

Smart Mining - Automation and Digital Transformation

Chris Chindanya - AMMZ 2020

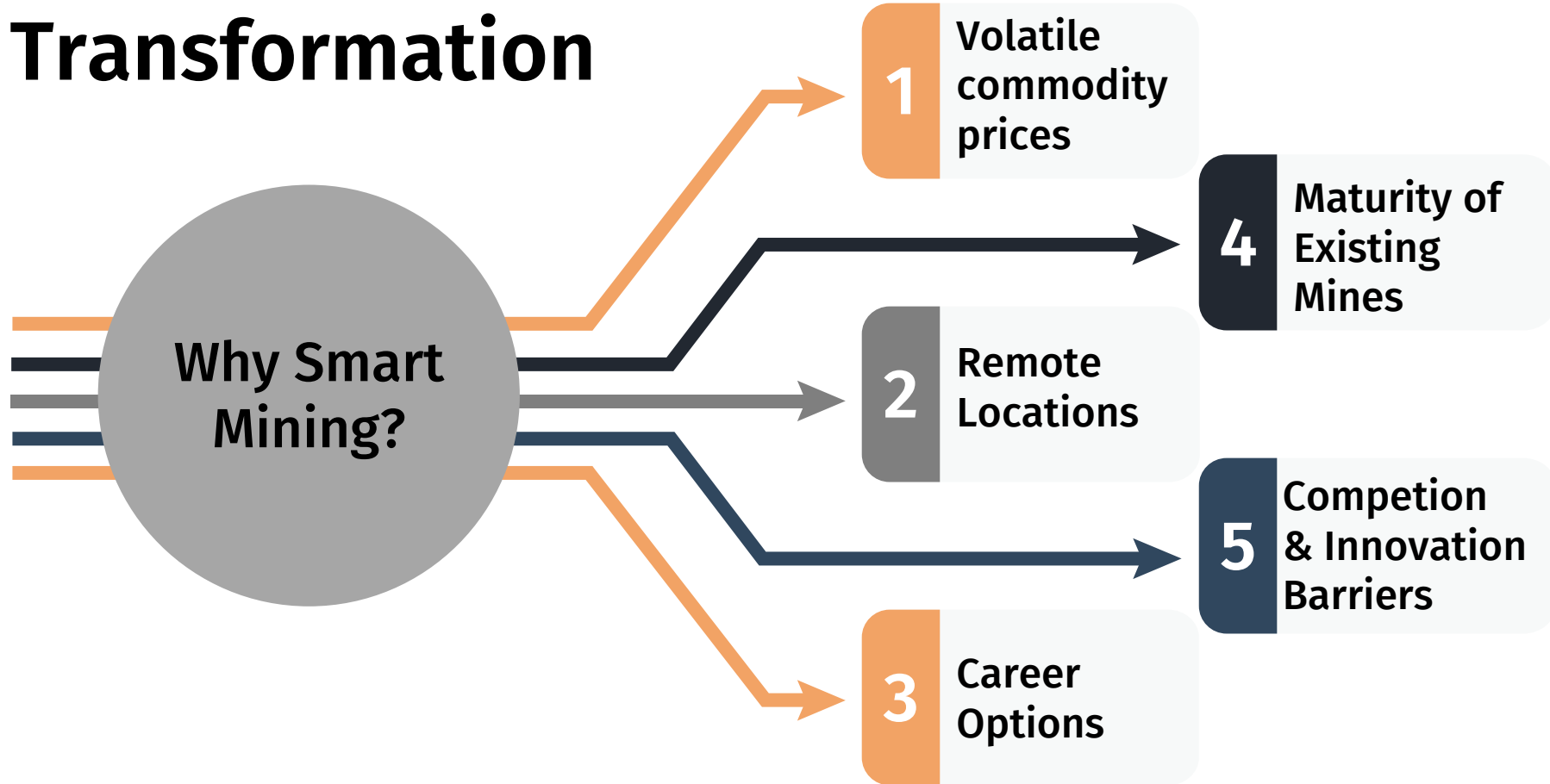


Smart Mining - Automation and Digital Transformation

“Digital transformation is not about updating your technology but about upgrading your strategic thinking.” **David Rogers 2016** (Columbia Business School Alumni) [The Digital Transformation Playbook](#)



