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Exploring Challenges Impeding Sustainable Supply Chain Practices in Mining Sector

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Abstract

Growing pressures from various players such as governments, non-governmental organizations, and customers have impelled business corporations to address the economic, environmental, and social issues associated with their supply chain activities. Consequently, the concept of sustainability has become a buzzword among scholars and industry practitioners. Although, the concept of sustainability is attaining high level of importance in Europe, America, and Asia due to its ability of ensuring environmental sustainability, in Africa the integration and application of sustainability's concept is facing several challenges. To this end, this study aims at exploring the barriers hindering the implementation of such concept in mining industry of the Southern African Development Community (SADC), which its economy depends heavily on mining sector. The findings revealed that the major barriers blocking the development of Sustainable Supply Chain in mining industry of SADC region include Lack of commitment on environmental deterioration, lack of communication and knowledge sharing, Ineffective monitoring and control system, lack of effective policy and legislation direction, high cost associated with the implementation of SSCM, Poor Supplier Commitment, lack of green practitioners, poor senior managements' commitment, lack of recycling activities. Lack of Political commitment and support, Lack of managerial support and practical tools, and inadequate individual capacity.

Keywords
Mining industry, challenges, Sustainability, Supply Chain Management, SADC.

I. Introduction

Mining operations supply chain activities cause important environmental and social damages, with economic implications underlying all these activities [38]; [39]; [41]; and [42]. During the past decade, environmental deterioration associated with mining industry's operations has become a buzzword word among industrial practitioners and other stakeholders such as government, non-governmental organizations (NGOs), and consumers. As a result, mining industry practitioners have come under pressure to take full responsibility for environmental degradations caused by mining operations. Hence, most of them have been forced to re-view their business processes by including sustainability practices into SC's activities. In light to this, it should be point out that over the past century the business goal of mining practitioners was only based generating significant revenues for the company. This philosophy backs life cycle logic and evaluation allowing a holistic methodology to lessen environmental damages generated from mining operations. Accordingly, Supply Chain (SC) activities symbolize both production and materials acquisition and used, the type of the production processes and activities (i.e. exploration, mining, mineral processing and extractive metallurgy), and by what means waste produced are employed, if it is a closed-loop, industrial ecosystem, or disposal focused.

It is believed that management of the above-mentioned SC concerns will assist to alleviate environmental deteriorations caused by mining operations. For instance, mining operations such as exploration creates the erasure of vegetation that in return produces soil destruction and environment damage. Drilling can lead to severe soil and water pollution through oil spills. In addition, mining industry's operations such as digging, loading and hauling/transportation, refining, and extraction of metals from ore can lead to change of natural body water flows,

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augmented residue load in rivers, and waste rock and overburden disposal causing airborne dust, acid drainage, and erosion. Therefore, these operations necessitate much attention and mining practitioners [28]; [30]; and [33] emphasize on this issue by stating that mining sector as whole is recognized as environmental unfriendly. This environmental un-friendliness associated with its operations SC activities have driven several mining corporations to face competitive, regulatory, and community/social strains setting off increased thought of greening their SC activities. Hence, so far, the green solutions put in place by mining practitioners have basically focused on internal SC activities of the principal corporation. These localized and reactive sustainable environmental management practices do not systemically lessen greenhouse gasses emissions and focusing on costly in-vestments in waste management, clean-up or remediation. Hence, to reduce or eradicate the undesirable eco-logical impact of mining operations supply chains, there is the need to fully handle this issue [33]; [35].

