The Extractive Industries and Society xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

The Extractive Industries and Society

journal homepage: www.elsevier.com/locate/exis

Mining at the crossroads: Sectoral diversification to safeguard sustainable mining?

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ARTICLE INFO

Keywords:
Integration
Diversification
Mining
Agriculture

ABSTRACT

Green economic principles call for a broadening of the scope of mine planning and operations to incorporate sectoral diversification as a formal part of the life cycle of mines. In this opinion piece we argue that sectoral integration of mining holds promise to improve the long term business resilience of the mining sector. We explain this notion for the case of diversification to agriculture in South Africa. The challenge is certainly not unique to South Africa and whilst the mining sector has become more socially and environmentally conscious, it remains a challenge world-wide. Ample opportunity remains for innovative interventions that go beyond mitigating risk of the post-mining landscape, towards socially and economically inclusive development solutions. It is hoped that this contribution ignites more debate on finding new ways to develop the complex relationships between sectors into mutually beneficial and cooperative coexistence based on true sectoral integration, so as to improve the long term sustainability of developing economies.

1. Introduction

The greening (UNEP, 2011, 2012) of economies is increasingly becoming the mainstream approach for the practical implementation of the sustainable economic development ideal. Consequently, green economic objectives increasingly direct current global economic developmental pathways via so-called “green economic principles” (Allen, 2012; Nahman et al., 2016; Stoddart et al., 2012). Although there are many viewpoints regarding these principles, it is inevitable that countries and businesses need to redefine their competitive advantage in terms of the green space, i.e. in terms of green economy principles, if their economies and businesses are to remain competitive.

However, adopting such green economy principles as an overarching economic development paradigm has sector-specific requirements and impacts (Nahman et al., 2016), and each sector faces unique challenges in adapting its mainstream operations in accordance with green economic principles. Primary sectors such as agriculture, fisheries, forestry and mining which generally have significant negative impacts on the environment, are often in conflict with green economic principles. In particular, future mining operations will have to be conducted very differently from the current mainstream practice in order to remain in business (Digby et al., 2018). Yet, evidence suggests that in some countries such, as South Africa multi-national mining companies have been slow to incorporate green economic principles in their core business because, firstly the very nature of the business is based on the extraction of finite resources (Digby et al., 2018). Secondly, the mining sector as a whole has to great extent, confined itself to a mono-sectoral approach to business, often missing out from benefiting from catalytic development in the value chains of non-mining industries (Campbell, 2012). Thirdly, mining companies tend to apply globally standardised corporate systems for the design, construction, operation, and decommissioning of their mines, and hence find it difficult to adjust their businesses given the lack of flexibility in these systems. In effect, this “one size fits all” approach to mine planning, development and operation, is often an impediment to adaptation that could ultimately compromise the resilience of the very same mining company it supports (Hilson, 2012). All three of the above-mentioned reasons imply the need for broadening the scope of planning and operations to incorporate an eventual transition to other sectors as a formal part of the life cycle of a mine (Digby et al., 2018). In this opinion piece we suggest that sectoral integration of mining answers this need. We present some supporting arguments that diversification holds promise to achieve such integration in order to improve the long term business resilience of this sector. Although, we discuss this notion for the case for integration with agriculture within the context of South Africa, the challenge is not unique to South Africa and whilst the

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https://doi.org/10.1016/j.exis.2018.06.005
Received 23 March 2018

mining sector has become more socially and environmentally conscious, it remains a challenge world-wide. Ample opportunity remains for innovative interventions that goes beyond mitigating risk of the post-mining landscape and more towards socially and economically inclusive development solutions.

2. Mining at the crossroads

Thus far limited diversification has been thought of within a post-mining context only - mainly due to legislation that motivates planning with mine closure in mind (Digby et al., 2018). However, we argue that planning for sectoral diversification to achieve such integration needs to happen from the beginning of a mining operation, to ensure that such integration becomes part of the core business of the mining company, i.e. not at the post-mining phase. I.e. the question could be asked as to whether or not mining companies would mine differently if their objective includes sectoral diversification. We argue that this is an important question since such integration could not only provide potential opportunities for increasing profits, but could expand and diversify mining companies into other sectors, potentially far beyond their current scope of business, so as to create a legacy of sustainability for the local social ecological system in which it operates (Digby et al., 2018). This will of course imply fundamental changes to current mining operations and changes to the mainstream mining business model, because mining companies will need to plan such diversification as an integral part of mining operations. It does, in effect call for sectoral integration by means of diversification to internalise mining externalities to maintain the long-term financial sustainability of mining companies. Because such diversification will then be done within a company, revenue streams from the company will be used to catalyse the diversification alongside its current mining operations. If done in a financially acceptable way the sector will maintain its important catalytic role within a green economy; essentially by becoming 'development- companies', rather than merely an extractive industry with a socio-ecological deficit at mine sites once its operations are concluded. This is a radical departure from current mainstream practice in mine planning and development, to an approach which embodies increased awareness that a mine has a context in a broader social ecological system, and one that is better aligned with the need to build socio-economic resilience in that system; leaving a positive legacy. It will also enable the mining sector to access potential benefits, which are currently not within its reach. Such diversification will have profound impacts on the way current mining operations are conducted. Profitability in the short/medium term may be marginally lower, but long term business resilience of the mining company could be increased due to avoided externalities from its mining activities. This potential should be juxtaposed against the backdrop of a steadily declining mining sector: as mineral resources are depleted and opportunities for new mine development dwindle, long term solutions for financial sustainability for mining companies need to be found. One option lies in diversification.