Smart Mining - Automation and Digital Transformation



Organisation Outlook - External Factors

Technology Factors



Skills



Macro-economic
Factors



Socio-economic Factors



Geopolitical Factors



Market Factors



Regulatory Concerns



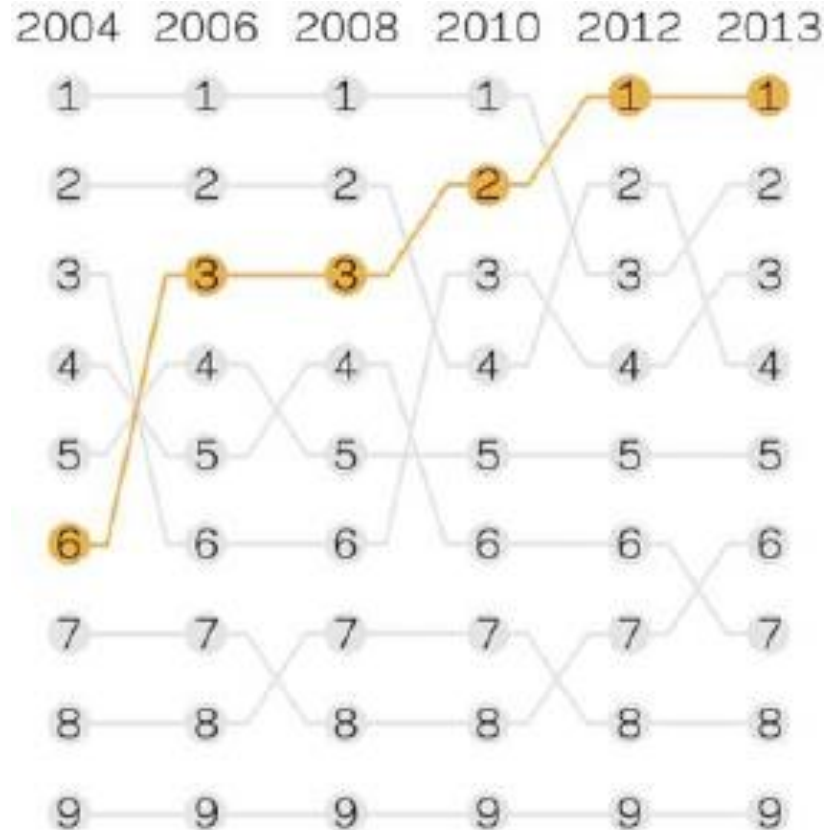
Globalisation



Environmental Issues



Focus on Technology Has risen to Top!



