



Improving the Social and Economic Welfare: The Challenges of Artisanal Mining Operators in the Haut-Katanga Province of the DRC

BY

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Abstract

Based on entrepreneurship and innovation theories, this study explored strategies to resolve artisanal miners' social and economic challenges in the Haut-Katanga province of the Democratic Republic of Congo (D. R. C) by implementing positive social change in local communities. This study also provided an overview of the state of artisanal mining activities in the Haut Katanga province and discussed the potential job creation and sources of income that artisanal mining operators can find. The artisanal mining industry is a significant source of employment and income for the local population and the D. R. C government. The DRC government established a new mining code promulgated to protect and sustain mining activities in March 2018. Moreover, the DRC government created a technical service called Service d' Assistance et d' Encadrement du Secteur Artisanal et a Petite Echelle (SAEMAPE) to monitor and train artisanal mining operators. Despite this innovation, the effectiveness of supervision and training of artisanal and small-scale mining remains timid. However, artisanal miners also experience several challenges in improving their social and economic lives. Government and mining leaders must implement effective strategies to overcome social and economic challenges and promote positive social change for artisanal miners. Data for this study were collected using interview questions from 8 top government and mining leaders who implemented effective strategies to increase social and economic conditions in the Haut-Katanga province. The founding of this study revealed that artisanal mining officials or business leaders in the Haut-Katanga province of the DRC should (a) improve educational programs and working conditions, (b) regulate wages or salary based on risks, and (c) facilitate access to financial services or advisers for artisanal miners. These strategies would help to reduce poverty, health problems, and environmental degradation. The article concluded by discussing the need to improve artisanal mining practices and sustain positive social change in the local communities. The findings from this research may also be used to identify potential solutions to improve the social and economic welfare of artisanal mining employees in other provinces or regions of the DRC.

Keywords: Social and economic challenges, Artisanal miners, Positive social change.

Introduction

The primary role of organizational leaders is to improve and sustain people's social and economic lives [1, 2]. Government and business leaders must establish appropriate strategies to mitigate employees' social and economic challenges and

promote positive social change [3]. In the artisanal mining industry, which is often based on informal and illegal mining practices, appropriate and effective strategies to sustain employees or artisanal miners' welfare are needed to save millions of people's lives in the mining industry. In the Democratic Republic of Congo (DRC), especially in the Haut-

Katanga province, artisanal mining activity is a significant source of income and employment, contributing at least 10-20% of the country's mineral production [4]. However, the exploration and exploitation of artisanal mining pose several challenges involving employers, miners, and local government officials, particularly in the social and economic lives of the local population in the Haut-Katanga province located in the southeastern region of the DRC.

Despite the role of the government and mining leaders in supporting artisanal miners' development, current research analysts show that 0.4 to 0.5% of death occurs every year because of the lack of appropriate training and equipment in the artisanal mining industry [4, 5]. Therefore, it is essential to understand the causes of artisanal miners' social challenges, including health, water, environment, and death, to implement and ensure better social and economic lives. Furthermore, finding appropriate strategies to mitigate artisanal miners' challenges could improve the relationship between government leaders, employers, and the local population. This study explores these issues by relying on entrepreneurship theory as the primary framework and innovation concept as the supporting theory and analyzing data collected from eight government and mining leaders in the Haut-Katanga province of the DRC.

Background

The number of incidents in the artisanal mining work environment is increasing yearly, and it has become a big concern in the Haut-Katanga province of the DRC for both government and mining companies [5]. According to Sovacool [5], artisanal mining, also known as small-scale mining, poses significant challenges to the local population and artisanal miners, negatively affecting their social and economic lives. Per Sovacool [5], one of the most critical challenges is the pollution of water sources because of the chemicals and waste materials that fall into surrounding rivers or streams from mining exploration or exploitation. The release of chemicals and waste materials can create intense air pollution and affect the local population's health and water quality. The worst drinking water quality may cause diseases or even deaths [6]. Additionally, vegetation degradation caused by artisanal mining activities can lead to soil erosion, which may impact or affect the local environment or ecosystem.

The risk of accidents is another social impact of artisanal mining activities. Artisanal miners often work in dangerous conditions without appropriate safety equipment and training, which may lead to serious injuries or fatalities. In the artisanal mining sectors, too much dust arises from mining activities and can cause respiratory problems such as tuberculosis or lung cancer [6]. The economic impacts of artisanal mining on artisanal miners and the local population are also significant. For instance, Huntington and Marple-Cantrell [7] argued that while artisanal mining can provide an essential source of income for individuals and families, it can also lead to a cycle of poverty and dependence. Huntington and Marple-Cantrell [7] also added that the lack of formal regulation and policies

in artisanal mining activities often results in exploitation by mediators and traders who offer low mineral prices, leaving miners with little bargaining power. Moreover, artisanal mining often displaces small-scale farmers and traditional livelihoods as miners seek new areas to explore and exploit. This can result in social tensions and conflicts over land use and resource allocation, leading to further economic insecurity for local populations.