Furthermore, the concept of sustainability practices into supply chain will help to assess to lessen world- wide's environmental footprint [20]; [24]; [25]; and [36]. Sustainable Supply Chain Management (SSCM) is described an efficient and cohesive approach, which aid business corporations to build up a 'win-win' situation generating profit, good reputation and market share as well as environmental efficiency [26]; [27]; [28]; [30]; and [33]. In the past decade, several studies regarding the practices of SSCM implementation in the mining industry have only focused on environmental management practices in developing countries, ignoring the integration of SSCM practices from a holistic perspective. Hence, understanding the challenges hindering the implementation of such measures, as regarded by mining industry managers, especially in the SADC region would aid clarifying and assisting the implementation of SSCM practices in that part of the world. The degradation of environment is happening within a progressively more globalized, industrialized and interconnected world, with the ever-increasing number of human around the world as well as production and consumption trend that are not sustainable. The deterioration of ecosystem service is lowering enhancement opportunities and might impact negatively on future generation well-being. In the context of environmental issues such as global warming, ozone depletion, solid waste disposal and air pollution on the ascendency, mining operations are being regarded as the main source from which these environmental issues are generated [39]. On the other hand, mining sector is the biggest contributors of revenue for economic growth in the most of countries of SADC. Despite being the biggest contributor to the economic growth, serious damages have been caused to the environment.

The damage caused to the environment around the world and human health through mining sector operations is of high level and hard to be quantified [37]. For example, [56] considered the damage caused to the environment as over-whelming. While [21] point out that annually coal mining causes at least 6000 deaths in China alone. Additionally, [58] report that the deterioration of land by the cobalt, cop-per, steel, and gold mining is pronounced, chemical contamination from the extraction process of these minerals creates a heavy weight over the environment, with harmful gases emissions release into the air. Research by [8] show that the trend of mercury intoxication during the gold amalgamation process is high. While [32] argues that the main issues with-in communities that are close to mining sector are pollution of water and air from carbon oxide, carbon dioxide, sulfur dioxide, mercury and cyanide. Even though mining sector sometimes support the communities for economic causes, it seen as a socio-environmentally destruction firm [7] [46].

The current level of deterioration of the environment by mining sector as well as its negative impact over the entire organism require important introspection on how effectively the operations creating the deterioration would self-check itself. Additionally, throughout the effects of supply chain activities over the environment, business organizations are being encouraged to develop environmental governance strategies concerning the changes of environmental requirements [6]. It is from the backdrop that the present paper aimed at exploring the barriers preventing the development of SSCM in mining sector. SADC region was used a case study. Electricity is assuredly the master key for energy source across the world. The implication is that the world has been modernized due to the use of electricity. All the facilities and equipment that developed countries rely upon and developing countries seek, from lighting to the most sophisticated electronic devices, require electricity to operate. Electricity is a product that is hard to store because it is the most fleeting among all types of energy. Therefore, it must be consumed as soon as it is generated [29]. These two characteristics (most fleeting and hard to store) make electricity both the most important and one of the most difficult product to understand economically. Due to its magnitude and economic importance, the electricity sector often needs significant investments to increase its power capacity in or-der to meet demand from consumers. Therefore, any lack or shortage of electricity does serious damage to the economics' activities of a country and its people [14].

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I.1 General Information and overview of the mineral re-sources of the SADC

The SADC region is an organization that consist of 15 member countries (Angola, Botswana, the Democratic Republic of the Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe). Over the period of 2003-2012, SADC alone contributed of around 38% of Gross Domestic Product (GDP) in Africa. The organization is striving for regional development in upholding economic growth, security and peace across the region. Since its creation, SADC has developed policies and strategies for regional development with the goal of supporting and sustaining economic growth and improving life style of its inhabitants, with the projected economic benefits of enlarged market size, enhanced intra-regional trade and investment flows [62]. Additionally, it is important to point out that the economies of states member are not at the same development phases. For example, Malawi is considered as the poorest countries in the world, while the country such as South Africa is counted among the developed countries in the world. As sated earlier, mining sector is an important sector within the SADC region, with approximately half of the world's Gold, Platinum group metals, Chromite, and Manganese in the region.

