



DATABASE MANAGEMENT & SMART MINING

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The importance of database;

Background – Bre-X

1993 - Canadian penny-stock Bre-X Minerals buys rights to Busang property in Kalimantan on basis of a few anomalous grab samples

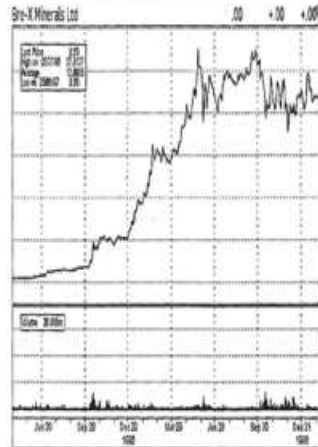
1995/6 – Drill results released by Bre-X suggest presence of increasingly large gold deposit

Sept 1996 – Bre-X shares rise to C\$286, for a Mkt cap of C\$ 6 billion

Feb 1997 – Bre-X claims a resource of 71 million oz Au. Fire on site destroys maps and assay sheets

Mar 1997 – All major companies looking at takeover. Bre-X suggests that resource may rise to 200 million oz Au

Mar 26 1997 - Freeport's due diligence drilling report states: 'To date, analyses of these cores, which remain incomplete, indicate insignificant amounts of gold'.



“The last card you turn over is the only one that matters.”



Mining Codes

The mining codes in the post-Bre-X era:

- International: CRIRSCO
- Canada: NI 43-101
- Australia: JORC
- South Africa: SAMREC
- USA: SEC
- Great Britain: IMM
- Turkey: UMREK



Giving the best possible data to geologists to improve mining operations, including:

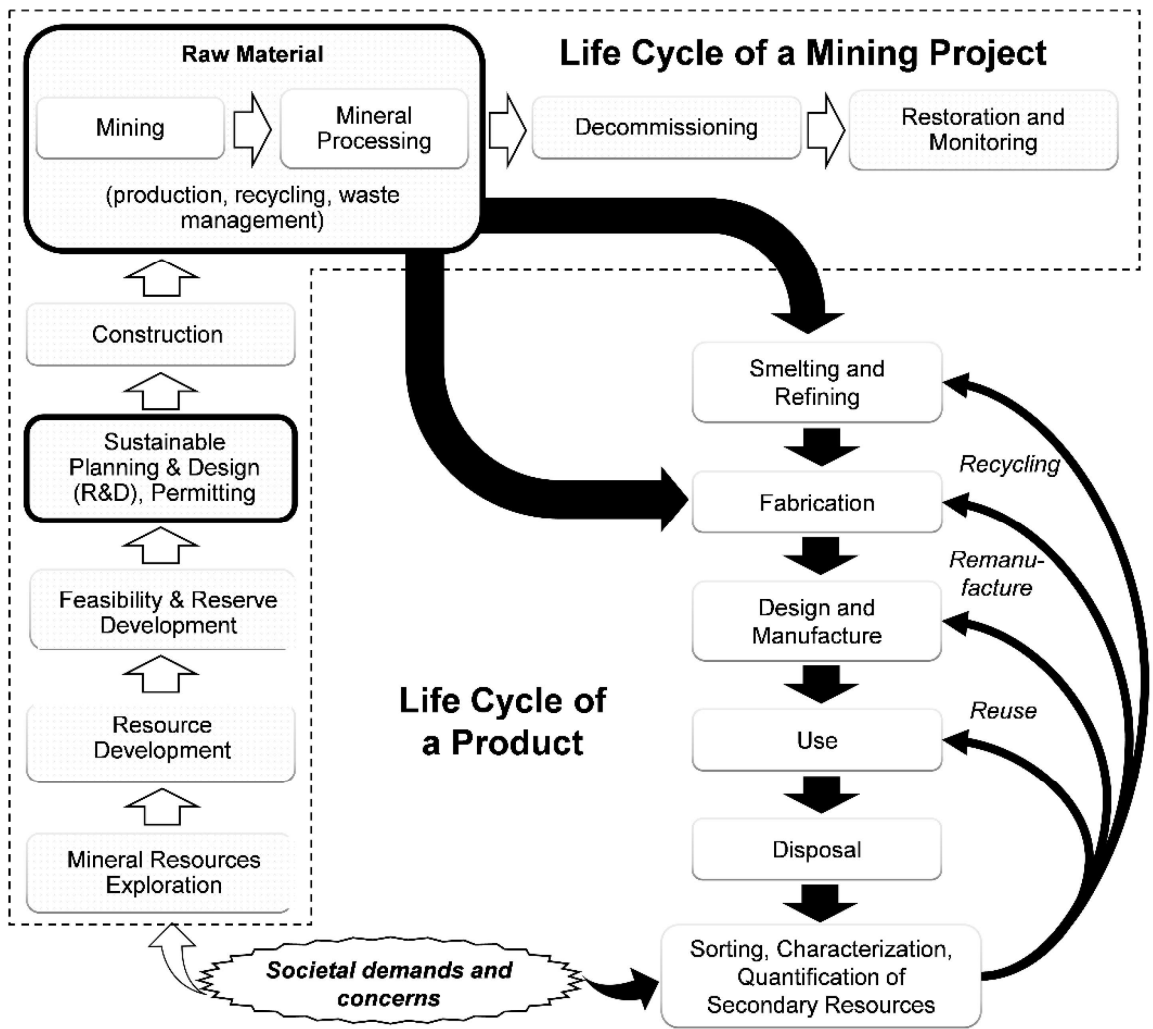
- Alleviates compliance and data integrity concerns by providing a single source of truth for all your geological data
- Gives access to the data to everyone who needs it, when they need it
- Improves the efficiencies of high-volume data capture and management
- Gives you complete control over your data from the point of capture through to batch sample submission to the laboratory across web, desktop and mobile
- Applies validation rules from the point of capture to ensure no corrupt or incorrect data is stored
- Ensures the quality of your geological data from capture at the first drillhole or sample, **through the life of the mine** and **even after decommissioning**
- Provides auditable data, which improves trust for reporting, critical decision-making, governance and compliance reporting requirements



