauangal, 2023; Yakovleva et al., 2022). In a study on financing schemes for Zimbabwe's small-scale and artisanal gold mines' gold output, Matsiwira (2022) established that government policies positively influence artisanal and scale performance mining by providing sustainable funding models. According to a related study, Hilson and Maconachie (2020) established that government policies positively influence artisanal and small-scale mining performance. Some studies, such as those by Chuma (2021), have focused on reframing artisanal and small-scale gold mining as a livelihood strategy. In brief, the current study focuses on the effect of government policies on artisanal and small-scale mining performance. Empirical literature shows that the main goal of government mining policy is to provide a context that allows both major and small-scale mining, exploration, and value-adding businesses to function effectively and economically in order to effectively contribute to wealth creation and economic growth. Thus, it can be hypothesised that:

H3: Government policies have a positive effect on artisanal and small-scale mining performance

2.5 The moderating effect of human resource management

The coordination, administration, and allocation of human resources in a way that advances an organization's objectives constitute human resource management. Human resource management emphasizes investing in workers, protecting their well-being, and overseeing every facet of staffing from recruiting to remuneration and training (Khalid & Nawab, 2018). According to Selenko et al. (2017), the main objective of any intervention in human resource management is to help organizations and their people achieve their objectives. According to Hassan (2016), HR professionals may assist staff members in achieving their personal objectives by offering interventions and programmes that support personal growth, such as formal training, educational opportunities, career development activities, and mentorship. Enhancing organizational performance is the end goal of the majority of human resource programs, if not all of them. While there are other factors that affect an organization's performance, Kaufman and Miller (2011) note that human resource management is becoming increasingly important to an organization's success.

The direct relationships between artisanal and small-scale mining performance, human resource management, government policies and sustainable livelihoods have been examined and established in the following studies: Chuma (2021), Hilson and Maconachie (2020), Clifford (2022), Paschal and Kauangal (2023) and Yakovleva et al. (2022). This shows that the three variables are directly and positively related to one another. Moreover, earlier studies point to the fact that HRM in the mining sector needs a strategic and all-encompassing strategy in the current dynamic and competitive environment. By coordinating human resource operations with business objectives, efficient HRM may provide mining ventures a competitive edge and increased value. HRM in the mining sector requires strategic planning, ongoing training, and the implementation of successful retention and incentive programmes. Companies in the mining industry may improve performance, save expenses, and guarantee long-term sustainability by tackling these issues and utilising strategic HRM methods. However, there is a lack of empirical evidence on whether human resource management can moderate the relationship between artisanal and small-scale mining performance and sustainable livelihoods. Based on evidence from extant literature, human resource management interventions assist employees and organizations in attaining their goals (Selenko et al., 2017). According to Hassan (2016), HR professionals may assist staff members in achieving their personal objectives by offering interventions and programmes that support personal growth, such as formal training, educational opportunities, career development activities, and mentorship. Previous studies on artisanal and small-scale mining performance and sustainable livelihoods have not addressed the moderating effects of human resource management. Therefore, this study is unique in that it focuses on establishing the moderating effect of human resource management on the relationship between artisanal and small-scale mining performance and sustainable livelihoods of employees in the mining sector. Based on the foregoing discussion, it can be hypothesized that:

H4: Human resource management moderates the relationship between artisanal and small-scale mining performance and sustainable livelihoods of employees.

Based on the hypotheses outlined above, a research model is proposed, as shown in Figure 1.

