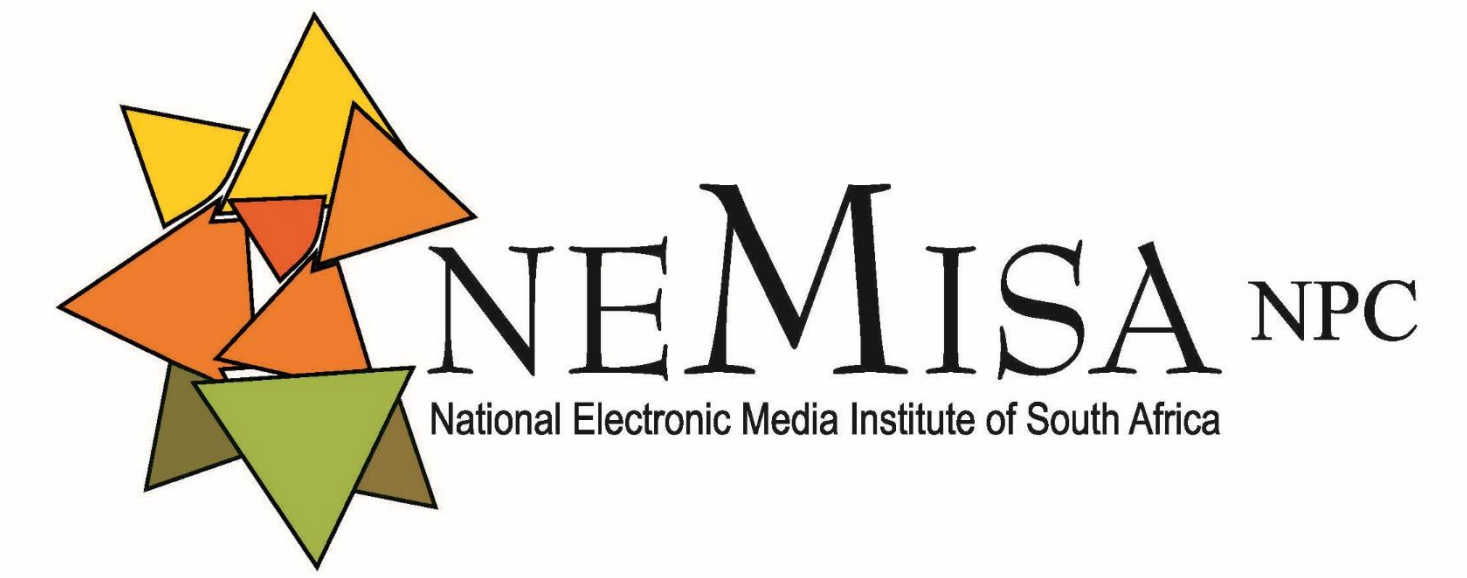


Re-skilling South African Coal Miners in the Digital Era

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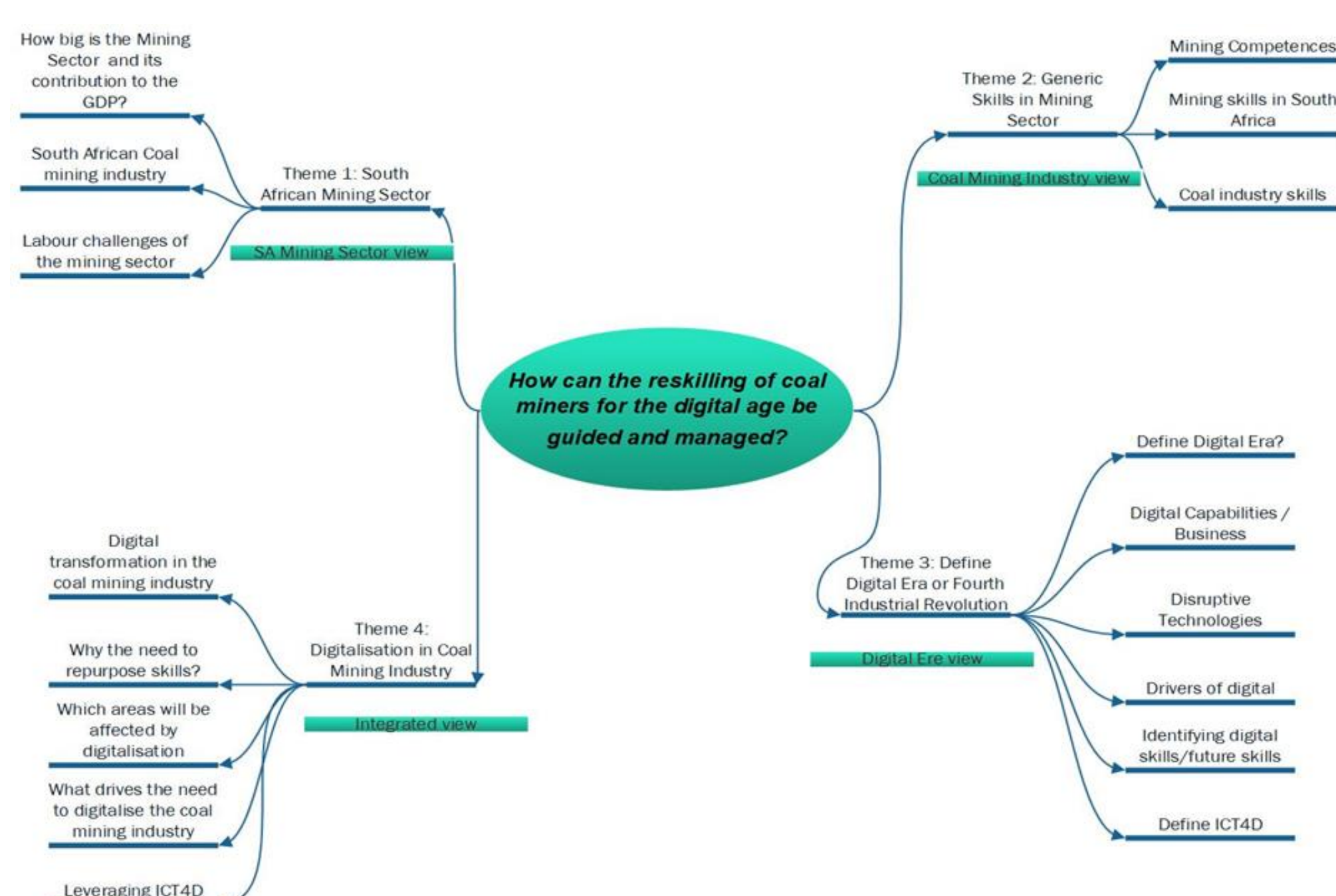
Introduction

The Fourth Industrial Revolution (4IR) has featured prominently in scholarly spaces and the South African media. Conversations are centred on how this new revolution will impact the lives of citizens in terms of work and their participation in the global economy. Equally, other countries and global organisations have similar concerns. This paper aims to explore the impact of digitalisation or the 4IR on the South African mining sector particularly concerning the future of work in this sector. The emphasis is drawn to the mining sector because evidence suggests that it contributes significantly to the employment of low-skilled workers in South Africa workers (Statistics South Africa, 2013:4). The study draws a focus on the coal mining industry because it is an extensively mechanised industry which has increased its upgrades in its use of technology in an attempt to extend the life of major coal deposits (Coal Mining Council South Africa, 2019). Therefore, the impact of digitalisation in this sector will be a signifier for future labour trends and the labour market.