Entrepreneurship Theory

In the mid-20th century, two economists, Joseph Schumpeter and Israel Kirzner, developed entrepreneurship theory [8]. Per Candela and Lambert [8], entrepreneurship theory is based on understanding and improving the processes, practices, and strategies individuals need to start, grow, and manage new business activities. However, as markets and individuals' behaviors continuously affect business activities, entrepreneurship theory has evolved to encompass various interdisciplinary perspectives, including management, psychology, sociology, and economics. As a result, the impact of entrepreneurship theory on government and mining companies' leaders can be significant, as it provides a framework for understanding the challenges and opportunities associated with artisanal mining activities.

Using entrepreneurship theory to start, grow, and manage their organizations, government and mining leaders can gain new ideas to identify real business problems, assess risk management, develop effective development strategies, prevent uncertainty, and increase mining productivity. Additionally, entrepreneurship theory can provide government and mining leaders with new resources and strategies to support services, such as business incubators, accelerators, and mentoring programs, to resolve complex issues and promote success [9]. Luamba [10] added that a real business manager or leader must enjoy creating things to evolve and make more profits. As explained above, artisanal mining in the Haut-Katanga industry needs a better understanding of the entrepreneurial process among artisanal miner leaders to examine the drivers of entrepreneurship, such as access to capital, technology transfer, and the development of networks and social capital. Finally, research is also needed to understand better the implications of the informal economy for the region's economic growth and to identify strategies for improving the economic, environmental, and social impacts of artisanal mining activities. As applied to this study, Schumpeter and Kirzner's entrepreneurship theory holds crucial elements that might contribute to identifying and understanding fundamental strategies government and mining leaders need to mitigate artisanal mining challenges and improve the social and economic welfare of artisanal miners and the local population.

Literature Review

This literature review identified several key factors and sources contributing to mitigating artisanal miners' challenges and promoting positive social change in the local communities. Mulaba-Bafubiandi et al. [11] argued that artisanal mining activities involve the extraction of minerals

such as copper, cobalt, and gold from small-scale mines, often using rudimentary equipment and techniques. While artisanal mining provides employment and income for many, it poses several challenges. The literature shows that artisanal mining activities in the Haut-Katanga province led to the exploitation or misuse of the workforce, particularly children and women, who are vulnerable to abuse and discrimination. Recent research pointed out that children, especially young males between the ages of 15 and 17 years old, misusing to dig in narrow and dangerous mining galleries because of their easy accessibility than adults to dangerous narrow zone [11]. Moreover, the lack of proper equipment and safety measures leads to health problems such as respiratory illnesses, skin diseases, and eye problems [11].

The literature review also indicates that artisanal mining activities lead to environmental degradation, especially when using mercury and other hazardous chemicals that contaminate the soil, water, and air. This has significant implications for the health and well-being of the local population and the ecosystem. Furthermore, artisanal mining activities may lead to conflicts and violence, particularly over land and mineral rights [4]. Moreover, poor sanitary conditions in miners' camps favor epidemics and a higher prevalence of diseases such as HIV because of promiscuity and prostitution [11]. Effective managers or leaders need to be innovators to take preventive action to save the lives of artisanal miners, their families, and the entire local population. Moreover, ensuring good living conditions will contribute to sustaining mining activities which would benefit both government and the population.

Supporting Theory of Innovation

Innovation is introducing something new to an existing system, method, product, or service [10]. Schumpeter [9] argued that innovation is the implementation of new ideas and solutions that create added value for a business or organization. Luamba et al. [10] added that innovation involves using new technologies, developing new products and services, or performing new business models and processes to sustain an organization's longevity. Schumpeter [9] opined that innovation should include the introduction of new approaches to business problem solutions. Innovation is crucial and strategic for a company to stay competitive while facing the pressure of competitors. Luamba et al. [10] added that the impact of globalization on business activities is increasing innovativeness in solving complex issues that companies or organizations may face. Luamba et al. [10] opined that creativity should contribute to a reach customers' demands or satisfaction while affected by the impacts of competition and globalization. Recent researchers argued that some businesses or organizations fail to succeed because managers lack the innovative spirit to take precautions to analyze customers' needs and prevent the adverse effects of competitors [10]. Therefore, managers should perceive innovation as a strategy that prevents failure and promotes an organization's success.

Moreover, the impact of globalization on business activities has affected customers' and market behaviors [10]. As globalization increases competition and affects product quality and services, business managers should proactively anticipate market behaviors in the short or long term [9,10]. Per Schumpeter [9], innovative entrepreneurs, managers, or leaders should be able to compete in the market efficiently, sustain long-term organization viability, reduce operational costs, promote working conditions, and increase employee satisfaction. Some researchers suggested that leaders who use appropriate methods, such as implementing new processes to improve employee or customer loyalty and product or service quality, have the probability of succeeding effectively [9, 10]. In the current business context, innovation has become unavoidable for managers to maintain high business or organization standards [10]. Government or mining leaders should consider using innovation as a managerial tool that promotes a healthy working environment, increases an organization's longevity, and prevents negative impacts on employees' social and economic lives. Researchers can use many other business concepts, but innovation should be helpful and strategic for official or artisanal mining leaders to implement positive social change in the local communities.