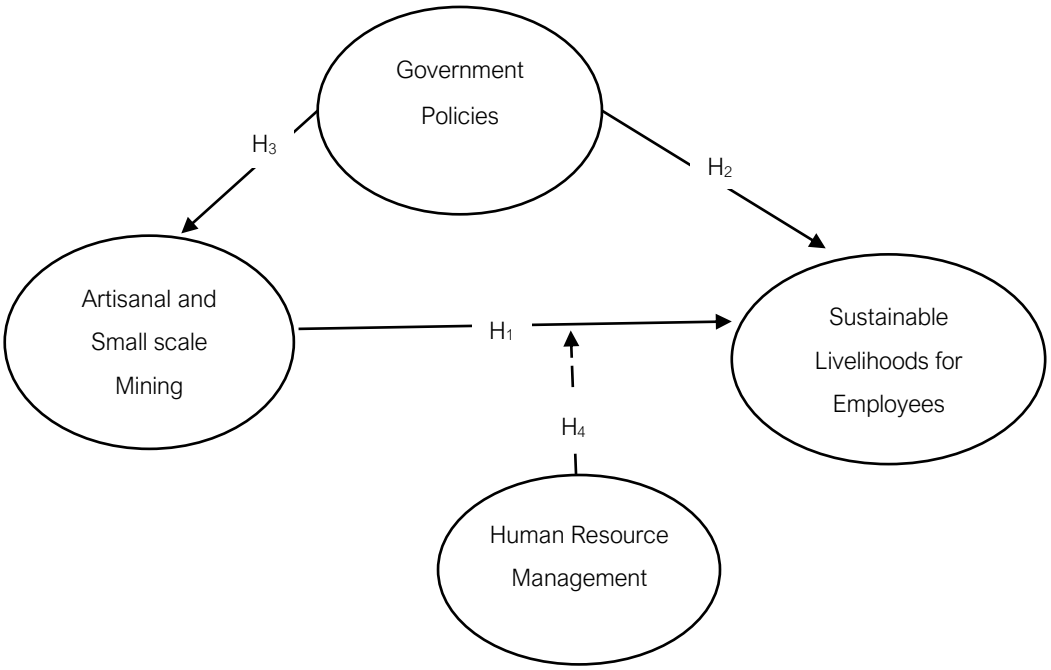

Figure 1: Conceptual framework. *Source: Authors' own*

3. Methodology

The methodology used in this study covered questionnaire design and measurement, as well as sampling and data collection procedures. This study targeted managerial employees in the small-scale mining sector in Mashonaland West Province, Zimbabwe. Mashonaland province was selected to represent the whole country since this province houses nearly all the minerals found within the whole country. A total of 377 managerial employees were selected to participate in this cross-sectional survey because they are expected to have a decent life (sustainable livelihoods) from earnings from the artisanal and small-scale mining activities. In addition, managerial employees have knowledge of the performance of mining. The data collection was conducted between August and October 2023: the time when mining activities are at their peak, because in this period during the rainy season pit flooding does not disturb mining. This is the time when all artisanal miners perform to their best, and it is the time when small-scale miners employ quite a lot of workers.

Respondents were randomly selected from various ASM including Alaska Mine, Hans Mine, Angwa Mine, Anna Mine, Avondale Mine, Caesar Chrome Mine, and Cedric Mine. The mines chosen as part of the sample are artisanal and small-scale and some of these mines were formerly owned and operated by major companies that disserted the mines during the land reform in Zimbabwe and during the economic challenges in the period between 2000 and 2009. The mines were then bought by new local and international investors but the mines are operating below capacity due to limited capital and lack of proper government support. Hence, these mines need support in terms of proper government policies to perform well and they are also in need for proper human resource management for sustainable livelihoods. The researcher sought permission from the relevant authorities prior to the questionnaire distribution process. Questionnaires were physically distributed to the respondents and collected after a minimum of three days. Respondents were happy to provide information to the researcher, as they hoped that this could help them air their views to the responsible authorities. All respondents were assured of anonymity and confidentiality during the research process.

3.1 Design and measurement of questionnaires

A structured questionnaire with Likert type questions was used to collect data from employees of small-scale miners. A structured questionnaire was adopted because it is rather simple to use the data obtained from structured questionnaires for a statistical analysis. Second, because structured surveys include standardized questions, data gathered using well-crafted questionnaires are less likely to be tainted by researcher bias.

The research instrument has five sections: artisanal and small-scale mining performance (ASS), government policies (GOP), human resource management (HRM), sustainable livelihoods (SUL), and demographics. All items within each construct are scored on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). These items were borrowed from previous studies and modified to meet the needs of this study. Table 1 presents the items and sources of the instruments.

Table 1. Questionnaire items and sources. *Source: Authors' own*

Artisanal and small-scale mining performance	Sources
The organisation achieves its targeted levels of production The organisation achieves monthly sales targets The organisation makes good profits The company's financial statements show positive cash flows The organisation shows signs of expansion every year The companies continue to acquire new assets on a yearly basis	Chuma (2021), Hilson and Hu, (2022), Paschal and Kauangal (2023)
Government policies	
Government policies offers proper regulation of artisanal and small-scale mining Government policies are helping mining organisations to thrive There is consistency in government policies in the mining industry The government enforces the relevant laws in the mining industry Current government policies propel the mining industry to greater heights Government policies contribute to the performance of artisanal and small-scale mining	Febrianti et al. (2020), Nyavaya (2021), Singo et al. (2022), Zvarivadza (2018)
Human resource management	
Employees are satisfied with the training they receive from their organisations The management has a collaborative approach in supervision The career development policy is present within the organisation There is job security within the organisation Employees are paid a decent wage Chances for promotion are high	Hassan (2016), Selenko et al. (2017), Gaura et al. (2021)
Sustainable livelihoods	
Employees plan for their future using wages paid to them Employees' lives are being transformed due to decent wages Artisanal and small-scale mining is employee-centred Artisanal and small-scale mining improves the living condition of employees Artisanal and small-scale miners share profits with employees to cushion them Artisanal and small-scale mining assists in poverty alleviation	Korah et al. (2019, Paschal and Kauangal (2023), Yakovleva et al. (2022)

3.2 Data Analysis

Scale validation was done using sampling adequacy test, convergent validity and discriminant validity. Standardized factor loadings, individual item reliability, critical ratios, Cronbach's alpha, and composite reliability were used to determine convergent validity. Discriminant validity was assessed using mean, standard deviation, average variance extracted, and squared inter-construct correlations.