Technology factors

Market Factors

Macro-economic factors

People skills

Regulatory concerns

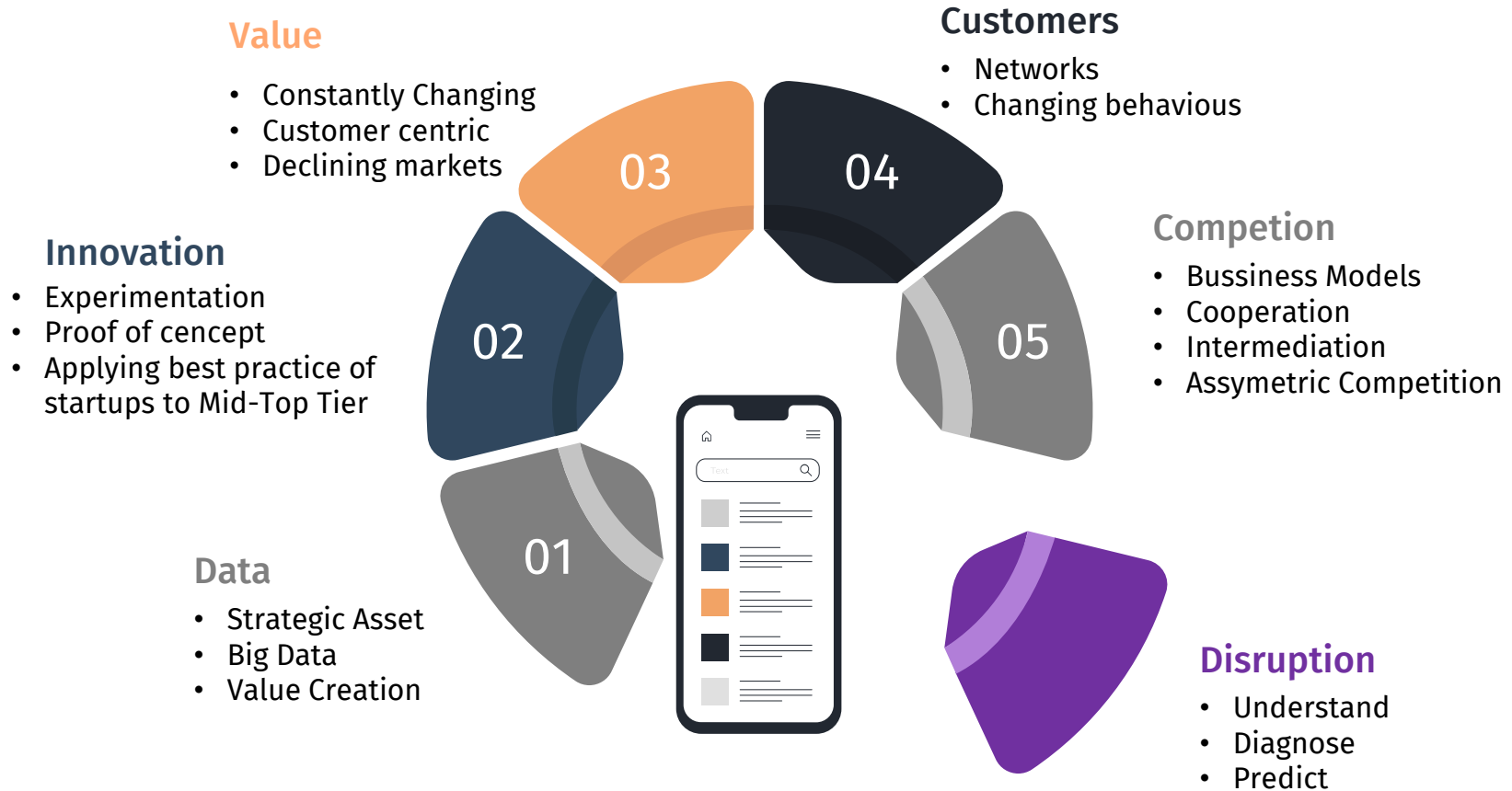
Socio-economic factors

Globalisation

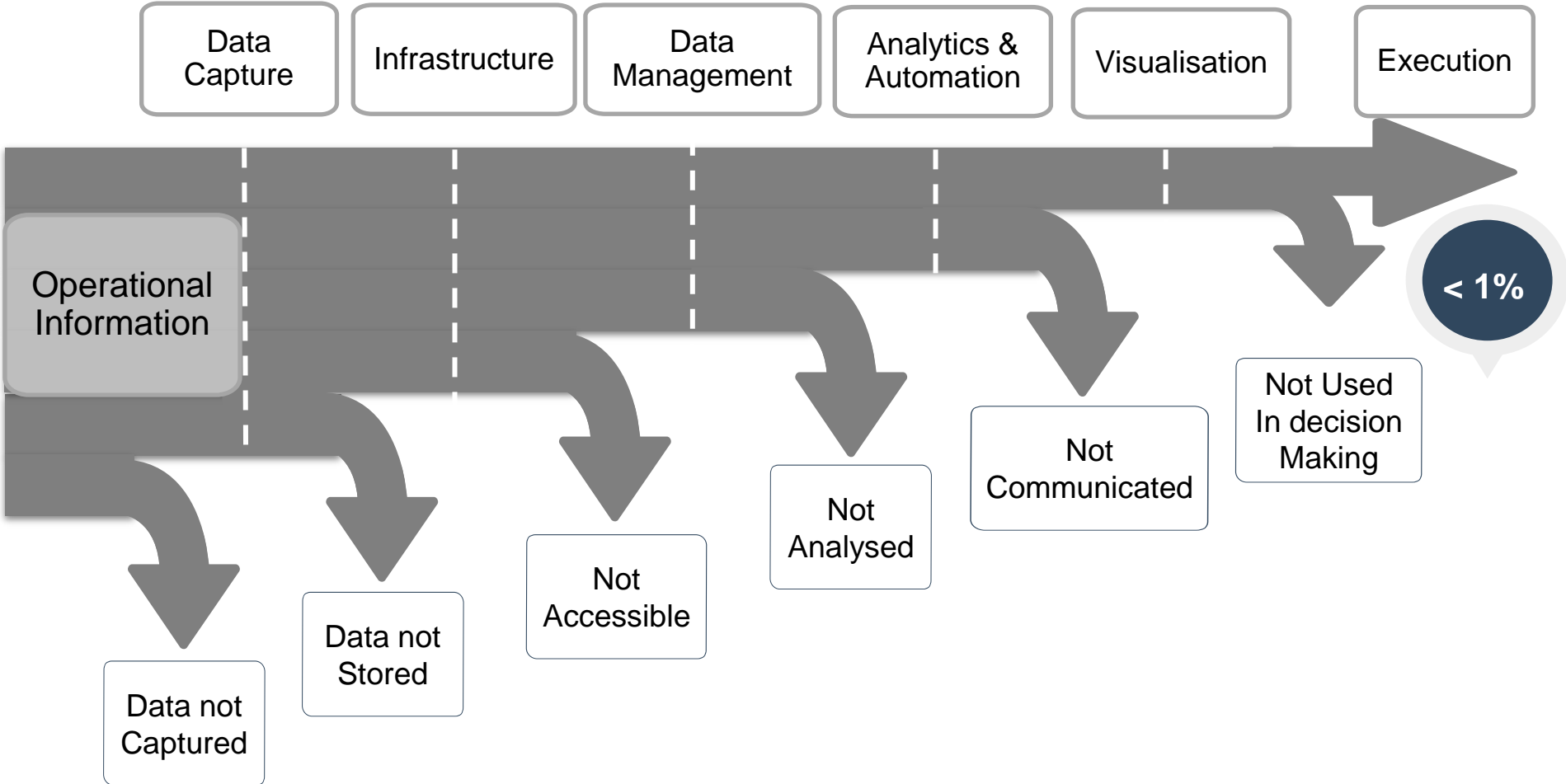
Environmental Issues