A clear challenge presented by the mechanisation and modernisation of mines is that Information and Communication Technology (ICT) is changing the nature of work, making human involvement obsolete in the digital era. The anticipated result of this is a consistent decline in the need of specific skills and jobs. In light of the urgency to curb job insecurity, a central part of this study seeks to understand how people in the coal mining industry “reskill” themselves to remain relevant and productive. This standpoint is also linked to how they transition towards possessing new skills in the digital era. The transformation introduced by ICT is not a fundamental drawback. However, a dominant challenge exists because of the deficiency in critical frameworks and methods that guide re-skilling processes for miners to acquire new skill sets. The study is situated within a broader debate on the implications of technological change on the nature of work and aims to develop a framework that will support the re-skilling and repurposing of current skills possessed by coal mine workers in the digital era. The main research question for this study is: How can the reskilling of coal miners for the digital age be guided and managed?

The understanding is that mining companies will adopt disruptive technologies as indicated by several authors (Abrahamsson & Johansson, 2008; Coal Mining Council South Africa, 2019), The reason for this is that mining businesses would like to remain profitable in an industry that has seen a rapid decline over the past decade (Leeuw & Mtegha, 2018). There is a consistent agreement that jobs will be displaced or lost (Valsamis et al., 2015; Hirsch-Kreinsen, 2016; Gumede, 2018), particularly in the low-level skills category (Leeuw & Mtegha, 2018). Further to this, (Moavenzadeh, 2015; Balkaran, 2016; World Economic Forum, 2017; Löow, Abrahamsson & Johansson, 2019) it is predicted that with every revolution, new jobs or skills are created. Oshokoya & Tetteh, (2018) suggests that future mining will depend on highly skilled skeleton labour force, with the ability to multitask through mechanised and remote-controlled operations and monitoring. The key themes that will be explored by this research are shown in figure 1 below.