Kaiser Meyer Olkin (KMO) and Bartlett's test of Sphericity (BTS) were performed, to determine the sufficiency of the study sample and the suitability of the data (Hair et al., 2010).

The Kaiser Meyer Olkin (KMO) Bartlett's Test of Sphericity was performed using SPSS® version 21.

SPSS V22 and AMOS V22 were used to analyse the primary data. Descriptive statistics and hypotheses tests results through structural equation modelling (SEM) test were produced. SPSS was used since it is suitable for theory creation, and prediction is especially helpful when working with complex and huge models. Moreover, AMOS is superior in covariance-based SEM tool, providing a wide range of tools for structural modelling and confirmatory factor analysis.

4. Results

In total, 377 questionnaires were returned. Table 2 presents the sample profiles used in this study.

Table 2. Demographic breakdown of the sample. *Source: Authors' own*

Characteristic		Frequency	Percent (%)
Age	18-19	43	11.4
	20-29	69	18.3
	30-39	106	28.1
	40-49	113	30
	50+	46	12.2
Gender	Male	243	64.5
	Female	134	35.5
Occupation	Underground supervision	244	64.7
	Blaster supervisors	26	6.9
	Electricians	19	5
	Heavy equipment operation	26	6.9
	Site surveillance	14	3.7
	Other	48	12.7
Average monthly income earned (USD)	Less than $100	181	48
	$101-250	115	30.5
	$251-500	42	11.1
	$501-750	23	6.1
	Above $750	16	4.2
Years of working at the mine	Less than 5	149	39.5
	5-10	123	32.6
	More than 10	105	27.9
Highest level of qualification	Without diploma	172	45.6
	Diploma level	132	35
	First degree	47	12.5
	Other	26	6.9

The majority (76%) of small-scale mining employees who participated in the current study were between 20 and 49 years of age. This was the most active group that sought to earn a living. Of the respondents, 64.5% were male and female respondents constituted 35.5%. These findings show that there were more male than female managerial employees in the small-scale mining industry. This is attributable to the fact that most mining activities are labour-intensive, which can deter the employment of females in this sector. The majority of the employees were underground workers (66.7%). The bulk of employees earned less than $100 USD and this constitutes 48% of the study sample. In addition, the mainstream of employees had worked at a particular mine for less than five years (39.5%), followed by those who had worked for 5 to 10 years (32.6%). This implies that most workers continuously switch employers looking for better working conditions. A bigger share of the respondents (80.6%) had a diploma as the highest level of qualification. This implies that most of the respondents were educated to a diploma level and resorted to artisanal mining employment.

Table 3: KMO and Bartlett's Test. Source: Authors' own

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.922
Bartlett's Test of Sphericity	Approx. Chi-Square	5016.800
	df	595
	Sig.	.000

Table 3 shows a Kaiser–Meyer–Olkin measure of sampling adequacy of 0.922. Bartlett's test of Sphericity showed an approximate chi-square of 5016.800 and Degrees of Freedom of 595 ($p<0.001$). The results met the minimum requirements recommended by Field et al. (2012), and Bartlett's test of Sphericity was significant at $p<0.05$. Table 4 shows the results of convergent validity.

Table 4: Measurement model fit indices. *Source: Authors' own*

Constructs	Items	Standardised Factor Loadings (λ)	Individual Item Reliabilities	Critical Ratios	Cronbach's Alpha (α)	Composite Reliabilities
Artisanal and small-scale mining performance	ASS1	.495	.713	-	.824	.893
	ASS2	.788	.752	32.965***		
	ASS3	.912	.873	36.173***		
	ASS4	.855	.916	40.914***		
	ASS5	.842	.654	22.173***		
	ASS6	.751	.682	24.431***		
Government policies	GOP2	.544	.708	-	.832	.841
	GOP3	.624	.649	21.534***		
	GOP4	.753	.673	23.248***		
	GOP5	.831	.655	22.389***		
	GOP6	.825	.851	37.433***		
	GOP2	.897	.687	25.491***		
Human resource management	HRM1	.743	.678	-	.815	.824
	HRM2	.733	.669	24.351***		
	HRM3	.656	.753	28.163***		
	HRM4	.549	.766	26.621***		
	HRM5	.464	.647	23.369***		
	HRM6	.725	.689	25.573***		
Sustainable livelihoods	SUL1	.839	.745	-	.883	.897
	SUL2	.989	.632	26.365***		
	SUL3	.919	.729	27.597***		
	SUL4	.858	.685	25.318***		
	SUL5	.536	.747	28.389***		
	SUL6	.624	.688	25.791***		

