

# Mining's year ahead will demand deep innovation

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Mining's immediate future is to be impacted not just by economic cycles or established trends, but by structural issues demanding urgent and deep innovation.



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Mining remains a significant sector in the global economy, but there are several significant issues facing the industry at the end of 2020. Most of these are either cyclical or part of an established trend, and require learning from the past and the application of limited innovation. These include how the sector is dealing with resource nationalism and the spread of infectious diseases like Covid-19. Other issues, however, are structural – such as the sector's response to automation and climate change – and demand deeper levels of innovation.

Not all issues have underlying trends that lead to predictable futures. In fact, it is sometimes not possible to influence the trend because the issue is mostly outside the control of the mining sector; examples include poverty, macroeconomic uncertainty and global trade wars.

## Within the control of the sector

Among the key trends and issues that are mostly within the control of the mining sector are the world's continued demand for minerals, the derisking of supply chains, and increased competition for scarce capital – as well as resource management and compliance. These trends are listed below, along with the related issues that the sector will be confronting in 2021.

### 1. The world needs more minerals

- Search for (new) 21st century mineral products
- Remote mining
- Mining at extreme depths

### 2. Derisking of supply chains

- Diversified and global mineral supply and demand pipelines

- Infrastructure bottlenecks
- Production disruption

### **3. Increased competition for scarce capital**

- Partnerships and joint ventures contributing to return on capital
- High capital and insurance costs
- Better pricing arrangements

### **4. Value-add asset and resources management**

- Mine modernisation to achieve better mine plan certainty
- Balance between regulations and change management needs

### **5. More compliance and reporting requirements**

- Governance and regulatory non-compliance a critical risk
- Sustainable development goals becoming a form of 'soft' international law
- Local content adoption and shared value approach to mining

## **Structural shifts**

In addition to dealing with these cyclical issues and established trends, there are other trends of a more serious nature, resulting from structural shifts in the economy. These will require urgent innovation by the sector in 2021, and include:

- structural shifts in risk management practices; growing climate change concerns;
- a growing resistance to carbon; the increasing pace of technology adoption; and
- disruption of mining and its future of work.

Risk management is shifting from a mindset that asks the question “What is our risk?” to the question of “What risk do we present to others?” This is both controversial and fundamentally different from the past. Imagine a situation where stakeholders will determine and quantify some risks in the future – with less control for companies. This is not only likely but fully anticipated.

## **Technology and skills**

The next shift is a global mining ‘pull’ for relevant technology and skills, away from “What or who is in the market?” to “What do we need and who can we partner with to get it?” The technology and 4IR trend is unstoppable and automation of the entire mining value chain is fast becoming the major driver of value. With this come risks like cyberattacks, information breaches and theft of data and intellectual property. In addition, the adoption of more technology will create a new future of mining with a more human-centred future of work.

In conclusion, we are expecting a future in which artificial intelligence and human skill-sets will determine how we mine, while climate change issues will determine where and when we mine. Further, carbon content and the ability to control its release into the atmosphere will influence what we mine.

## ABOUT THE AUTHOR

Professor Frederick Cawood is director of the Wits Mining Institute at the University of the Witwatersrand and a former head of the School of Mining Engineering at Wits. His passion is responsible mining with his current personal research focusing on the intersection of mine modernization and public policy. He has served in various capacities at professional body, learned society, industry, government and international structures in the interest of responsible mining for national benefit. Fred has published internationally on mineral economics, mine surveying and mining law and policy matters and he currently serves on several editorial boards. He is a co-author of two World Bank books - one on mining royalties and the other on transfer pricing in African mining.

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