Job Creation and Sources of Income

The concepts of entrepreneurship and innovation are essential for creating wealth and jobs. Luamba et al. [10] argued that organizational leaders should combine innovation and entrepreneurship to increase business activities, employment, and income. Per Luamba [10], entrepreneurs or investors can be individuals or organizations in any industry or sector of business activities that start and develop businesses to generate more revenue or profit. Independent artisanal miners or mining corporations may be entrepreneurs or investors if they take the risk to create and manage a business with a predetermined goal of increasing wealth or satisfaction. However, Candela and Lambert [8] explained that entrepreneurs or investors need appropriate human, material, and financial capital to start or develop a new organization or business activity. Entrepreneurs or investors may also need specific equipment, such as Personal Protection Equipment (PPE), used for security in artisanal mining activities. Besides getting adequate equipment or machinery, entrepreneurs need appropriate financial means from credible and secured sources to cover other business expenses. Furthermore, new investors or entrepreneurs may need skilled employees to better understand the organization's practices and be productive. In artisanal mining activities, investors or entrepreneurs should be able to assess and determine appropriate equipment, working capital, and skilled employees to prevent risks such as accidents, health issues, etc., and ensure high productivity.

The issue of job creation and sources of income in the Haut-Katanga artisanal mining industry is an essential topic for consideration because the DRC is one of the poorest countries in the world, and the Haut-Katanga province is one of the most disadvantaged regions in the country. The artisanal mining industry in the Haut-Katanga province is a significant employer and source of income, accounting for over 90% of

the province's mining activities. The artisanal mining sector in the province has a long history and has been a significant source of income and subsistence for rural communities. Artisanal miners in the region produce gold, diamonds, cobalt, copper, tin, and other minerals for export. Despite the critical role of artisanal mining activities in the economy of the DRC, the sector is not well-regulated and is associated with a range of illegal activities. The artisanal mining industry is rife with human rights abuses, environmental degradation, and child labor. The government of the DRC has recently introduced several initiatives to comply with international regulations and find durable solutions for promoting positive social change.

Luamba [10] added that with technological advances, entrepreneurship is becoming more affordable to control and produce in real-time. Moreover, artisanal miners may need to learn and understand business and government regulations to avoid penalization in case of non-compliance with government policies. Luamba [10] added that the lack of the necessary financial capital or means might adversely affect the missions and goals of the organization or projects for entrepreneurs or investors. Finding suitable employees, equipment, and financial means can maximize the probability of success or the chance to succeed. Moreover, new business starters, entrepreneurs, or investors are risk-takers responsible for identifying business risks and the best ways to mitigate them.

Additionally, a miner entrepreneur or investor must be prepared to present a convincing business plan to potential lenders or buyers to secure their organization's credibility. Moreover, an artisanal miner entrepreneur or investor must also know how to manage his resources efficiently by tracking expenses and staying accountable for the business's performance. By doing so, an artisanal miner entrepreneur can ensure that the company uses money effectively and efficiently, which may lead to long-term productivity and sustainability.

Causes of Artisanal Mining Activities Collapsing

Businesses or individual entrepreneurs may collapse for multiple reasons [8]. Appropriate entrepreneurship and innovation strategies are critical factors that prevent companies' failure. Starting small new ventures could be challenging to enter new markets where competitors are already established [10]. Schumpeter [9] revealed that promoting entrepreneurship and innovation allows entrepreneurs or investors to have and identify adequate resources or capital needed to realize their missions and prevent business failure. To Schumpeter [9], weak managerial, technical, conceptual, and personal skills are among the factors that contribute to businesses' failure or organization collapse. Luamba [10] opined that many small companies collapse because of a lack of managerial skills, entrepreneurial spirit, a passion for business, and business strategies to sustain longevity. James et al. [12] used a qualitative methodology and image restoration theory to analyze hotel leaders' strategies to maintain tourism profits

following a natural disaster like a hurricane. In their conclusion, James et al. [12] found that the failure of a company is a process that can also arise from a natural disaster, artificial, or criminal activities. Therefore, per James et al. [12], managers should have a realistic business strategy which may include monitoring the weather and getting information from public sources regarding other factors, such as criminal activities in the area. In addition, government or artisanal mining leaders should act as investors and be aware of analyzing internal and external factors that may sustain longevity and prevent failure.