Geopolitical factors

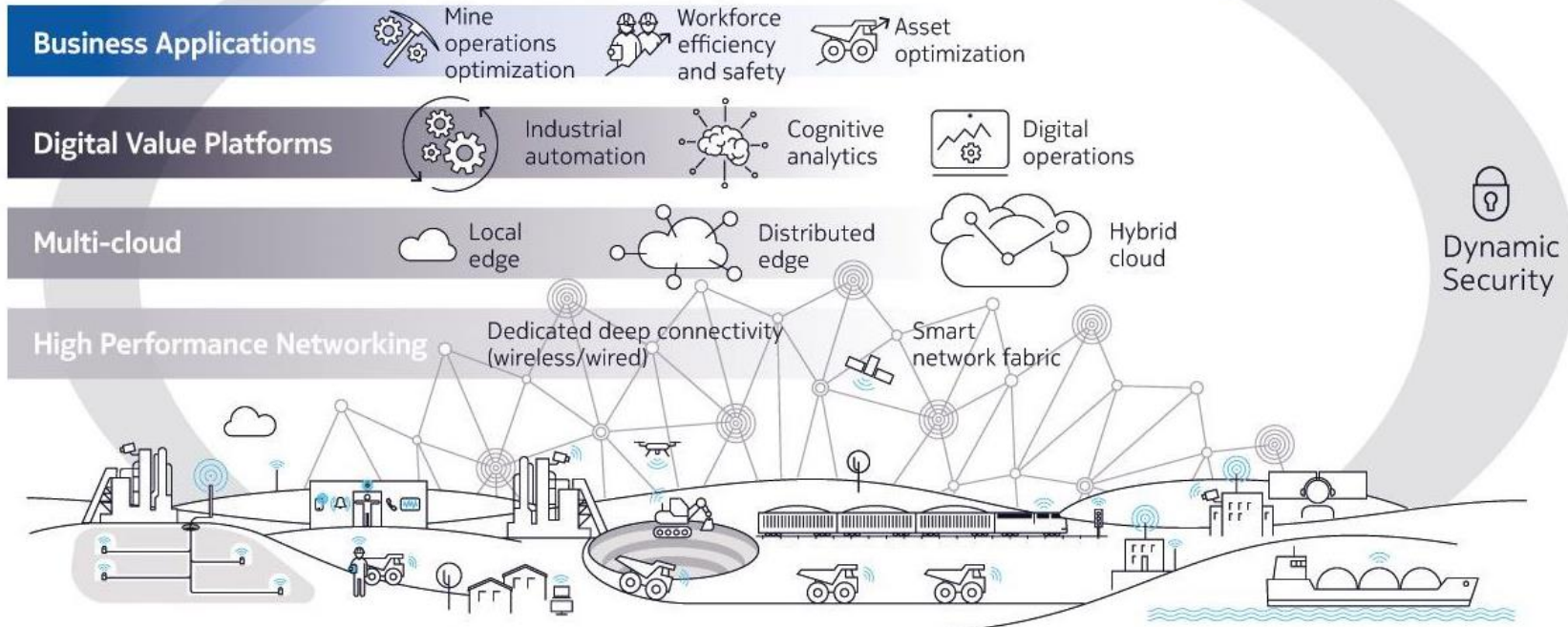
5 Domains of Digital Transformation



Mining Organisations Data Management



Digital Transformation Value-chain Overview



IoT in Mining - Some players pushing digitalisation