Table 1: Minerals resources of the SADC [62]

Mineral	Unit	World	SADC	% SADC
Antimony	sKt	4 690	250	5.3
Chromite	Mt	44 446	41 290	92.9
Coal	Mt	525 500	60 000	11.5
Cobalt	Kt	8 800	555	6.3
Copper	Mt	595	47	7.9
Gold	Tonnes	46 000	24 500	53.0
Iron Ore	Mt	101 100	5 900	5.2
Manganese	Mt	4 796	3 992	83.2
Nickel	Mt	123.3	12.8	10.4
Phosphate Rock	Mt	33 710	3 440	10.2
Platinum Group Metals	Tonnes	67 041	58 900	87.9
Uranium	Kt	2 320	289.7	12.5

The above minerals resources contribute enormously to the GDP, employment and fighting poverty within many states members of SADC region, whilst nearly all of them depend upon mineral exports for their foreign exchange earnings. Despite an average of 3% GDP growth per capita in the region during the past decade, it is however important to point out that economic growth in SADC differs significantly from country to country. For example, a state member like Angola earned a GDP growth per capita of about 7% annually during the past decade. While, the GDP per capita of a state member like Zimbabwe has been decreasing over the last decade due to politic crises and the actual GDP per capita is around 2.8% annually [62]. In some cases, economic growth is boosted by a thriving resource industry (Angola and Mozambique); whilst in others, especially small state members, it is the services sector [62].

II. Literature review

Although the research started with a strong input from practice, it is grounded in the ever-increasing domain of research on SSCM. The SSCM research field has been receiving high level of significance among scholars and industry practitioners over the current decade. Supply networks represent the entanglement of the interests of various stakeholders and are a key dimension of business activities and larger strategy. The proactive integration of sustainability practices into the SC acknowledges the strategic significance of SC in attaining long-run social, economic and environmental merit [45]; [44]; [47]; [48], [50]; So far, there has never been a common agreement concerning the definition of SSCM [51]; [55]. And there exist various perspectives through which to study it and contribute to the emerging body of research. In fact, the wide-ranging expressions that fits under the para-sol of SSCM is a good indicator of this lack of agreement. The concerns involved in SSCM differ from one industry to an-other and several authors have articulated the complexity to develop an overarching SSCM framework [47]; [48].

To date, research in the field of SSCM has aided in improving our understanding regarding the barriers and enablers of SSCM. For example, [15]. [10]; [4]; [3]; and [27], of its relation to performance and risk management [3]; and [27], and of relations between companies in the SC [4]. Over the cur-rent decade, a huge amount of literature on SSCM have been published by [5]; [10]; [15]; [16]; [20]; [24]; [25]; [26]; [27]; [28]; [30]; [33]; and [36] contributing with

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valuable summaries of what has been done in the field and of where future research opportunities lie. This important amount of literature also backs the argument made in the above lines that this re-search domain is gaining in importance.

A significant input of the literature has been to offer various comprehensive and robust descriptions. For example, [24]; and [25] outline SSCM as 'the strategic, clear incorporation and accomplishment of a corporation's economic, social, and environmental goals within the systemic management of key inter-organizational business processes for enhancing the long-run economic performance of the single organization and its supply chains'. In turn, [26]; [27]; [28] describe SSCM as 'the coordination of material, information and capital flows as well as collaboration amid corporations along-side the SC whilst considering goals from all three magnitudes of sustainable development (economic, environmental and social) that originated from consumers and shareholder obligations.' Both these descriptions highlight the triple bot-tom line outlook of performance or worth creation and the importance of the relationship among organizations within the SC to achieve sustainability. They see the implementation of environmental and social principles as a requirement for members of a SC who wish to remain involved, however at the same time also view as a potential source of competitiveness stemmed from meeting the expectations and economic standards of consumers [30]; [33].