Figure #1

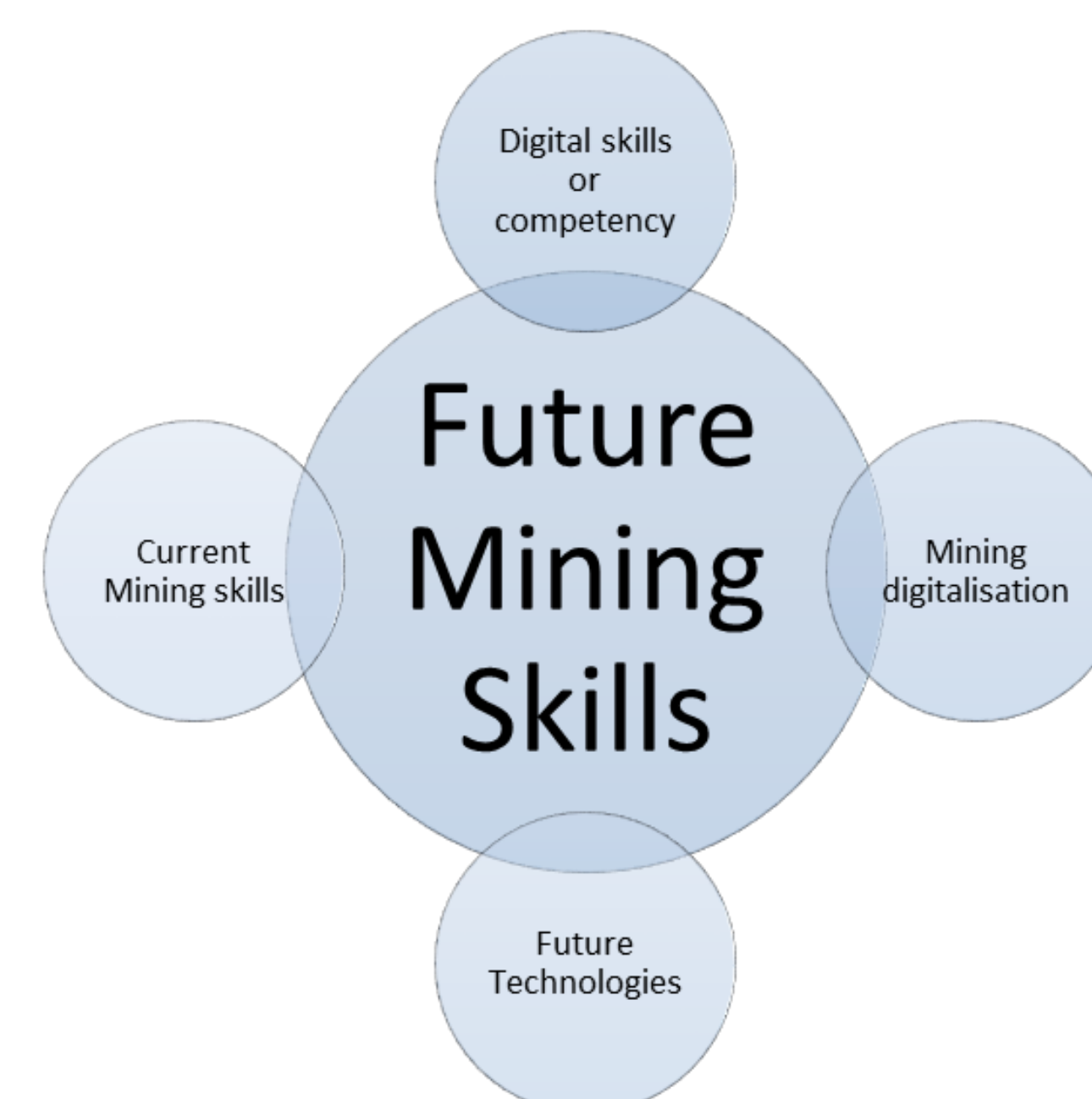


Methods

This study will utilise the qualitative research approach and plans to explore the digitalisation and skills development in the South African Coal mines. As such, the research will use the DSR methodology. Literature on DSR, indicates that there exists uncertainty about DSR as a research methodology. It does not appear in the list of methodologies mentioned by Oates (2006), Myers (2013) or Saunders (2007). Van Staden (2017) refers to DSR as a methodology and combines it with a case study as part of the methodology selection. The benefit of using DSR is its iterative research and design process which is suitable to develop and evaluate a framework or model as an artefact (Bärenfänger & Otto, 2015).

To develop this study, a full-text search on the following themes was conducted (see figure 2) using the search strings. The main themes identified are: future technologies (Digital era or Fourth industrial revolution (4IR)), digital skills or competency, mining skills, mining digitalisation (mechanisation) and future mining skills Figure 1

Figure #2



Results

Digital disruptions are a reality that is transforming how business is conducted while introducing new business models that did not exist in the past (Segal, 2016). These disruptions cut across all industries without exception (Segal, 2016).

Below is a list of reasons for digitalising the mines according to (O’Callaghan, 2017; Gumede, 2018):

- Safety of the employees;
- Improved operations to realise the benefits of real-time intelligence, safe working environment and effective communication.
- improved monitoring and supervision.
- Upskill employees;
- To run a sustainable mining operation

“The industry is expected to be knowledge-driven through a database model that receives and sends information (environmental, mining production and mineral processing) to enable proactive decisions to be made from both operational and control room perspectives” (Oshokoya & Tetteh, 2018).

Conclusions

The literature review provides a clear overview of the role that the South African mining sector, and the coal mining sector, in particular play in terms of labour towards the economy of the country and its growth. The SA mining sector experiences several challenges with safety, falling commodity prices, labour issues and policy uncertainties being the most prominently stated. By embracing digital technologies and developing a digital strategy, coal mining companies can leverage the benefits. The research needs to go into depth and identify the impacted capabilities and the skill sets that need to be repurposed. This will ultimately lead to the development of the ICT4D 2.0 learning process to advance displaced skills.

Recommendation

The topic of the 4IR is still relatively new however, based on the literature it has gained significant importance. The research question needs to be explored as the literature did not address the gap between the current minor position and the future minor position. The article by Löow, Abrahamsson & Johansson, (2019) Introduces the base to start this work.

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