NewTrax – IoT Hub, Operations and Safety systems

Mobilaris – Digital Solutions for increased efficiency and safety

Hexagon – Digital Solutions for smart mining

Honeywell – Forge; Enterprise performance management solution

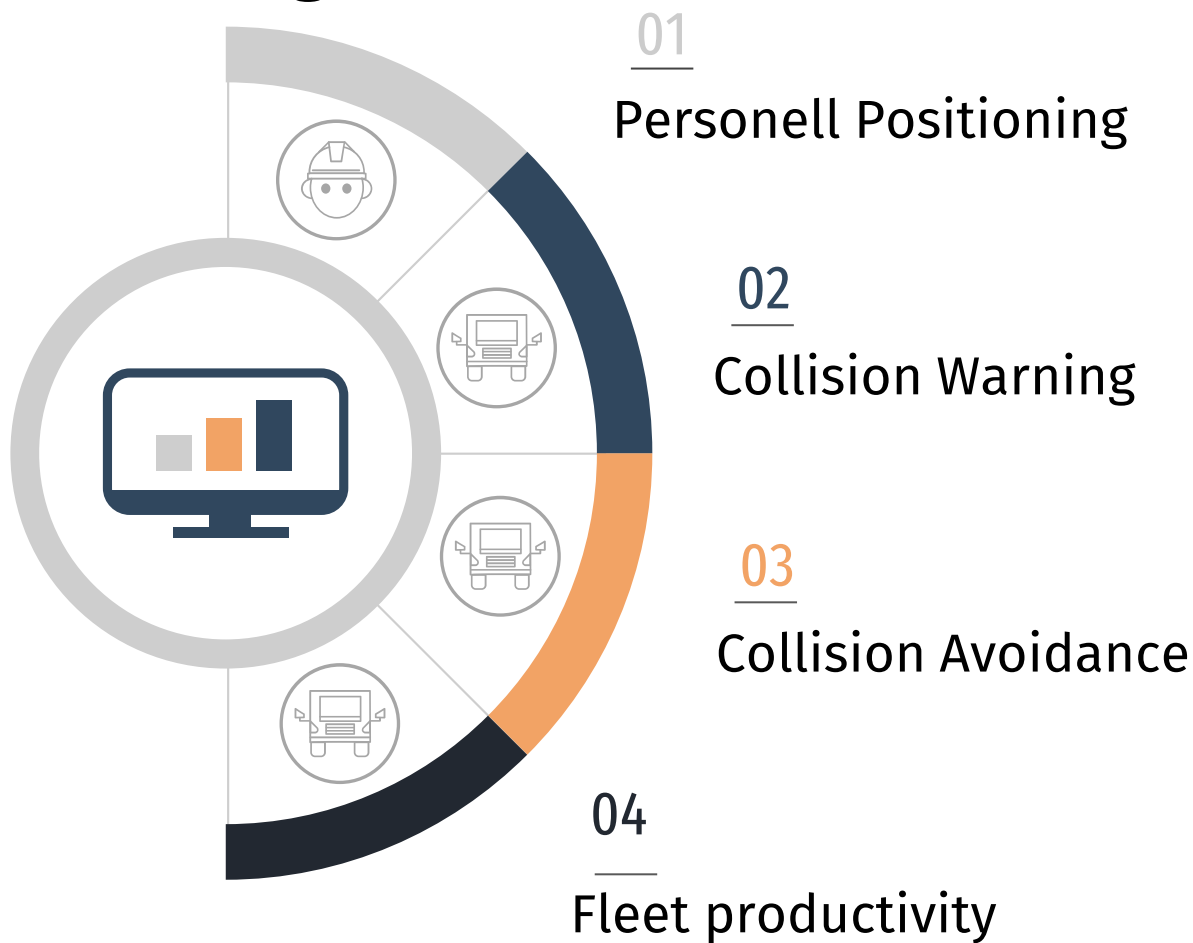
