Technology Trends and implications in Mining

A community perspective

A brief overview

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What technologies are coming?

A Taxonomy of disruptive technologies

Users of big data
- Analytics
- Machine learning
- Automation
- Digital twin

Integrators/trackers of big data
- IoT
- Blockchains
- Smart contracts

Enablers of digitalization
- Sensors
- Wearables
- Drones
- Satellites

Process improvers
- Tailing recovery
- Renewable energy
- Water management technologies
- Electronic vehicles

Source: IGF 2019
Technologies likely to be adopted by 2025

- IoT & connected devices: 90%
- Cloud computing: 87%
- Encryption & Cybersecurity: 83%
- E-commerce and digital trade: 62%
- Virtual reality: 57%
- Power storage and generation: 57%
- Text, image & voice processing: 76%
- A.I (ML, neural networks): 76%
- Non-humanoid robotics: 90%
- Connected wearables: 87%
- Big data analytics: 83%
What impacts are we likely to see?

**For mining industry:**
- Improved efficiency (labour; assets; operation)
- Higher productivity
- Improved work & workers safety

**For Governments:**
- Balance of socio-economic benefits
- Revenues
- Possible implications for ASM

**For communities:**
- Changes in occupations and jobs
- Ripple effects on local economies
- Gendered implications
Impacts at the local level: Employment

2\textsuperscript{nd} highest risk for mining industry

19.9%
Risk of Job displacement by 2025

49%
Expected fall overall by 2040 (Canada)

What is needed?

Skills and education

Recalibrating local content policies

Alternative livelihoods: diversification
Impacts at the local level: Tech as an opportunity

Shared infrastructure

1. Renewable energy: greening the mine can be an opportunity to light up communities

2. Access to water: Water saving technologies can free resources for communities. Water management technologies can be shared with communities.

3. Shared connectivity: A game changer overall, for economic activities; in support of education; health etc.

Local innovation

Opportunities for local firms to design tailor-made solutions for high-tech mines.
Data collected by mines for wider benefits

Data to support mining governance

- Better understanding of ore grades
- Real time info on flow and quantity of ore extracted
- Improved audits and revenue collection/ avoid IFFs
- Responsible sourcing

Real-time data analyzed through AI:

Two examples

Data to support non-mining sectors

- Water management policies
- Better agriculture policies
- Development of new farming techniques;
- Environmental management and biodiversity
- Management of climate risks

Real-time data on weather, water, climate
Questions for discussion

How are governments engaging with companies? Are rethinking ways to strengthen community resilience?

Do new technologies offer an opportunity to reset and rethink community relations? What are the risks?

Is CSR still sufficient to keep the social licence to operate? Or should we brace for new and innovative social investment mechanisms?
THANK YOU

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