Bringing about such diversification would be challenging and designing suitable incentives to enable such diversification will not be easy. For example, in the context of legal and financial accounting frameworks mining infrastructure is unique in that it is the only asset class which is not depreciated to a zero value when mines close. This is because mining infrastructure becomes a liability to its owners due to the requirement that the company needs to restore the mining site to a stable, non-mining condition, preferably one resembling the status quo prior to mining. Such legislation aims to avoid (in theory) threats to the integrity of the social ecological system of the broader area, from residual impacts in the post-mining landscape which have not been remediated. However, the liability may be sold or transferred to another entity, but only after it has been determined that the new owner possesses the means to do the required restoration. Typically, mining companies transfer these liabilities to other mining companies, often with little consideration to the potential from other sectors such as tourism and agriculture, to not only contribute to the restoration effort but also to reap benefit in doing so. There are indeed many examples around the world where redundant mining infrastructure has been re-used in creative ways to generate a competitive advantage for new businesses (all of the following are for post-mining landscapes with new owners):

- Mining and agriculture: Re-use of mining infrastructure in agriculture and acid mine drainage for irrigation.
- Mining and manufacturing: Re-use of mine equipment in manufacturing and mine tailings for manufacturing of stone paper.
- Mining and services: Treated acid mine drainage to augment municipal water supply.
- Mining and tourism: Pitlakes from open pit mining transformed into tourist/entertainment attractions.

Maintaining ownership after mine closure along with a migration from one sector to another (as being called for here), presents major challenges for mining companies. Not only can the financial cost of the negative impacts of mining operations no longer be avoided, but the requirements of diversification must be incorporated into mine planning and design - something which mining companies have not done before. We discuss diversification towards agriculture, as one example of a pathway to achieve integration.

3. The mining – agricultural nexus

Although both the mining and agricultural sectors are embedded in a larger socio-cultural context, with both being polluters and major transformers of land, these two primary sectors remain the main catalysts of economic development in most economies - particularly in the developing world (Ross, 2015; Weng et al., 2013). Unfortunately, mining and agriculture are most often seen as competitors (Pijpers, 2014, Van der Burgh et al., 2012) and although we acknowledge this perspective, we argue that the relationship between mining and agriculture is more diverse and complex than merely competition. The relationship between mining and agriculture could be explained by many variables other than competition and in order to understand and use the mutual dynamics between the sectors (including competition) to the benefit of both, mining and agriculture should be considered as complimentary sectors. However, this requires profound insight into the interconnectedness of the two sectors and new research and policy development should examine mining and agriculture beyond current typologies of competition, in order to secure a more sustainable future for both.

The notion has been illustrated at the household level (Pijpers, 2014). Both mining and agriculture have long been a source of livelihood for millions of people in Sub-Saharan Africa, with people from the same household often working in both sectors. Nevertheless, despite the co-existence and importance of mining and agriculture in the everyday lives of many people, the interconnectedness of the two activities has received relatively little attention (Hilson, 2002 and Pijpers, 2014; Digby et al., 2018). This is most pronounced in the context of commercial scale operations. It is evident from the literature that artisanal mining and agriculture are often employed as complementary economic activities as a livelihood strategy for rural households across Africa (Pijpers, 2014; Hilson and McQuilken, 2014). Individuals are able to combine working in these two sectors in a strategy to increase their standard of living (McHenry et al., 2015; Hilson and McQuilken, 2014).

However, Bill Turner (AAMIG) has argued: "*One of the most impressive legacies a mining company can leave behind following mine closure is a local community with a productive agricultural capacity; one that is run on a commercial basis rather than subsistence farming and one that is sustainable. This is the kind of result that contributes to making a mining company a partner of choice and an employer of choice and helps build a*