[41]; [52]; and [53] point out that being engaged in sustainability is a prerequisite; but their SSCM charter also directly accentuates the significance of the economic aspect. They propose that sustainability for any organization is more than just determining and getting involved in social and environmental activities that expectantly assist, or at least not damage, economic performance [7]; [8]. Rather, it implicates evidently following the principles of the 'triple bottom line' [41]; [56]; and [59], which clearly leads managers to determine those operations that enhance economic performance and dictate the prevention of social and environmental activities that fall outside the concept of sustainability. This statement is backed by [45]; [44]; [47]; [48], [50]; [51]; and [55] exploration of case studies of exemplar companies aiming to build up more complete SSCM theory, which suggests that a SSC is one that performs well on both modern measures of profit and loss as well as on an extended conceptualization of performance that take in social and environmental aspects.

II.1. Supply Chain Management (SCM)

Research by [20]; [24]; [25]; [26]; [27]; [28]; [30]; [33]; and [36] define SCM as the combination of the activities involving the flow of information, transformation, movement, production of products from the raw materials stage (extraction), storage of materials and transport of end- product to the final-consumers with the objective of meeting customer's needs to achieve competitive advantage. Its focus is to raise company's effectiveness and efficiency. Furthermore, [22]; [23]; [24]; [20]; and [29] describe SCM as the process that helps manufacturer to strategically communicate with his supply chain partners and collaboratively govern intra- and inter-organization system. They continue by stating that the major goal for SCM is to reach the maximum potential of effectiveness and efficiency when delivering the end-products or services and to achieve consumers' worth by delivering goods and services with the minimum cost possible and the shortest period. In accordance with [30] the traditional SCM is described as a set of various entities involve within the upstream or downstream flow of goods, services, finances, and/or information from a source to the end-users. [1] point out that a company's environmental performance is generally dictated by its own environ-mental measures. Therefore, [16] report that the SCM's concept should be altered into the SSCM context, which will perform as the flashpoint of environmentally conscious implementation plans, based on continuous improvement, which will allow organizations to achieve competitive ad-vantage, whilst achieving sustainable processes and development. And, literatures regarding SSCM have been growing at a fast pace. However, several business organizations are still facing the challenges of implementing sustainability principles into their supply chain activities.

To this end, [5] point out that Boston Consulting Group con-ducted an international survey based on at least 1, 500 company managers, the findings of this latter one demonstrated that nearly 72% of industry managers revealed that they have not had developed no clear approach to introduce the concept of sustainability within their business organizations. That is an intriguing result since the findings also revealed that almost 90% of respondents argued that implementing sustainability in the supply chain can have negative effect over strategic decision making. A sustainable company will contribute towards sustainable development by providing economic, social, and environmental benefit. The international growing concerns regarding environmental issues such as climatic change, pollution and social is-

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sues associated with poverty, health, working circumstances, safety and inequity, have pushed business organization to incorporate sustainability principles into their daily business activities.

II.2. Sustainable Supply Chain Management (SSCM)

To have a deep understanding about the concept of SSCM, studies by [45]; [44]; [47]; [48], [50]; [51]; [55] start their examinations into backgrounds of SSCM by outlining the following definitions. [45]; [44] cogitate the sense of SSCM by quoting a description made by [50]; [51]; [55] point out that "The SC involves all operations including the flow and production of goods from raw materials to after sale products. Material and information flow both upstream and down-stream activities of the supply chain. In light to this, SCM is the combination of the aforementioned activities through enhanced SC relationships to achieve a sustainable competitive benefit." When developing his understanding about SSCM, research by [51]; and [55] view SSCM as the systemic process, strategic management of the traditional business operations and the strategies throughout this business operations in a specific corporation and amid businesses within the SC with the goal of developing the long-run performance of the single corporations and the SC as a whole" [15]. [10]; [4]; [3]; and [27]. Furthermore, [3]; and [27] develop a second explanation by [3]; [4]; and [29], which describe SSCM, as a process of integrating key business activities from consumers through initial suppliers that delivers goods, services, and information, which increase worth for consumers and other participants" [55]; [39]. Additionally, [38]; [39]; and [41] describe SSCM as: "A development that meets the needs of the present without compromising the ability of future generations to meet their own needs." [3]. [4]; [10]; [15]; and [27] report that SC has been gradually viewed as the core of contemporary competition. Supply networks are complex and provide opportunities for companies to create valued and matchless skills and achieve a strategic advantage over their competitors [33]; [35]; [38]; [39]; and [41]. SSCM has originated from the acknowledgement of the strategic significance of procuring and supply operations both in attaining the company's long-run performance, and in handling sustainability concerns in business performance [45]; [44]; [47]; [48], [50]; [51]; and [55]. As an academic field, SSCM has been developing during the past decade.