Epiroc – Certiq (Fleet Monitoring), **Mobilaris** (Situational awareness)

Sandvik – AutoMine (Autonomous), OptiMine (Analytics)

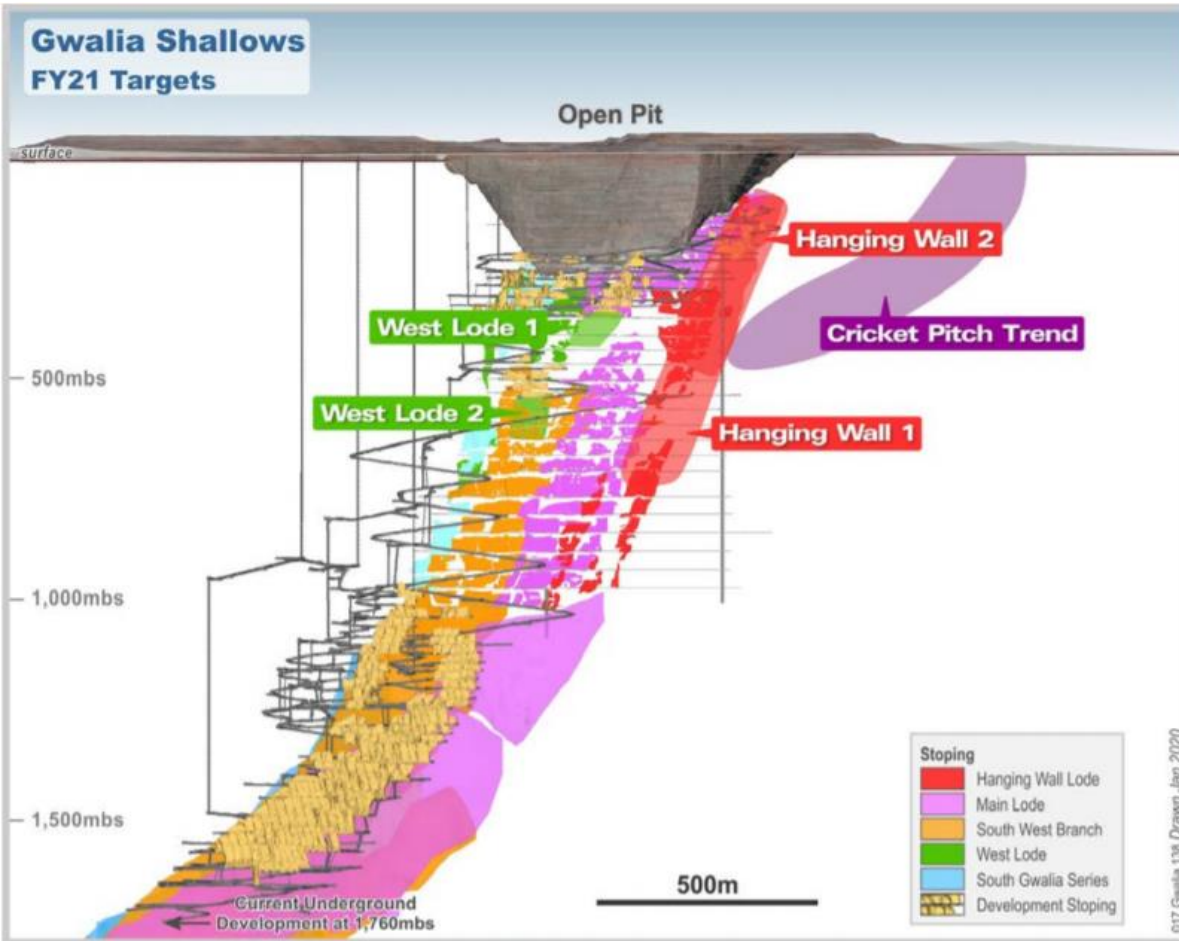
Multiple Vendors – Ventilation on Demand Solutions