Note: - CR is fixed; *** $p < 0.001$

The results in table 4 show that standardized factor loadings were above the recommended 0.4 cut-off point (Hair et al., 2014). The critical ratios were appropriately large and statistically significant ($p<0.001$). Individual item reliabilities, composite reliabilities and Cronbach's alpha values were all acceptable as they were above 0.5 (Hair et al., 2010). The results indicate that convergent validity conditions were satisfactory.

Discriminant validity was assessed using mean, standard deviation, average variance extracted, and squared inter-construct correlations, as shown in Table 5.

Table 5: Mean (M), standard deviation (SD), AVE and SICC. *Source: Authors' own*

Construct	Mean	SD	EMPT	CDEV	EMJS	ORGP
Artisanal and small-scale mining performance	4.417	1.112	**.669**			
Government policies	3.786	.966	.234	**.732**		
Human resource management	3.924	.945	.281	.349	**.586**	
Sustainable livelihoods	4,637	.962	.336	.278	.249	**.618**

Note: Diagonal elements in bold represent AVEs

The results in Table 5 show that all constructs had average variance above the recommended cut-off point of 0.5 (Hair et al., 2014). In addition, all AVEs (diagonal elements) were above 0.5, and above the squared inter-construct correlations (Field et al., 2012). Therefore, the minimum conditions for discriminant validity are satisfied. H1, H2, and H3 were tested using structural equation modelling (SEM) in AMOS Version 24. Table 6 presents the results of the hypotheses test.

Table 6: Results of hypotheses testing. *Source: Authors' own*

Hypothesis	Hypothesised Relationship	SRW	CR	Remark
H1	Artisanal and small-scale mining performance → Sustainable livelihoods	.359	18.817***	Supported
H2	Government policies → Sustainable livelihoods	.296	12.548***	Supported
H3	Government policies → Artisanal and small-scale mining performance	.443	21.558***	Supported

Notes: SRW = standardized regression weight, CR = critical ratio, *** = significant at p<0.001.

The results for H1 show that artisanal and small-scale mining performance has a positive effect on sustainable livelihoods (SRW= 0.359, CR = 18.817, p<0.001). Therefore, H1 was supported. The results for H2 showed that government policies positively influenced sustainable livelihoods (SRW= 0.296, CR = 12.548, p < 0.001). Thus, H2 was supported. Similarly, the results for H3 show that government policies have a positive effect on artisanal and small-scale mining performance (SRW = 0.443, CR = 21.558, p < 0.001). Consequently, H3 was supported.

Moderated regression analysis was used to test H4 (H4: Human resource management moderates the relationship between artisanal and small-scale mining performance and sustainable livelihoods). The referent results are summarized in Table 7. The results show that the coefficients for the interaction terms (artisanal and small-scale mining performance × human resource management) were insignificant (beta .203, t-statistic 9.959, p>0.000). This suggests that human resource management moderates the effect of artisanal and small-scale mining performance on the sustainable livelihoods of mining employees.

Table 7: Coefficients of moderated regression model

Variable	Beta	t-statistic	p value
Artisanal and small-scale mining performance	.415	12.031	.000
Human resource management	.367	11.023	.000
Artisanal and small-scale mining performance × human resource management	.203	9.959	.000

5. Discussion

Can sustainable livelihoods of employees be attained through proper government policies, artisanal and small-scale mining performance and human resource management? Prior studies' findings emphasise that employees in the mining sector should benefit from the proceeds and that the miners should also ensure that the community benefits (Chipangura, 2019; Lawson & Lahiri-Dutt, 2020; Franks, 2020; Orleans-Boham et al., 2020; Brugger & Zanetti, 2020; Perks & Schneck, 2021). Additionally, when developing plans for the

sustainable livelihoods of employees, management should prioritise improving human resource management practices, including compensation, career development, training, wage and incentive aspects of employment and employee welfare. However, earlier studies paid little attention to the moderating effect of HRM on the relationship between artisanal and small-scale mining performance and sustainable livelihoods of employees. Therefore, this study sought to investigate this aspect. Thus, the current study narrowed the knowledge gap in the extant literature on business management by expanding literature on the moderating effect of human resource management on the relationship between artisanal and small-scale mining performance and sustainable livelihoods. The study's empirical results confirm all the hypothesised relationships (H1-4) and highlight the importance of HRM and proper government policies for the improvement of small-scale performance and the livelihoods of employees.