[33]; [35]; [38]; [39]; [41]; and [42] describe sustainability as a process of meeting present demands without compromising the capacity of future generation to meet their needs also. Furthermore, Studies by [45]; [44]; [47]; [48], [50]; [51]; [55]; and [59] point out that sustainability refers to the productions of products and creation of services employing processes and systems, which do not generate pollution into the environment; conservation of energy and natural wealth; economically viable; safe and healthful for employees, communities and customers; and socially and creatively rewarding for all stakeholders. SSCM is solely based on three bottom lines, which are environmental, social, and economic effect of goods and service [61]. The purpose of developing a sustainable supply chain system is based on creating, keeping and thriving long-run environmental benefits [60]. There exist several reasons that force companies to apply sustainability principles into their SCM such as laws enforcement and regulations establish by the government as whole, with the objective of ensuring their social responsibility to the public, and due to some economical and business paybacks [55]; [39]. Introducing sustainability principles into business organization's activities has merely an objective of ensuring the management of social, economic, and environmental benefits [31]. Such incorporation is seen a profit for the company to increase competitive advantages

III. Methods

A qualitative methodology was used in the present study, deploying a survey that was conducted based on a questionnaire as the primary data and secondary data from previous studies. The collection of primary data was done anonymously due to political issues in many states members of the SADC region. The design of the questionnaires was solely set to explore the feasibility of developing SSCM within mining sector of SADC. At least a total of 453 valid responses were collected from the 480 questionnaires. Only 423 respondents were able to answer to the questions. Our sample collected answers from different mining companies of different size. Therefore, it is believed that the findings of this research will increase awareness regarding SSCM practices in this part of the SADC region.

IV. Results

The purpose of this section is to the present and analysis the collected data in accordance with the research methodology that was deployed during data collection. And these are presented in the figure 1 below