IoT in Mining - NewTrax Suite

NewTrax Underground Safety Systems



NewTrax – Personnell Positioning - Gwalia Mine



St Barbara Gwalia Mine 2017

Features

- RFID enabled Caplamps
- Tag board - RFID Tag reader
- Evacuation Notification
- Distress Signalling
- Fall Detection
- Location Awareness
- Lone Worker Check-in

Benefits

- Monitor personnel location real-time
- Complete visibility and insight
- Enhanced control in emergency
- Works over multiple communication systems; WiFi, LTE, MineHop, Leaky Feeder
- Data available in real time via the Newtrax IoT Hub

IoT in Mining - Certiq Insights (OEM)

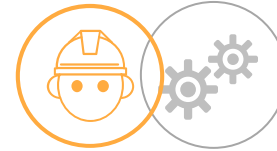
Telematics Fleet Monitoring System



Operations



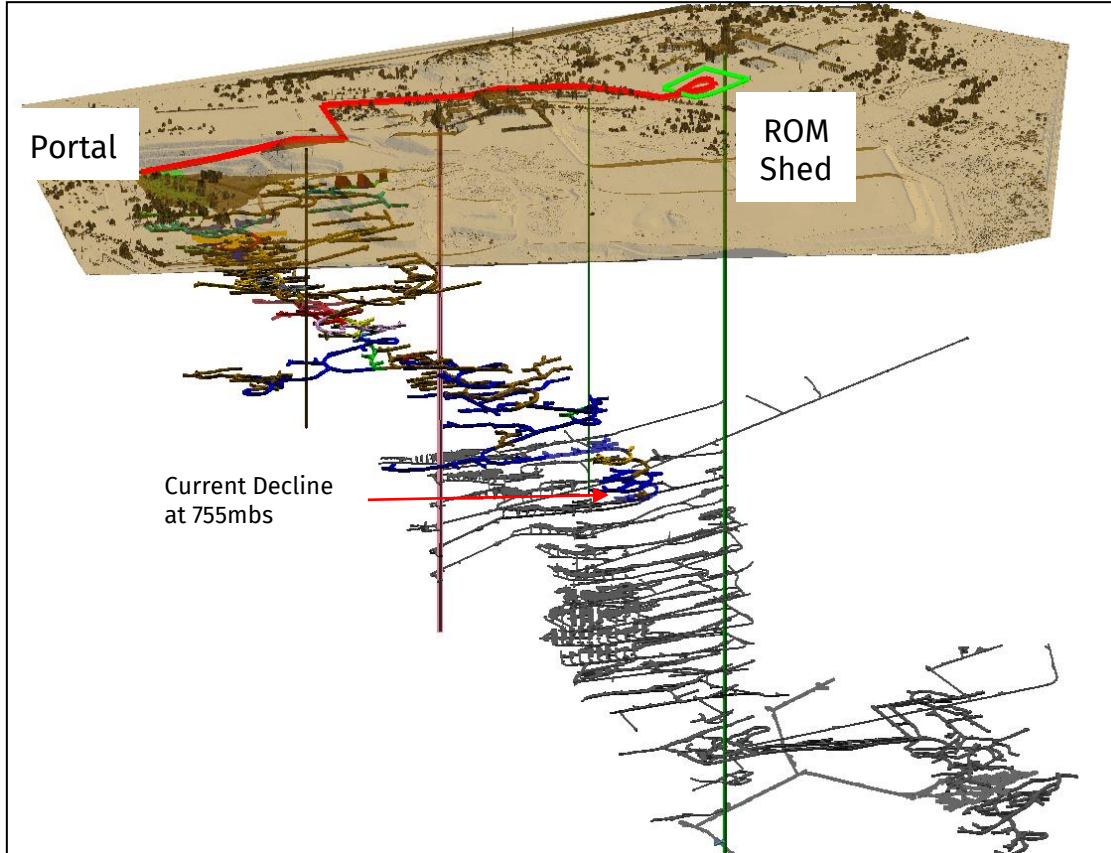
Maintenance



Fleet Management



Epiroc – Certic - North Mine (UG Haul Trucks)



Perilya North Mine (2020) (UG Haul Trucks)

Features

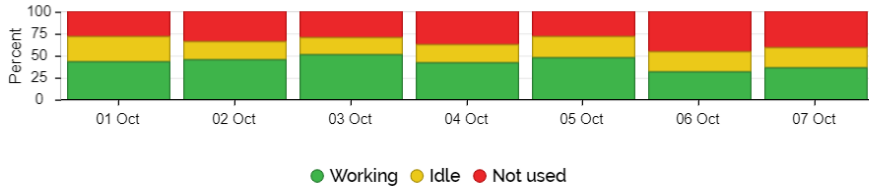
- Gathers, compares and communicates information
- Generates reports & notifications
- Surface & underground application
- Fleet or single machine tracking

Benefits

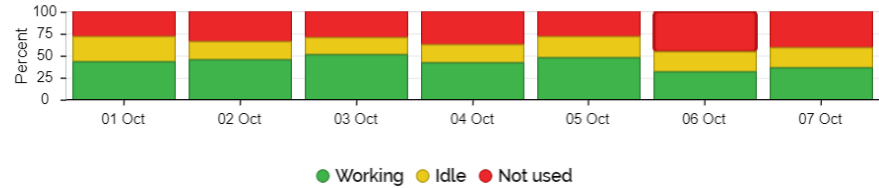
- Real-Time data
- Processed Data, Track KPI's
- Payload compliance
- Enables Short Interval Control
- Paves way to proactive maintenance
- Potential to reduce costs
- Low setup costs (Zero cost for us!)

Operation > Utilization

Utilization % (3/3)



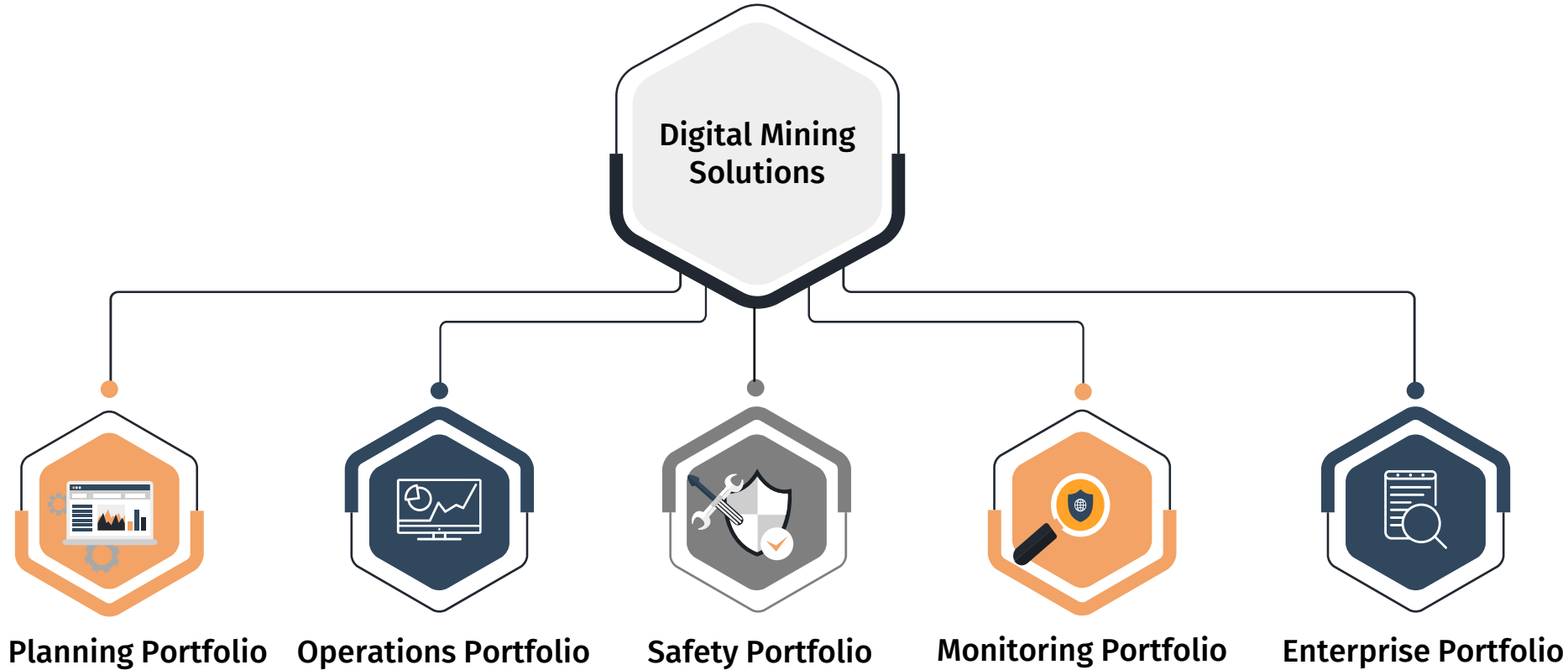
Utilization 24 % (3/3)