The Democratic Republic of Congo (DRC) is one of the world's most mining resource countries; however, it remains one of the poorest that needs to promote the social and economic welfare of the population. Artisanal and small-scale mining (ASM) is also a significant source of livelihood for communities living in the DRC's Haut-Katanga Province. Smith et al. [13] argued that ASM activities are often precarious, and many of them have been collapsing in recent years for many reasons, such as inadequate access to finance, a lack of formalization and regulation, declining mineral prices, illegal mining activities, and the presence of armed groups. Smith et al. [13] added that inadequate access to business resources had significantly contributed to ASM activities collapsing in the Haut-Katanga Province because ASM artisans often rely on informal funding sources, making accessing appropriate capital needed to sustain their operations difficult. Also, the high cost of inputs and low returns from ASM makes it difficult for miners to secure their finance from formal institutions. Furthermore, ASM activities in the Haut-Katanga Province lack appropriate formalization and regulation. This has led to a lack of transparency in managing operations.

Moreover, the impacts of globalization are affecting business positively and negatively. Some organizations are struggling to enter new markets and improve customer service because of competition due to globalization [10]. Also, as customers increasingly demand more personalized services or products that companies offer, the lack of entrepreneurship or innovation skills may decrease customer loyalty and retention [10]. Luamba [10] highlighted the importance of promoting customer service regardless of the size or nature of the business. Per Luamba [10], providing excellent customer service helps to build customer, employee, and vendor loyalty and satisfaction, which is an adequate strategy to remain competitive in the markets. James et al. [12] opined that organizational business managers must proactively deal with customer service and develop customer relationships through effective communication by addressing internal and external customers' needs and responding timely to customer feedback. Government and mining leaders must know their competitive environment and develop strategies to mitigate risks, remain competitive, and prevent failure.

Working Environment Conditions in the Artisanal Mining Industry

Improving the work environment reduces working risks and prevents accidents [14]. Chagadama [15] argued that improving the work environment is vital to motivate employees to stay in the organization and reduce turnover. Kumar and Bhattacharjee [16] conducted a questionnaire survey with 36 features among 360 miners and developed a prediction model to identify the most critical factors influencing miners' risk tolerance in the Indian coal industry. Based on their analysis, Kumar and Bhattacharjee [16] found that it is crucial to determine the risk tolerance to design improved training modules, safety, recruitment, and deployment policies in the mining industry. Chagadama [15] added that the work environment could affect employees directly or indirectly with factors such as lighting, air temperature, noise, or dust. According to Chagadama [15], a good working environment increases employees' emotional attachment and productivity. Therefore, based on entrepreneurship theory, government officials or mining leaders might improve the work environment to prevent accidents and promote workers' social and economic welfare.

The Democratic Republic of Congo (DRC) is home to various mineral resources, including gold, tungsten, lithium, tantalum, tin, cobalt, and diamonds, mined by different and multiple artisanal miners [17]. As people work in uncertain conditions; as a result, artisanal miners face hazardous working conditions and environmental degradation, making their work conditions and environment difficult, even uncomfortable. Also, the work conditions for artisanal miners in the Haut-Katanga Province mainly depend on the mining sites, primarily located in rural areas and lacking basic amenities such as electricity, water, and sanitation [18]. In addition, miners often lack access to PPE for health protection. Furthermore, miners are subject to hazardous working conditions, including the risk of rock falls and inhalation of chemical dust. As a result, miners risk suffering from various physical and psychological health problems, including respiratory diseases, musculoskeletal disorders, occupational stress, and hearing loss [18].

Artisanal and small-scale mining (ASM) is one of the DRC's most hazardous and environmentally damaging economic activities. This is mainly due to the lack of formal regulations, outdated technologies and methods, and the informal nature of the sector. In the Haut-Katanga province of the DRC, ASM activities are concentrated mainly in the copper and cobalt-rich basin characterized by informality and rudimentary technologies and techniques, which significantly impact the environment and social life. Additionally, the lack of appropriate safety measures leads to the degradation of the natural environment, as mining activities often involve clearing vegetation and the excavation of soils, leading to land degradation, the destruction of habitats, and the loss of biodiversity [18].

Moreover, the determination and creation of a safe work environment are paramount to preserving the environment.

Rose and Allen-Spies [17] analyzed workplace hazards and the associated risks to assess the effects of mining activities on the health and environment of artisanal diamond miners in Kimberley, Northern Cape province. Rose and Allen-Spies [17] found that mining activities had a detrimental environmental impact. The authors also argued that occupational health and safety challenges included physical, biomechanical, respiratory, and psychosocial hazards. Several studies have identified a lack of safety equipment and practices, leading to a high incidence of occupational injuries and deaths [16, 17, 18]. Per Irengue et al. [17], the artisanal mining sector in the Haut-Katanga province of the (DRC) has become increasingly important as the region's economy has diversified away from its traditional reliance on the extraction of minerals from artisanal mines. The sector is characterized by many small-scale miners working in dangerous conditions with limited access to education and healthcare. As explained above, the lack of effective strategies to manage and oversee artisanal mining activities may harm the social welfare of miners and the local population.