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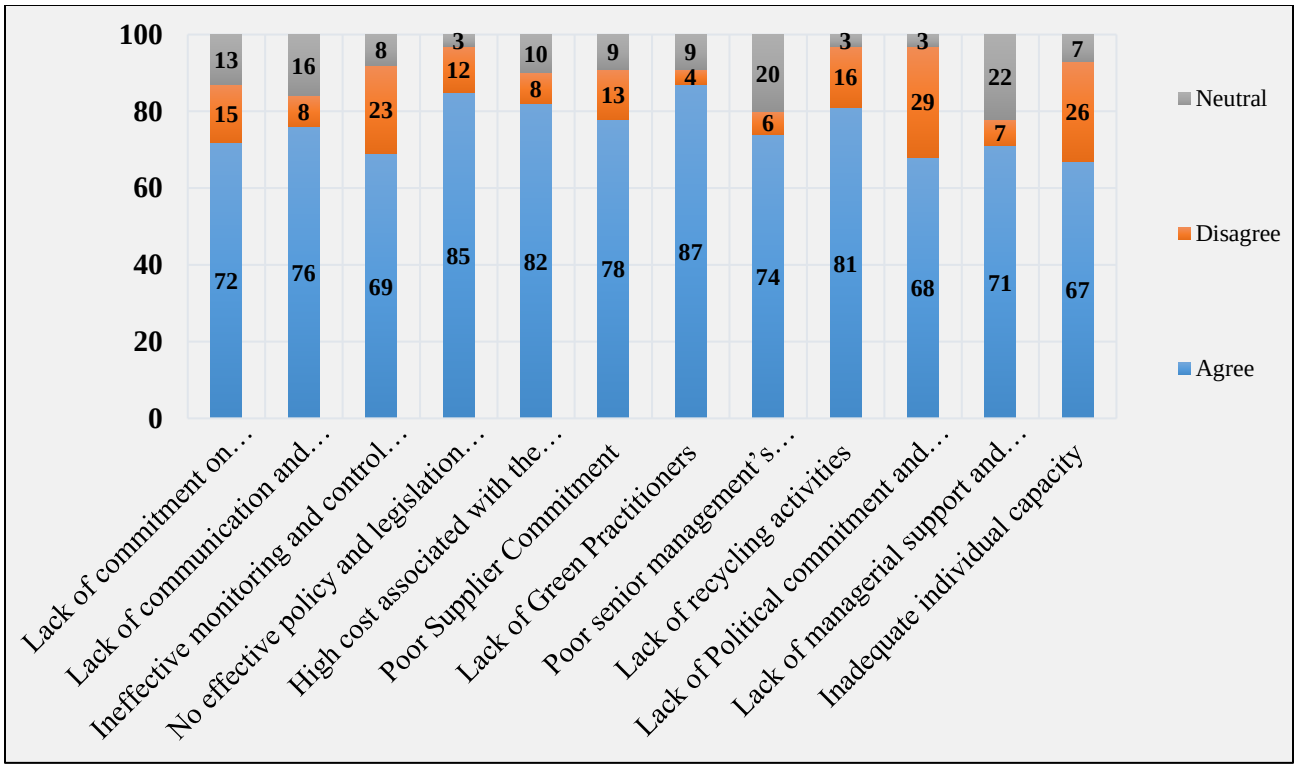

Figure 1. Major barriers in mining sector of the SADC region

IV.1. Lack of commitment on environmental deterioration

The results from the survey conducted on this sub-section are illustrated on the figure 1 above. In accordance with 72% of the respondents report that social development and economic growth are the major factors that are in the interest of the mining sector, however considers the environmental protection as least important. And this can be noticed from the results illustrated in the figure 1 above. The respondents also revealed that they know about the environmental deterioration created by the mining industries' operations, such as release of carbon dioxide into the environment, river and soil during the mining operations. The respondents revealed that the environmental degradation issues are not fully included in the scope by the investors.

IV.2. Lack of communication and knowledge sharing

From this figure, it can be depicted that 76% of the respondents strongly agree that there is a lack of commitment from all stakeholders involve in the mining sector to improve environmental aspect by organizing training programs in order to raise awareness about green system. [13] backs this barrier by pointing out that when knowledge sharing is well-established within a green supply chain can push stakeholders to create new capabilities for effective measures. Training and education are important elements to successful implement SSCM within any organization, while developing strong communication among all stakeholders would help the any organization to adopt green practices [52]; [55]. In addition, the respondents indicated that they are not fully aware about the significance of implementing sustainability principles into SCM, and, they do not know about the advantages associated such practice.

IV.3. Ineffective monitoring and control system

At this point, it has been indicated by 23% of respondents that there are monitoring and controlling systems that are put in place that serve to control and monitor the number of small particles into the environment, which are generated from the production process. However, 69% of the respondent report that the system put in place is not properly applied and is not effective. For this reason, the respondents consider pollution as an inherent component of running business within the mining sector. They event stated that for pollution to be fully mitigated the mining sector should close, because according to them there is no way to reduce pollution with the current monitoring and control system. That means, the implementation of SSCM will require up-grading the present controlling and monitoring system to a more holistic one. Therefore, the current monitoring and controlling system is a factor that does not help to keep the environment green.