Studies focusing on the relationship between artisanal and small-scale mining performance, government policies, human resource management, and sustainable livelihoods are scarce, especially in an emerging economy characterized by informal and unregistered mining activities. Most studies focused much on relationships among diverse variables and ignored relationships between artisanal and small-scale mining performance and sustainable livelihoods (Brugger & Zanetti, 2020; Franks, 2020; Lawson & Lahiri-Dutt, 2020; Orleans-Boham et al., 2020; Perks & Schneck, 2021).

Moreover, prior studies have not encompassed the relationships between the moderating effect of human resource management on artisanal and small-scale mining performance and sustainable livelihood. The current study was conducted to narrow this knowledge gap in the body of management knowledge by examining the effect of artisanal, scale, and government policies on sustainable livelihoods moderated by human resource management.

First, it was established that artisanal and small-scale mining performance positively influence sustainable livelihoods. These results corroborate earlier findings of related studies that have reported similar results (Arhin et al., 2022; Brugger & Zanetti, 2020; Dzimunya et al., 2018; Kansake et al., 2019; Mkodzongi & Spiegel, 2019; Zvarivadza, 2018). Hence, if small-scale mining organizations perform better, they will eventually contribute to sustainable livelihoods of employees through the payment of better wages. This implies that if artisanal and small-scale mining organizations achieve targeted levels of production, sales targets, targeted profits, positive cash flows, expand their mining operations, and acquire new assets, then they can better pay their employees and contribute to sustainable livelihoods.

Favourable government policies that support small-scale mining activities were found to influence the sustainable livelihoods of employees. Therefore, if proper and sound government policies are put in place, this could support profitable mining activities for mining organizations. In addition, if there is consistency in government policies towards artisanal mining, improved performance by artisanal and small-scale mining activities can be observed. This finding contributes significantly to the body of management knowledge in that the study is among the few to offer empirical evidence based on the relationship between government policies and sustainable livelihoods of employees within the artisanal and small-scale mining sectors.

Government policies were found to influence artisanal and small-scale mining performances. The study's results corroborate earlier studies that conclude that there is a positive relationship between proper policy formulation and organizational performance (Perks & Schneck, 2021; Clifford, 2022; Yakovleva et al., 2022). Thus, government policies can help organizations thrive, or the opposite can also be true. Therefore, key issues in government policies include policies on resource allocation, institutional capacitation, and consistency in government policies. Therefore, if such policies are properly implemented, they will propel the artisanal and small-scale mining industry to greater heights. Therefore, this study contributes to the management of knowledge in artisanal and small-scale mining by empirically validating the effects of government policies on artisanal and small-scale mining. This study adds to the existing knowledge the following: artisanal and small-scale mining performance, government policies and human resource management are important variables that influence sustainable livelihoods in the mining community

6. Practical implications

How can small-scale mining organizations contribute to the sustainable livelihoods of their employees? In order to do this, management is advised to focus more on human resource management aspects such as payment of decent wages to employees, career development, and setting aside funds aimed at benefiting workers after retirement. The payment of decent wages in the mining industry allows workers to plan for the post-employment period. This motivates workers to improve their productivity. In addition, workers in the mining sector can be motivated to produce more if management improves their working conditions and job security. Working conditions can be enhanced by paying attention to labour laws, such as adhering to normal working hours, allowing workers to take paid leave, and implementing health and safety programmes at the workplace. Health issues require prioritisation, as most workers are exposed to hazardous gases or mining dust in most cases. Workers are occasionally exposed to extremely hot or cold weather, which can affect their health. Workers can experience uncomfortable or distracting noise levels to the detriment of their health. Thus, government policies need to favour employees, especially when it comes to issues related to wage and incentive aspects of employment.

Moreover, employees' welfare can be improved if management observes labour laws and implements them in the mining sector. Most employees in the small-scale and artisanal mining sector do not have any pension funds to cushion them after retirement. The government should put such programmes in place and should assist pensioners after retirement. It is common that the majority of former workers in the small-scale and artisanal mining sector are destitute and die without anything. This scenario is common in the majority of developing nations in the Sub-Saharan region. Only the owners of small-scale mines benefit more at the expense of workers. The government should establish policies to protect these workers and plan their future lives. The management of the mining industry in development nations should also ensure that safety and health regulations are followed: they should notify workers about potential dangers, take necessary action to reduce those risks, and should train workers in safe work practices.