Qualitative Methodology

This study used a qualitative methodology that included interviews with government officials and artisanal mining experts to explore the social and economic challenges that artisanal miners and the local population face in the Haut-Katanga province of the DRC. The interviews were conducted in French and translated into English. The participants were selected based on their direct involvement, experience, and knowledge of artisanal mining activities. Qualitative methodology and case study design were better in this research because they enabled an in-depth understanding of the phenomenon analyzed by real participants who lived the problem. Yin [19] argued that qualitative methods allow researchers to explore the underlying values, beliefs, and experiences of the people involved in a study.

In contrast, quantitative methodology relies on data that can be measured and collected using a huge number, such as surveys [19]. The case study design is beneficial because it allows in-depth exploration of a specific case and can be helpful when the researcher wants to gain a deeper understanding of a particular phenomenon or situation. We did not choose other methodologies such as quantitative or mixed methods and designs like the phenomenological or narrative because qualitative methods and case study design provide a more comprehensive understanding of the research topic. Quantitative methods, such as surveys and experiments, are more suitable for measuring and collecting numerous data. Per Yin [19], phenomenological and narrative designs are more suitable for understanding how people experience a particular phenomenon or situation.

Method

Population and Sampling

Population and sampling are crucial components of qualitative research because they allow researchers to focus on a specific group of people who can provide meaningful information about the topic analyzed [19]. As the population of

government and artisanal mining leaders in the Haut-Katanga province is significant, we used the sampling method to select a representative sample of 8 participants who met the eligibility criteria. Yin [19] suggested that a minimum sample size of 4 participants is acceptable in qualitative analysis; however, it should be representative to provide crucial information related to the study. Therefore, participants were selected using the purposive sampling method based on their experience of mitigating artisanal miners' challenges and promoting the positive social and economic welfare of artisanal miners. To identify and select a representative sample of participants for this multiple case study, we used the Internet and Google search engine to gain insight into the official government sources for the potential participants in the Haut-Katanga region. The initial sample included eight government officials and mining leaders from different sites and locations (see Table 1) who met the eligibility criteria. Participants agreed to participate freely without compensation and understood the benefits of this study.

Table 1
Demographic Data of Participants

<i>Participants</i>	<i>Experience in Artisanal Mining Activities</i>	<i>Location</i>	<i>Type of Mining</i>
P1	6	Kipushi	Open
P2	10	Kambove	Open
P3	8	Kakanda	Undercover
P4	5	Luisha	Open
P5	7	Lubumbashi	Undercover
P6	9	Likasi	Open
P7	4	Kasumbalesa	Undercover
P8	7	Kasomeno	Open

Note.

P=Participants (1, 2, 3, ...,8)

Procedures

The primary research question was: What strategies do government officials and artisanal mining leaders use to improve the social and economic welfare and reduce the operational challenges of artisanal mining employees or miners?

1. What strategies or policies did you use as a government or artisanal mining leader to improve social and economic lives and reduce working challenges in the artisanal mining sites in your city and surrounding areas or organization?
2. How do you determine if your strategies to improve social and financial welfare meet your goals?
3. What specific challenges or barriers did your government or organization face in promoting social and economic welfare and reducing working challenges in your local city or organization, and how have you addressed them?

4. What, if any, strategies to promote social and economic welfare and reduce working challenges were the most effective in your city or organization?
5. What measures did you take to sustain a long-term positive social change in your local city and surrounding areas or organization?
6. What other additional information can you provide to sustain your strategies to improve social and economic welfare and reduce working challenges in artisanal mining?

The interviews were organized at the participants' official offices. All participants responded to the same questions within 30 to 40 minutes. After the interviews, we used member checking for data reliability and credibility. For data triangulation and consistency, we collected additional information from the public and other official sources, such as administrative and financial reports. Finally, we used Nvivo 12 to identify the emerging themes for data analysis. The three major themes that emerged from this study were (a) improving educational programs, (b) establishing wages or salary regulations based on risks, and (c) providing access to financial services or advisers.

Presentation of Findings

1.1. Theme 1: Improving Educational Programs and Working Environment

The first theme that emerged was educational programs. Responses for educational programs came from interview questions 3, 4, and 5, which focused on preventing artisanal mining risks. All participants agreed that knowing mining procedures and understanding appropriate artisanal mining risks were significant to better deal with everyday mining challenges. Fromm [19] expressed that understanding mining practices, procedures, and policies increases the chance of preventing exploitation incidents and contributing to reaching success or the main organizational goals. The participants also revealed that promoting educational program experience was a factor that sustained productivity. P2, P4, P5, and P6 noted that having artisanal mining knowledge and expertise was essential to prevent daily deaths and injuries.