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IV.4. No effective policy and legislation direction

As it can be seen from the figure above, most of the participants revealed that the current policy and legislation is not effective when it comes to environmental deterioration. It is believed that the government is not enough explicit and does not assist preventing the environment from deteriorating. From this statement, it can be believed that the environmental risk is not a priority for the government. That means, the government must consider it as a priority to force mining industries to effectively adopt it and efficiently apply it. [55] point out also this barrier by stating that generally government legislation forbids mining sector to destroy the environment with the release of toxic air and water pollution by deploying technologies, which control or clean gas emission from production process. Here as it can be noticed from the graph above most of respondents indicate that the government should enforce the present policy and regulations by being more strict and severe when the mining sectors do not comply. They also state that the safety and protection of the environment is not taken lightly by the government. They continued by claiming that unless SSCM is seriously considered and properly enforced, the current government regulation is a mere intention to protect the environment.

IV.5. High cost associated with the implementation of SSCM

Generally, customers go for least cost; hence this requires the cost involved in incorporating sustainably principles must not be high to allow organizations to offer their products at lower cost. However, research by [22] report that developing SSCM is costly and require a significant amount of funds specifically for small to medium enterprises. [33] also point out that even though most of the small to medium enterprises are aware about the economic benefit that may be generated from making supply chain environ-mentally friendly. But, these enterprises seen cost as the main barrier for developing SSCM in a business organization. As it can be depicted from the figure, respondents strongly agree that cost is a serious concern in implementing SSCM. They believe that if enough funds are allocated for such change, the implementation of SSCM would be feasible. To sum up, respondents agree that the development of SSCM needs significant capital investment because it is a long-term investment. Additionally, SSCM re-quires new world- class technologies, which can easily detect and control the waste produced. That is why, it always says the more you become green, the more you become ex-pensive.

IV.6. Poor Supplier Commitment

Here, the respondent reported that can contribute significantly to the implementation of SCCM. However, suppliers are not fully involved in this process of changing from ordinary supply chain to sustainable one. That means, suppliers are not ready and prepared to partake in this process due to their poor commitment as revealed by respondents. Hence, supplier's commitment can in somehow influence the development of SSCM in mining sector. Therefore, they are ad-vice to demonstrate some intellect regarding the SSCM.

IV.7. Lack of Green Practitioners

From the results above, mining sector in many SADC states members do not have green practitioners. In fact, it was reported by respondent that there are not well-trained and well experienced green specialists. Therefore, it is believed that to effectively develop SSCM, there must be enough green specialists who can do their job well. With the presence of skilled green specialists, organization see a way of cutting costs, increasing competences and demonstrating certain social and environmental responsibility within a professional manner.

IV.8. Poor senior management's commitment

[54] argue that commitment form senior management is extremely significant for the success of any project. In the case of this study, commitment from senior management would be a key driver for environmental protection action. For ex-ample, it can promote and support the activities associated with the development of SSCM. In this sense, participants report that there is a poor commitment from their senior managers concerning the protection of the environment. Their main objective is solely based on economic growth of the company even if they are not environmental friendly. However, if they are competitive in the market they see no problem with environment deterioration. Therefore, this is also a main challenge that hinders the green activities in the mining sector of the SADC region

IV.9. Lack of recycling activities

They respondents report that most mining companies are not engaged recycling activities. Engaging in recycling activities can create economic and environmental advantages for communities especially the waste from mining sector are harmful to human being health. Respondents believe that recycling can play a critical role in mitigating the need

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for new landfills as well as their related costs. To sum up, respondent indicated that recycling can participate in developing the mining industrial as in most cases the recycled materials are used as raw materials for manufacturing and other utilizations.