In addition, artisanal and small-scale mining organizations are encouraged to achieve targeted levels of production, sales targets, targeted profits, positive cash flows, expand their mining operations, and acquire new assets. This can improve artisanal and small-scale mining performance so that they pay better wages, which contributes to the sustainable livelihoods of employees.

7. Conclusions and future research directions

The study sample was drawn from Mashonaland West Province. Thus, the generalization of the findings can be difficult. Future research could be improved by extending related studies to other provinces in and beyond Zimbabwe. The current study only used managerial employees' perceptions to assess the effect of artisanal and small-scale mining performance, government policies, and human resource management on sustainable livelihoods, particularly in the artisanal and small sectors. Future studies may improve study results by encompassing managers' perceptions and the perceptions of officials from government ministries such as the Ministry of Mines and Mining Development to assess the effect of artisanal and small-scale mining performance, government policies and human resource management on sustainable livelihoods, particularly in the artisanal and small-scale mining sectors.

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References

- Arhin, P., Erdiaw-Kwasie, M. O., & Abunyewah, M. (2022). Displacements and livelihood resilience in Ghana's mining sector: The moderating role of coping behaviour. *Resources Policy*, *78*, 102820. https://doi.org/10.1016/j.resourpol.2022.102820
- Bansah, K. J. (2023). Artisanal and small-scale mining formalization in Ghana: The government's approach and its implications for cleaner and safer production. *Journal of Cleaner Production*, *399*, 136648. https://doi.org/10.1016/j.jclepro.2023.136648
- Bansah, K. J., Dumakor-Dupey, N. K., Kansake, B. A., Assan, E., & Bekui, P. (2018). Socioeconomic and environmental assessment of informal artisanal and small-scale mining in Ghana. *Journal of Cleaner Production*, *202*, 465-475. https://doi.org/10.1016/j.jclepro.2018.08.150
- Basson, M., & Erdiaw-Kwasie, M. O. (2019). Entrepreneurship under siege in regional communities: Evidence from Moranbah in Queensland, Australia. *Journal of Rural Studies*, *66*, 77-86. https://doi.org/10.1016/j.jrurstud.2019.01.011
- Brugger, F., & Zanetti, J. (2020). "In my village, everyone uses the tractor": gold mining, agriculture and social transformation in rural Burkina Faso. *The Extractive Industries and Society*, *7*(3), 940-953. https://doi.org/10.1016/j.exis.2020.06.003
- Camacho-Garza, A., Acevedo-Sandoval, O. A., Otazo-Sánchez, E. M., Roman-Gutiérrez, A. D., & Prieto-García, F. (2022). Human rights and socio-environmental conflicts of mining in Mexico: a systematic review. *Sustainability*, *14*(2), 769. https://doi.org/10.3390/su14020769
- Chikazhe, L., Bhebhe, T. B., Nyagadza B., Munyanyi, E. & Singizi T. (2022). The role of self-service technology and graduates' perceived job performance in assessing university service quality. *Quality Assurance in Education*, *30*(3), 1-25. https://doi.org/10.1108/QAE-03-2022-0080
- Chikazhe, L., Marere, R. P., Chavunduka, D., Chinofunga, S., Chifamba, O. & Kaviya M. (2023). Promoting service quality and organisational performance through customer retention strategies: The moderating role of ICT. *European Journal of Management Studies*, *28*(3), 193-211. https://doi.org/10.1108/EJMS-01-2023-0003
- Chikwere D., Chikazhe L. & Tukuta M. (2022). The influence of public procurement practices on service delivery: Insights from Zimbabwe's Rural District Councils. *Journal of Tianjin University Science and Technology*, *55*(9), 30-45. https://doi.org/10.17605/OSF.IO/RJC4Q
- Chikwere, D., Chikazhe, L., & Tukuta, M. (2023). Value for money in public procurement: Experience from Zimbabwe's rural district councils. *Cogent Social Sciences*, *9*(2), 2244746. https://doi.org/10.1080/23311886.2023.2244746