P1 stated that recruiting skilled employees saved money and reduced operational costs. Luamba [20] argued that using experienced employees for specific tasks is efficient for getting timely high productivity, which is essential to increased profits. For example, P7 stated, "I always get a daily morning meeting to remind all artisanal miners of safety issues and check their personal protection equipment personally and suggest changing any damaged equipment before entering the mining." P2 echoed, "To better prevent incidents, I read in front of all teammate safety procedures and policies and ensured everyone had his bottle of water and protection mask, which helped me decrease health issues." P3 stated, "I learned from previous incidents that knowing how to use a coded communication with a talky walkie was essential to convey, for instance, timely a warning message that prevents an incident." P4 added, "My educational program experience comes from my previous jobs. While working as a

miner, I experienced many injuries and deaths and learned that risk is always permanent in mining activities. That is why I bought safety equipment for each employee and required miners to care them out at any time while working or entering mining areas". All participants confirmed that understanding mining practices, procedures, and policies, such as avoiding using pregnant women and minors, are significant factors that prevent risks and protect human lives. For economic reasons, P1, P2, P4, P7, and P8 used an onsite training strategy to reduce costs and ensure everyone understood mining behaviors and practices well. These statements align with entrepreneurship tenets, which require entrepreneurs or leaders to be proactive to make sound decisions that prevent failure or incidents. All participants agreed that using entrepreneurship theory combined with innovation was crucial for sustaining safety measures that prevent health problems such as respiratory illnesses, skin diseases, and eye problems. Participants also agreed that entrepreneurship theory contributed to being more proactive and independent, which helped artisanal miners to secure their social and economic lives and future.

1.2 Theme 2: Aligning Salary and Wages with Market Value

The second emerging theme was adapting salary and wages to the market price of minerals. Responses for paying or indexing salary according to the market value came from interview questions 2 and 4, which focused on improving social and economic conditions. Artisanal miners in the Haut-Katanga Province of (DRC) are essential to the local economy and an important income source for the entire region. They are a vital part of the local economy and labor force, employing thousands of people. However, due to the lack of resources and limited access to knowledge and technology, artisanal miners often face difficult and dangerous working conditions, leading to poor wages and inadequate working conditions. This has led to a lack of social protection, greater economic inequality, and a lack of access to fundamental rights and services for artisanal miners. Indexed salary and wages to the market value are essential for ensuring artisanal miners are paid fairly for their work because mineral prices in the markets change consistently, sometimes reaching a high market pick price. In this case, employees can gain more money which makes them satisfied. This is also necessary for promoting social and economic welfare, as it allows miners to access the resources they need to live a fulfilled life and to be able to provide financial assistance to their families. In addition, by providing fair wages, artisanal miners are more likely to increase job satisfaction and employee retention.

Entrepreneurship as a factor that enables employees to use their experience and knowledge is paramount to social and economic development and assess business risks by sustaining productivity. Luamba [21] argued that the capability to take risks by entering a new business or work environment might affect profitability or productivity if employees are unsatisfied. Per Candela and Lambert [8], influential entrepreneurs should be those leaders or managers who use practical entrepreneurship skills to compensate employees at a

real work present value. All participants agreed that entrepreneurship skills were essential to determine the actual cost of labor and evaluate the salary that employees enjoyed. Participants also admitted that paying a competitive salary based on market or product value increased employee motivation and promoted a positive social change in the local communities.

Moreover, participants agreed that the role of entrepreneurship and innovation tenets was a primary factor in increasing productivity and preventing failure. For example, P3, P4, P5, and P8 stated that they used their entrepreneurship skills to learn employees' behaviors at work and home, which helped to determine the real social and economic needs of employees. Participants P1, P2, and P6 attested that entrepreneurship skills helped convince employees to understand their payroll based on market and financial constraints or challenges. P1, P3, P6, and P7 indicated that they always agreed with their employees to pay their salary in foreign currency, such as US dollars, to keep or maintain the Purchasing Power Parity (PPP) exchange rate. P8 added, "I always consider myself a team player and do my best to understand artisanal miners' social and economic challenges while living in the community. This helped me to use the direct deposit bank payment method at the end of each month." P7 opined, "I always have a personal face-to-face meeting with my employees to allow them to express their real social and economic needs and challenges because I consider myself like the father of our big family, which is our company." Per P1, paying my artisanal miners fair salaries and wages helped build trust and confidence and increased productivity. P1 and P7's strategies aligned with the finding of Luamba [21], who revealed that effective business managers should use entrepreneurship or innovative skills to pay salaries at actual costs, increase trust among, and reduce employee turnover, which is paramount for increasing any organization's productivity or profitability.

1.3. Theme: Adequate Financial Resources

The third emerging theme was accessing adequate financial resources and services. Responses for accessing sufficient financial resources and services came from interview questions 2 and 4, which focused on the impacts of financial resources and services in improving artisanal mining activities. The Democratic Republic of Congo (DRC) encompasses diverse artisanal mining sectors, with a significant proportion of the population relying on small-scale mining activities as a source of income. The artisanal mining sector in the DRC is mainly based on extreme poverty and a lack of access to essential services, such as banks and financial services [11]. In recent years, the government of DRC has taken steps to formalize the artisanal mining sector to improve miners' livelihoods and ensure compliance with international standards. However, access to financial services and advice remains limited in many parts of the country, particularly in the Haut-Katanga Province, where the artisanal mining industry is the most prevalent. Several initiatives have been undertaken for easy access to the banking systems and financial services by government officials to advise artisanal

miners on loans, saving money, and investment. These include establishing a mobile banking system, which allows miners to access banking services without needing to travel to a physical bank branch and providing financial literacy training and advice to miners. In addition, several international organizations, such as the World Bank, have provided funding to support the development of the artisanal mining sector in the DRC.

