Harnessing technology & automation for economic growth

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Mining Indaba Virtual – February 2021
Panel discussion talking points

TOPIC

4IR: How can African mining harness technology and automation in a pandemic to help grow economies?

- How should labour and industry work together to ensure Africa’s mining sector does not fall behind, while safeguarding employees?
- Establishing a way forward post-COVID-19: what are the next steps for labour and industry?
- What opportunities has the global pandemic presented for new technology testing and adoption?
- Updates on The African Union (AU) Agenda 2063 - a blueprint to support the continent’s accelerated growth, tech transformation, and to drive the benefits of a digitised economy.
- The AU agenda is aligned to South Africa’s own National Development Plan (NDP) 2030 vision of transforming the country into an inclusive and innovative digital society.
Managing COVID-19

Reducing impact on operations & employees

<table>
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<th>Total commitment:</th>
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GFG’s response plan

- Identify risks and provide mitigations
- Provide support to employees, host communities and government
- Development of business scenarios

Mitigation measures & support to employees

- Screening and strict site entry protocols
- Suspension of non-essential visits to the sites
- Flexible work schedule & working from home
- Mass testing of employees
- Robust case management protocol
- Three isolation centres set up at Tarkwa and Damang mines. Total capacity: 85 beds
- Provision of PPE, including facemasks and hand sanitisers, to employees
- Extensive awareness campaign
- Handwashing facilities set up the mines

Ongoing mass testing of employees
Managing COVID-19

Reducing impact on host communities

Total commitment: over US$1.2 million
Support to government: US$444,000

Support to host communities

- Collaboration with municipal health directorates to manage COVID-19 cases in host communities
- Donation of two ambulances to two host community hospitals - US$284,000
- PPE, including facemasks, hand sanitisers, gloves and protective gowns, donated to health workers and host community members
- Extensive awareness campaign on local radio and within host communities
- Handwashing facilities set up in host communities to encourage regular handwashing
- Branded GF facemasks distributed were produced by host community SMEs
Innovation & Technology

Swift adoption of technology enabled us to:

• Work from home effectively
• Conduct important business meetings and stakeholder engagements virtually
• Enhance efficiency

Prioritising health & safety of employees

• Investing in health & safety of employees is essential for business sustainability
What is the definition of I&T in the mining context?

Industry Revolution 4.0 in mining

Over the past 30 years industry has tried to harness innovation and technology (I&T) to improve efficiencies.

What does I&T mean for mining?

Digitisation of mining processes and integration into digital ecosystems through adoption of advanced technologies, such as robotics/unmanned vehicles, sensors, connected objects, etc., with potential to bring increased productivity, lower cost base, increased safety and security.
Modernising the mining industry

The impact of I&T on mining

- Safer working environments
  - Total safety (Zero Harm)
- Improved value creation & shareholder returns
- Optimal efficiency through simplification & smarter operations
- Reduction of footprint & social licence to operate
- Sustainability through Innovation & Technology

As with all business changes, some form of strategy is required
The 5S Mining Innovation Model

1. Safe
   - VR/AR training
   - Biosensors
   - Fatigue Detection
   - Health Monitoring

2. Simple
   - Modular Systems
   - Lean Mining Optimization
   - Theory of Constraints
   - Total Productive Maintenance

3. Smart
   - Artificial Intelligence
   - Machine Learning
   - Big-Data Analytics
   - Embedded Sensors

4. Stealth
   - Footprint minimization
   - In-mine recovery
   - Incremental pit mining
   - New gen mine caving

5. Sustainable
   - Social responsibility
   - Promoting economic growth
   - Community involvement
   - Sustainability through tech

Source: The 5S model by Prof. Tony Nieto
Key requirements for modernising

Three key components

- Digital mining systems
- Strategy
- Innovative Mindset (Working)

Vision and targets

Modernisation

Digital systems

New social architecture
Gold Fields’ journey – open-pit mining

What Gold Fields expects to achieve by 2025 as part of its I&T journey
Building the organisation to deliver the mine of the future

A new way of working is required for mining to achieve its desired outcomes

Pillars of organisational effectiveness to deliver on Gold Fields Horizon 2

- Healthier working environment
- Collaborative working culture
- Increased data analytics
- New ways of working
- Holistic health monitoring
- Development of I&T skills to operate the mine of the future
- Remote environmental monitoring
- Integrated operating centres
The Gold Fields Ghana’s story

I&T adoption at Tarkwa and Damang mines

Cost reduction + increased efficiency + improved safety = business sustainability for economic growth

Piloting auto drilling at Tarkwa mine

High precision GPS hole navigation system installed on drill rigs

Cleaner safer vehicle initiative (conversion of diesel engines to LNG)

Collision Avoidance System installed on mining fleet

Fatigue management system installed on mining fleet

Automation of HR systems and processes

Coming soon: State-of-the-art backbone communications infrastructure
The AU Agenda 2063
The Africa we want

Goal 4: Transformed economies

Economic transformation through:

- Modernisation
- Technology
- Sustainable natural resources management
- Value addition

Actions by Ghana government

Mining: a key factor to economic growth

- Sanitising small scale mining industry
- Introduction of community mining scheme
- Plans to refine gold locally
- Local content

Source: AU website https://au.int/agenda2063/goals

Master plan for transforming Africa into the global powerhouse of the future.
Thank you