- Chipangura, N. (2019). Towards the decriminalisation of artisanal gold mining in Eastern Zimbabwe. *The Extractive Industries and Society*, *6*(1), 154-161. https://doi.org/10.1016/j.exis.2018.09.003
- Chuma, M. (2021). *Reframing artisanal and small-scale gold mining as a livelihood strategy and the role of law in constituting livelihood assets* (Publication No. 10539) [Doctoral dissertation, University of the Witwatersrand, Johannesburg]. ETD Collection https://hdl.handle.net/10539/33266
- Clifford, M. J. (2022). Artisanal and small-scale mining and the sustainable development goals: Why nobody cares. *Environmental Science and Policy*, *137*, 164-173. https://doi.org/10.1016/j.envsci.2022.08.024
- Dinye, R. D., & Erdiaw-Kwasie, M. O. (2012). Gender and labour force inequality in small-scale gold mining in Ghana. *International Journal of Sociology and Anthropology*, *4*(10), 285–295. https://doi.org/10.5897/IJSA11.063
- Dzimunya, N., Mapamba, L., Dembetembe, G. G., Dzwiti, K., & Mukono, T. (2018, September). *Formalization of a roadmap to maximize the contribution of artisanal and small-scale mining in Zimbabwe*. ASM Conference 2018. Johannesburg, South Africa. http://hdl.handle.net/10646/3833
- Erdiaw-Kwasie, M. O., Dinye, R. D., and Abunyewah, M. (2014). Impacts of mining on the natural environment and wellbeing of mining-fringe communities in Prestea, Ghana. *Greener Journal Social Science*, *4*(3), 108–122. https://doi.org/10.15580/GJSS.2014.3.010614020
- Febrianti, N. T., Suharto, S., & Wachyudi, W. (2020). The effect of career development and motivation on employee performance through job satisfaction in PT Jabar Jaya Perkasa. *International Journal of Business and Social Science Research*, *1*(2), 25-35. https://doi.org/10.47742/ijbssr.v1n2p3
- Field, A., Miles, J., & Field, Z. (2012). *Discovering statistics using R*. Sage.
- Franks, D. M. (2020). Reclaiming the neglected minerals of development. *The Extractive Industries and Society*, *7*(2), 453-460. https://doi.org/10.1016/j.exis.2020.02.002
- Gaura, K. C., Manyanga, W. & Chikazhe, L. (2021). The effect of corporate social responsibility on brand awareness: Evidence from the insurance sector in Zimbabwe. *Journal of Marketing and Consumer Behaviour in Emerging Markets*, *2*(13), 22-36. https://doi.org/10.7172/2449-6634.jmcbem.2021.2.2
- Gukurume, S., & Tombindo, F. (2023). Mining-induced displacement and livelihood resilience: The case of Marange, Zimbabwe. *The Extractive Industries and Society*, *13*, 101210. https://doi.org/10.1016/j.exis.2023.101210
- Hair, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM) An emerging tool in business research. *European Business Review*, *26*(2), 106-121. https://doi.org/10.1108/EBR-10-2013-0128
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis: Global edition*. New jersey: Pearson
- Hassan, S. (2016). Impact of HRM practices on employee's performance. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, *6*(1), 15-22. https://doi.org/10.6007/IJARAFMS/v6-i1/1951
- Hilson, G., & Hu, Y. (2022). Changing priorities, shifting narratives: remapping rural livelihoods in Africa's artisanal and small-scale mining sector. *Journal of Rural Studies*, *92*, 93-108. https://doi.org/10.1016/j.jrurstud.2022.03.010
- Hilson, G., & Maconachie, R. (2020). Artisanal and small-scale mining and the sustainable development goals: Opportunities and new directions for sub-Saharan Africa. *Geoforum*, *111*, 125-141. https://doi.org/10.1016/j.geoforum.2019.09.006
- Kansake, B. A., Kaba, F. A., Dumakor-Dupey, N. K., & Arthur, C. K. (2019). The future of mining in Ghana: Are stakeholders prepared for the adoption of autonomous mining systems? *Resources Policy*, *63*, 101411. https://doi.org/10.1016/j.resourpol.2019.101411
- Kaufman, B. & Miller, B. (2011). The firm's choice of HRM practices: Economics meets strategic human resource management. *Industrial and Labor Relations Review*, *64*(3), 526-557.https://doi.org/10.2307/41149478