Utilization calendar Utilization statistic

Machine	Available time	Worked hours	Engine hours	Drill hours	Hydraulic pump hours	Tramming hours	Idle hours	Average worked hours	Average drill hours	Average hydraulic pump hours	Average tramming hours	Average idle hours
3 machines	504	215.5	278.8	0	0	186.9	114.4	10.3	0	0	8.9	5.5
MT65- UDT22	168	69.5	87	0	0	62.1	38.8	9.9	0	0	8.9	5.5
MT65- UDT21	168	71.9	96	0	0	63.2	38	10.3	0	0	9	5.4
MT65- UDT23	168	74	95.8	0	0	61.6	37.6	10.6	0	0	8.8	5.4

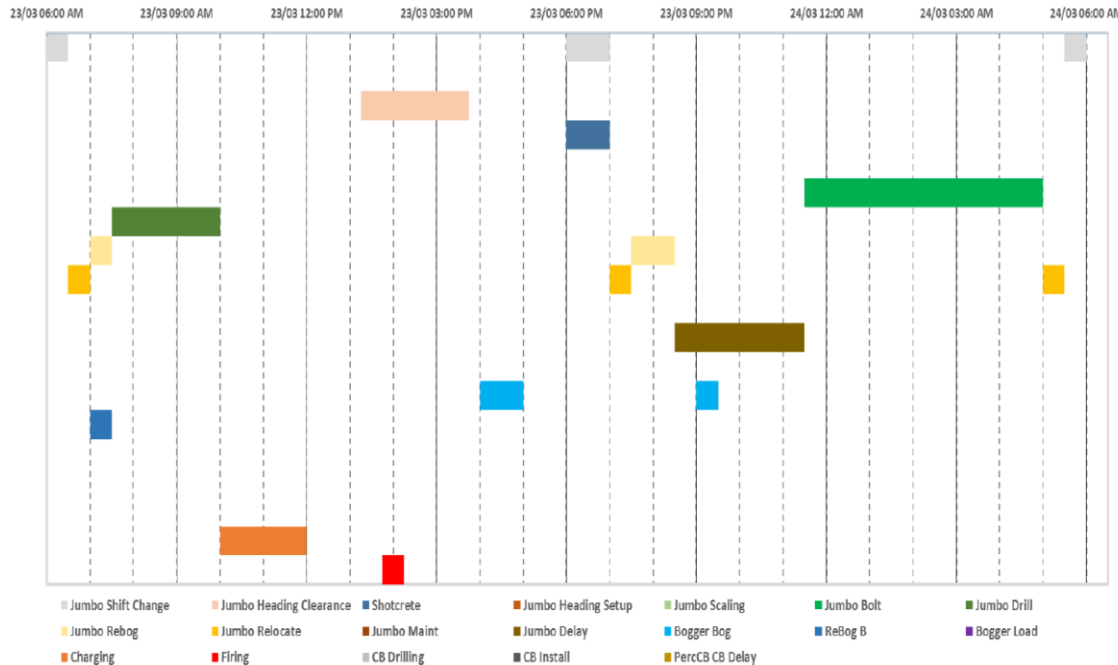
IoT in Mining - Hexagon



Hexagon – Mine reporting system – Leinster UG Nickel Mine

Thiess Global (BHP Site) 2018

9760_VEN_DEC Cycle #1900 Report



Features

- Portable Tablet interphase
- Activity and idle time tracking
- Track miners and equipment
- Track headings
- Short interval control tool
- Cycle, utilisation & cost reports

Benefits

- Digitise checklists and tasks
- Improved utilization
- Heading productivity analysis
- Short interval control scheduling
- Improves schedule compliance
- Predictive maintenance solution
- Seamless asset tracking

Future Trends – AI & Advanced Analytics (Industry 4.0)

“If data is the new oil, Analytics is
the new combustion Engine...”