The data collected from interviews and administrative and financial business and public reports indicated that all participants attested to the importance of accessing financial services and advice. P2, P4, P5, P6, and P8 showed that accessing adequate financial resources and services, such as banks, gave them sufficient equipment and helped to hire good individuals to cover critical posts and shifts. All participants agreed that having appropriate financial means helped to mitigate the financial crisis related to the US dollar fluctuation and implement strategies to reduce exploitation risks. For instance, P1 stated, "I have been resolving all miners' issues in real time because I have a revolving account from the bank to solve the problem in real-time. I also learned from my colleague that paying salary in advance was important to resolve some social issues that employee miners may have in an emergency case." P1 stated, "My financial background and experience working for 12 years as an accountant from my previous jobs helped me prepare my budget and financial planning for 2 or 3 years in advance. This helped me always save money, pay my employees and any other expense on time to avoid penalization from the government". P7 added, "I learned from my peers that I was tough in financial spending or money expenses. They also told me that my attitude to making a difference between my and the organization's expenses helped me succeed. I hope that it will be forever." P1, P3, P6, P7, and P8 argued that their financial knowledge and firmness in managing financial resources might come from school because they all took economics classes in college and learned how to save money. P2, P3, P4, and P5 added that their financial experience came from previous jobs because they started working in financial services, where they learned how to use financial services to invest during financial crises and hardships. Previous researchers argued that business entrepreneurs should have entrepreneurship and innovation knowledge or experience to sustain their business longevity [8, 9, 10].

All participants confirmed that having access to financial resources and services in managing their business activities associated with their educational programs are among the significant factors that contributed to becoming successful. Their arguments aligned with the findings of Luamba [10], who argued that effective managers should use their financial experience and knowledge to sustain productivity and longevity. The findings of this study indicated that the key to artisanal miners' success is having an educational program, paying wages or salary based on the price of market value, and having knowledge of using financial services such as banks. The participants identified several strategies for success; however, they believed that these three majors'

strategies were efficient in sustaining and innovating artisanal mining activities and remaining competitive in the artisanal mining industry. The participants also identified several challenges they believed artisanal miners must face, including limited access to financial means and services such as banks, financial advisors, planners, or investors.

Table 2
Degree of Participants' Adherence to the Themes

Nodes/Themes	Number of Participants	Participants Agreement with the Themes
Educational Programs	8	100
Salary and Wages	7	88
Financial Resources and Services	7	88

Results and Discussion

The interviews revealed that artisanal mining in Lubumbashi has significant social and economic impacts on the local population. The participants reported that artisanal mining leads to the exploitation of women and children. Women and children are vulnerable to mining activities because of a lack of protection. Women are often paid less than their male counterparts and subjected to long working hours in hazardous conditions. Children are even misused and do not have enough force or protection to defend themselves because of age. The lack of proper safety measures also leads to health problems, such as respiratory illnesses and skin diseases.

Moreover, artisanal mining in the Haut-Katanga province perpetuates poverty, with many miners unable to earn enough to support themselves and their families. The lack of access to education and training opportunities exacerbates this problem, as does the absence of social protection programs. Artisanal mining in the Haut-Katanga also has significant environmental impacts, with hazardous chemicals contaminating the soil, water, and air. This has important implications for the health and well-being of the local population, particularly those relying on agriculture and fishing for their livelihoods. Furthermore, additional research may be needed to understand better the organizational complexity of artisanal mining in the region, such as the various forms of collective and informal organization and the roles of intra-community competition and cooperation.

Conclusion

The challenges in the artisanal mining industry are significantly impacting the social and economic lives of the local population in the Haut-Katanga province of the DRC. The exploitation, poverty, health problems, and environmental degradation associated with artisanal mining need urgent action. Governments, mining companies, and civil society organizations must work together to promote sustainable mining practices that prioritize protecting the environment, the rights, and the local population's well-being. This can be achieved through better working conditions, access to

educational and training opportunities, and social protection programs. Mining companies can also invest in advanced technology and equipment that are safer and more efficient, while governments can enforce regulations to support small-scale miners.

