

10 insights into 4IR in the mining industry

A report has been released that aims at gaining an understanding of how the mining industry visualises the impact of the fourth industrial revolution (4IR) on its people, processes and technologies; how they perceive the evolution of 4IR on their businesses in the years to come; and what steps they are taking to transform their businesses in anticipation of these changes.



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Issued by PwC and the Minerals Council South Africa, the report also looks at how the Covid-19 pandemic has further accelerated the digitisation of the work process, as well as the adoption of automation and other innovative tools in the mining industry.

Twenty-three executives across 19 Minerals Council members were surveyed, and 10 emerging trends identified that are consistent with other international studies and can be used by mining executives and other decision makers to navigate their digital transformation journey.

1. The CEO drives the digital agenda

It is notable that the largest portion of survey respondents (47%) stated that the CEO was the primary driver of digital transformation in mining businesses, with only 5.2% mentioning the CFO. The executive head for technical or the group engineering head was seen by 9% of the respondents as being a driver of 4IR within their business. This shows that a top down approach can certainly start the process and provide the impetus and communications, while operations can help to focus those efforts where they are most needed.

2. Champions and innovators are emerging

There are four stages of digital maturity among respondents:

1. **Digital novice** - although there were very few respondents, these companies had not yet connected their functional silos and embarked on the digital journey.
2. **Digital followers** - though still in the early stages of technological maturity, these respondents had developed a clear strategy and were putting together the building blocks they needed to progress.
3. **Digital innovators** - these respondents were finding new value by sharing information and data and working

collaboratively between business functions.

4. **Digital champion** - only one mining company can lay claim to the title of digital champion given the selection criteria. We expect several more companies to join this category in the coming years, particularly as more businesses are finding the value of technology and starting to experience the connection between 4IR/digital and better bottom line results.

It is noteworthy that 32% of respondents considered themselves as digital champions and innovators that would pilot new technologies without waiting for others to prove it first

3. Investments are growing

Even though most mining companies were digital novices and digital followers, they were making investments in various initiatives to drive specific benefits. All companies surveyed were investing in digital technologies, with the average investment portfolio across all respondents, around R111m per year. However, 25% of respondents were spending more than 0.3% of turnover on digital investments (an average of R166 million per annum).

4. The main reasons for investing in digital

The major reasons for investments point toward throughput increase, efficiency increase, lower costs and improved health and safety. More than 90% of the companies surveyed expected at least a 10% throughput increase with some as high as 30%. Similarly, the majority expected more than a 10% reduction in costs. Health and safety were also expected to improve from current all-time bests, which is good news for the mining industry as this clearly points to a safe and more sustainable industry in future.

5. Where will the benefits come from

Most respondents believed that production, engineering and asset management related investments would unlock the most value. Interestingly supply chain and logistics seemed to be one of the underestimated areas in mining that drove costs and efficiencies, but our champions and innovators were actively investing in emerging technologies such as blockchain, IoT and AI in this area to unlock value.

6. Industrial IoT gets the biggest share of the wallet

South Africa's mining community was asked to what extent they were using or planning to use 11 4IR technologies in their businesses over the next five years. The most implemented technologies were condition monitoring at nearly 80% across all respondents and connectivity and IoT at almost 60%. Nearly 50% of respondents had piloted AI programs recently and we expect the implementation numbers to increase significantly over the next five years. 35% of respondents were using robotic process automation, with another 10% planning to implement it within five years. Nearly a third of all respondents already use virtual reality (VR) to train staff, while 20% were currently piloting and a further 28% intended to implement VR training within five years.

7. The workforce is changing

Nearly 95% of mining leaders believed that there would be a change in the nature of the workforce over the next five years to more skilled employees. They also anticipated an upward remuneration profile for these individuals. While some were concerned about increasing labour costs, the majority believed that the resultant productivity increases would offset these costs. Consistent with other industries, digital technologies and capabilities would be embedded in the business in contrast to current IT departments that render a service. This would necessitate new operating models going forward. In addition, the onus would be placed on mining companies to upskill their workforces to work in this new world as it would require new skills and 30% of respondents had actively started to invest in skills uplift in order to unlock the benefits of digital transformation. This is a key area of progress that will benefit the mining industry as a whole.

8. Organisational culture is keeping up with the times

The pace of digital transformation is often dictated by corporate culture and organisational structures. Less than a third of respondents believed that their employees had the requisite skills to realise their vision of the digital future, while over 70% believed that their leadership had a clear vision for the digital future and acted as role models for digital transformation.

9. Challenges to overcome

Mining companies stated that the top three challenges in implementing 4IR technologies in their businesses were: data management practices are not yet mature (53%); the workforce lacks the skills necessary to implement 4IR technologies (47%); and data and cybersecurity concerns (32%). Only a quarter of respondents mentioned the challenge of return on investment as an obstacle to digital transformation.

10. It is all about the data

The ability to manage and leverage data is a core capability to unlock the value of 4IR. Data management was a challenge to most of the respondents. Decisions in this space were often pragmatic in nature – for example rural connectivity is generally poor and mine data can often not feasibly be stored and synced without sufficient connectivity. 21% of respondents also indicated that, as far as they were aware, no formalised data strategy, as functionally supported by a data management office, existed in their operations.

Mining companies are realising the need to harness their data and view that as the foundation to drive digital transformation. The future of South African mining companies (conventional or mechanised), significant growth in productivity, and improved safety and health practices will happen through the adoption of 4IR technologies.

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