- Khalid, K., & Nawab, S. (2018). Employee participation and employee retention in view of compensation. *International Business Research*, *8*(4), 526-557. https://www.jstor.org/stable/41149478
- Kheng, Y. K. (2023). Effect of serene business environment on the performance of small and medium enterprises in Malaysia. *Malaysian Management Journal*, *27*, 59-82. https://doi.org/10.32890/mmj2023.27
- Korah, P. I., Nunbogu, A. M., Cobbinah, P. B., & Akanbang, B. A. A. (2019). Analysis of livelihood issues in resettlement mining communities in Ghana. *Resources Policy*, *63*, 101431. Https://doi.org/10.1016/j.resourpol.2019.101431
- Lawson, L., & Lahiri-Dutt, K. (2020). Women sapphire traders in Madagascar: Challenges and opportunities for empowerment. *The Extractive Industries and Society*, *7*(2), 405-411. Https://doi.org/10.1016/j.exis.2019.07.009
- Mapira, J. (2017). The mining industry in Zimbabwe: Challenges for sustainable development. *European Journal of Social Sciences Studies*, *2*(8), 313-329. Https://doi.org/10.46827/EJSSS.V0I0.244
- Mashapure, R., Nyagadza B., Chikazhe L., Mazuruse, G., & Hove, P. (2022). Women entrepreneurship development and sustainable rural livelihoods in Zimbabwe. *Arab Gulf Journal of Scientific Research*, *41*(4), 557-584. Https://doi.org/10.1108/AGJSR-07-2022-0112
- Matsiwira, L. (2022). Funding models for gold productivity from artisanal and small-scale gold mines in Zimbabwe. *International Journal of Economics, Commerce & Management*, *11*(10), 110-128. https://ir.cut.ac.zw:8080/xmlui/handle/123456789/294
- Mkodzongi, G., & Spiegel, S. (2019). Artisanal gold mining and farming: Livelihood linkages and labour dynamics after land reforms in Zimbabwe. *The Journal of Development Studies*, *55*(10), 2145-2161. https://doi.org/10.1080/00220388.2018.1516867
- Munyoro, G., Nyandoro, Z., Tanhara, J. R., & Dzapasi, Y. M. (2017). The significance of the microfinance sector on the development of artisanal and small-scale mining in Zimbabwe: A Case of Mashonaland West. *ADRRI Journal (Multidisciplinary)*, 26(3), 29-43. https://doi.org/10.55058/adrrij.v26i3.365
- Nyavaya, K. (2021, November). *Zimbabwe's rugged artisanal and small-scale mining sector*. Rosa Luxemburg Stiftung. https://www.rosalux.co.za/publications/zimbabwes-rugged-artisanal-small-scale-mining-sector
- Orleans-Boham, H., Sakyi-Addo, G. B., Tahiru, A., & Amankwah, R. K. (2020). Women in artisanal mining: Reflections on the impacts of a ban on operations in Ghana. *The Extractive Industries and Society*, *7*(2), 583-586. https://doi.org/10.1016/j.exis.2020.03.004
- Paschal, M., & Kauangal, J. (2023). Women position in artisanal and small-scale mining in sub-Saharan Africa: A systematic literature review. *Resources Policy*, *81*, 103314. https://doi.org/10.1016/j.resourpol.2023.103314
- Perks, R., & Schneck, N. (2021). COVID-19 in artisanal and small-scale mining communities: Preliminary results from a global rapid data collection exercise. *Environmental Science and Policy*, 121, 37-41. https://doi.org/10.1016/j.envsci.2021.03.007
- Selenko, E., Mäkikangas, A., & Stride, C. B. (2017). Does job insecurity threaten who you are? Introducing a social identity perspective to explain well-being and performance consequences of job insecurity. *Journal of Organizational Behavior*, *38*(6), 856-875. https://doi.org/10.1002/job.2172
- Tajpour, M., Hosseini, E., Ratten, V., Bahman-Zangi, B., & Soleymanian, S. M. (2023). The role of entrepreneurial thinking mediated by social media on the sustainability of small and medium-sized enterprises in Iran. *Sustainability*, *15*(5), 4518. https://doi.org/10.3390/su15054518
- Singo, J., Isunju, J. B., Moyo, D., Steckling-Muschack, N., Bose-O'Reilly, S., & Mamuse, A. (2022). Hazards and control measures among artisanal and small-scale gold miners in Zimbabwe. *Annals of Global Health*, *88*(1). https://doi.org/10.5334/aogh.3621
- Usaini, M., & Chee, W. H. (2023). The effect of corporate governance on earnings management in Nigeria's financial institutions: Moderating role of CEO competency. *Malaysian Management Journal*, *27*, 21-58. https://doi.org/10.32890/mmj2023.27
- Wegenast, T., & Beck, J. (2020). Mining, rural livelihoods and food security: A disaggregated analysis of sub-Saharan Africa. *World Development*, *130*, 104921. https://doi.org/10.1016/j.worlddev.2020.104921
- Yakovleva, N., Vazquez-Brust, D. A., Arthur-Holmes, F., & Busia, K. A. (2022). Gender equality in artisanal and small-scale mining in Ghana: Assessing progress towards SDG 5 using salience and institutional analysis and design. *Environmental Science and Policy*, *136*, 92-102. https://doi.org/10.1016/j.envsci.2022.06.003
- Zvarivadza, T. (2018). Artisanal and small-scale mining as a challenge and possible contributor to sustainable development. *Resources Policy*, *56*, 49-58. https://doi.org/10.1016/j.resourpol.2018.01.009