In conclusion, artisanal mining in the Haut-Katanga province is a double-edged sword, providing employment and income while posing significant challenges to the social and economic lives of the local population. Sustainable mining practices and a focus on improving the social and economic conditions of the local population are crucial to ensure that artisanal mining contributes to the entire region's or country's development without compromising the health and well-being of people and the environment. The findings suggest that having appropriate educational or training programs, paying reasonable salary based on market value or PPP, and possessing adequate financial means from affordable and credible sources are strategic to prevent social and economic challenges, such as people's health problems and environmental degradation, and ensure positive social changes by avoiding using persons at risk in artisanal mining activities and providing a good investment from salary or wages gained from mining activities.

References

- Rosário, A. T., & Dias, J. C. (2022). Sustainability and the digital transition: A literature review. *Sustainability*, 14(7), 4072.
- Žofčinová, V., Čajková, A., & Král, R. (2022). Local Leader and the Labour Law Position in the Context of the Smart City Concept through the Optics of the EU. *TalTech Journal of European Studies*, 12(1), 3-26.
- Oliva, F. L., Teberga, P. M. F., Testi, L. I. O., Kotabe, M., Del Giudice, M., Kelle, P., & Cunha, M. P. (2022). Risks and critical success factors in the internationalization of born global startups of industry 4.0: A social, environmental, economic, and institutional analysis. *Technological Forecasting and Social Change*, 175, 121346.
- Gulley, A. L. (2022). One hundred years of cobalt production in the Democratic Republic of the Congo. *Resources Policy*, 79, 103007.
- Sovacool, B. K. (2019). The precarious political economy of cobalt: Balancing prosperity, poverty, and brutality in artisanal and industrial mining in the Democratic Republic of the Congo. *The Extractive Industries and Society*, 6(3), 915-939.
- Rose, A., & Allen-Spies, J. (2023). Occupational health and safety challenges among artisanal and small-scale diamond miners in Kimberley, South Africa. *Occupational Health Southern Africa*, 29(1), 13-20.
- Huntington, H., & Marple-Cantrell, K. (2022). The importance of artisanal and small-scale mining for rural economies: Livelihood diversification, dependence, and heterogeneity in rural Guinea. *Journal of Rural Studies*, 94, 177-191.
- Candela, R., & Lambert, K. (2020). Transcending the Schumpeter-Kirzner Dichotomy: The Role of the Entrepreneur in Carl Menger's Theory of Price.
- Schumpeter, J. A. (1935). The analysis of economic change. *The Review of Economics and Statistics*, 17(4), 2-10.
- Luamba, D. S., Blye, M. L., Mwema, E. M., Williams, I. A., James, K., & Chagadama, J. (2021). The Benefits of Innovation for Small Businesses. *International Journal of Business and Management Research*, 9(4), 425-432.
- Mulaba-Bafubiandi, A. F., Ukponu, M. U., Odo, A. U., Singh, N., & Blessing, B. (2023). 5 Contemporary Issues in the Governance and Regulation of Artisanal and Small-Scale Mining (ASM) in Africa. *Mining Law and Governance in Africa: Transformation and Innovation for a Sustainable Mining Sector*, 8.
- James, K. C., Samora, D. L., Williams, I. A., & Luamba, D. S. (2021). Successful Strategies to Sustain Profits from Tourism Following a Hurricane. *International Journal of Business and Management Research*, 9(4), 457-466.
- Smith, N. M., Ali, S., Bofinger, C., & Collins, N. (2016). Human health and safety in artisanal and small-scale mining: an integrated approach to risk mitigation. *Journal of Cleaner Production*, 129, 43-52.
- Naji, G. M. A., Isha, A. S. N., Alazzani, A., Brough, P., Saleem, M. S., Mohyaldinn, M. E., & Alzoraiki, M. (2022). Do leadership, organizational communication, and work environment impact employees' psychosocial hazards in the oil and gas industry? *International Journal of Environmental Research and Public Health*, 19(8), 4432.
- Chagadama, J. (2022). *Small construction business owners' strategies to reduce voluntary employee turnover* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses databases. (UMI No. 29215802)
- Kumar, D., & Bhattacharjee, R. M. (2023). Application of wrapper-based hybrid system for classification of risk tolerance in the Indian mining industry. *Scientific reports*, 13(1), 6181.
- Rose, A., & Allen-Spies, J. (2023). Occupational health and safety challenges among artisanal and small-scale diamond miners in Kimberley, South Africa. *Occupational Health Southern Africa*, 29(1), 13-20.
- Irengé, C. A., Bushenyula, P. K., Irengé, E. B., & Coppieters, Y. (2023). Participative epidemiology and prevention pathway of health risks associated with artisanal mines in Luhifi area, DR Congo. *BMC Public Health*, 23(1), 1-14.
- Yin, R. K. (2019). *Case study research and applications: Design and methods* (6th ed.). SAGE Publications

20. Fromm, D. (2023). Insurance techno-politics: Car theft, recovery, and tracking systems in São Paulo. *Security Dialogue*, 54(1), 39-53.
21. Luamba, D. S., Chagadama, J., Nzala, M. K. W., & LJ, M. (2023). Analyzing the Correlation between Innovation and Performance in the Law Industry: A Case Study of GKJ Law Firm.