IV.10. Lack of Political commitment and support

[54] point out that both political commitment and support are essential factors that can facilitate and influence green activities in mining industries. [52]; and [55] argue that several public and private organizations are experiencing shortage of knowledge and skill for assessing different options in terms of their environmental facets and effects. This might cause all stakeholders feel averse to priorities green activities because they need tangible knowledge of which environmental requirements are important for a specific product group. [15]. [10]; and [4] show that the challenges associated with the assessment involve the ambiguity on how to describe a green product and how to weight the relative significance of various life-cycle performance indicators. Further, there is a perceived shortage of tangible product selection guidance, creating issues in determining greener goods alternatives. Additionally, there is a view of shortage of knowledge or means for possible assessment and follow up of the life cycle oriented information. This backs the idea that there is lack of management and distribution of best practices in many establishments.

IV.11. Lack of managerial support and practical tools

[7]. [8]; [9] discover lack of managerial support and practical tools as an additional cause affecting green activities. [15] on the other hand, look at the private firms fail to implement green activities practices because they do not have regulatory demands and clear regulatory charter for criteria development, assessment and integration, and to com-pare different options and to follow up the supplier performance. [42] point out that comparing to the single principles considerations, the life cycle perspective adds to the complexity of green activities within that the amount and range of acquiring benchmarks is increasing and needs to cover several phases of a product life cycle. The scope is stretched out to consider not only the characteristics of the product per se, however also how it has been manufactured and distributed, and its environmental effect during use and disposal phases. Additionally, the lack knowledge, cost matters and lack of clarity in regulation, business firms indicate poor supplier commitment and industry specific factors.

IV.12. Inadequate individual capacity

Deficient individual capacity is also another barrier preventing the implementation of SSCM. The capacity aspect may be associated with knowledge, understandings over environmental concerns, environmental education. The feeling of incapacity or insufficiency may also stem from an absence of eagerness or rational understanding. [22]; [23]; and [32] recommended managers, as well as procuring managers to have a diversity of attitudes toward environmental concerns, and sometimes also have an indecisive view concerning the potential and immediate costs and gains of green initiatives. Education and particularly training of buyers within public and private organizations needs to become more widespread in integrating SSCM elements in the operations of mining companies.

V. Conclusion and Recommendations

The present study aimed at investigating the challenges hindering the incorporation and implementation of sustain-ability practices into the supply chain activities. The Mining sector in SADC region was selected as a case study. The reasons of conducting such research in SADC mining sector is firstly because there is a lack of research regarding this topic. And secondly, because SADC has got some of the world's richest mineral resources as shown in table 1 above. Two sources of data were used; firstly, primary data was gathered from a survey conducted in five Southern countries. Whilst, the secondary data was obtained from the previous studies done in the same field. After collection and analysis of findings, it has been noticed that there are 12 major challenges that are preventing the development of SSCM such challenges are lack of commitment on environmental deterioration, lack of communication and knowledge sharing, ineffective monitoring and control system, lack of effective policy and legislation direction, high cost associated with the implementation of SSCM, poor supplier commitment, lack of green practitioners, poor senior managements' commitment, lack of recycling activities. It light of this, the following recommendations should be considered: The study recommends that mining industries should organize seminars and workshops to alert all the stakeholders involved concerning the benefits of SSCM and the importance to embrace it. Because, the development of SSCM would be easier when all the stakeholders are informed about advantages of SSCM. Secondly, it is recommended to mining firms to engage in training sessions to enhance the skills and knowledge of their all industries practitioners about SSCM. Because, when all the industries practitioners are well-educated and trained concerning the environmental rules and the policy, therefore will increase awareness and knowledge about the negative impact of mining operations on the environment and how the damage can be mitigated. Thirdly, mining industries should highly

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consider the level of damage on the environment created by mining operations and it impact on the communities implicates and teaches this philosophy to its personnel who would implement the SSCM vision within the company. Fourthly, the supplier should be fully committed and being involved at earlier stage to understand the principle of green to the community where the suppliers also could think of making the supply of green goods affordable for all customers to ac-quire green goods. This can assist in lessening the global warming due to fact that the users will consume products that are environmentally friendly.

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