SUSTAINABLE IN MINING

Sustainability has been commonly approached in mineral and metal processing from two perspectives:

1. focused on the resource use and management,
2. minimizing the impacts associated with the production process

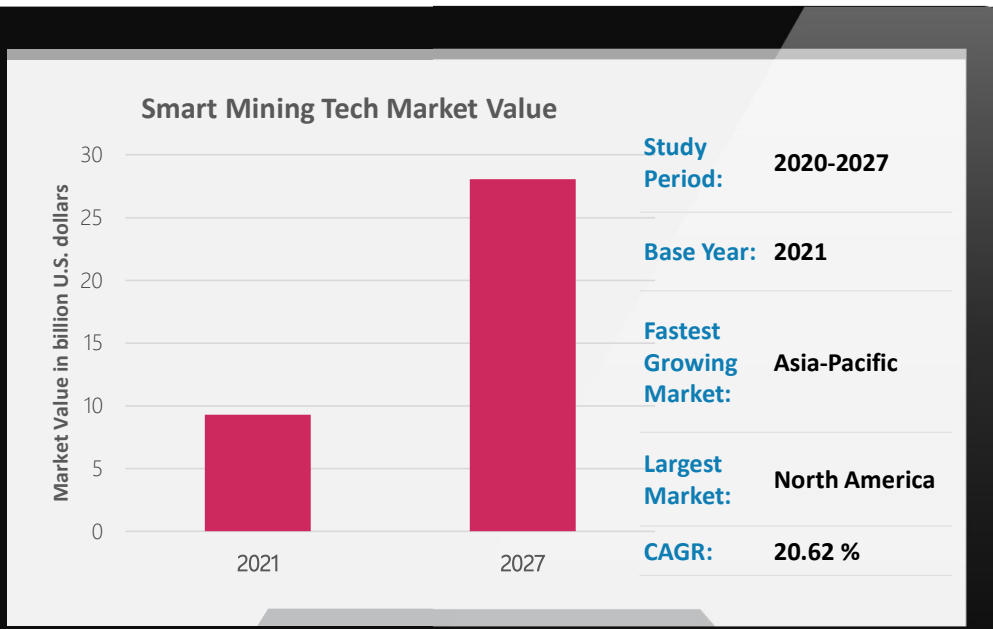


“THERE’S TONNES OF INFORMATION OUT THERE
BUT HOW DO YOU GET OUT?”



TECHNOLOGY BUILT TO SCALE

ENABLES CONNECTIVITY AND ADVANCEMENT



Source: Mordor Intelligence

Smart mining is the use of connected technologies in the mining sector. Include devices such as:

- Cameras
- Sensors
- Drones

Before, data was manually collected and written on paper. This method made it difficult to collect large datasets and use data to its full potential.

With smart mining, accurate data is collected automatically in large quantities through IoT sensors and devices. IoT allows people, machinery, and vehicles to remain connected so that data is automatically transferred between devices without the need for human interference.

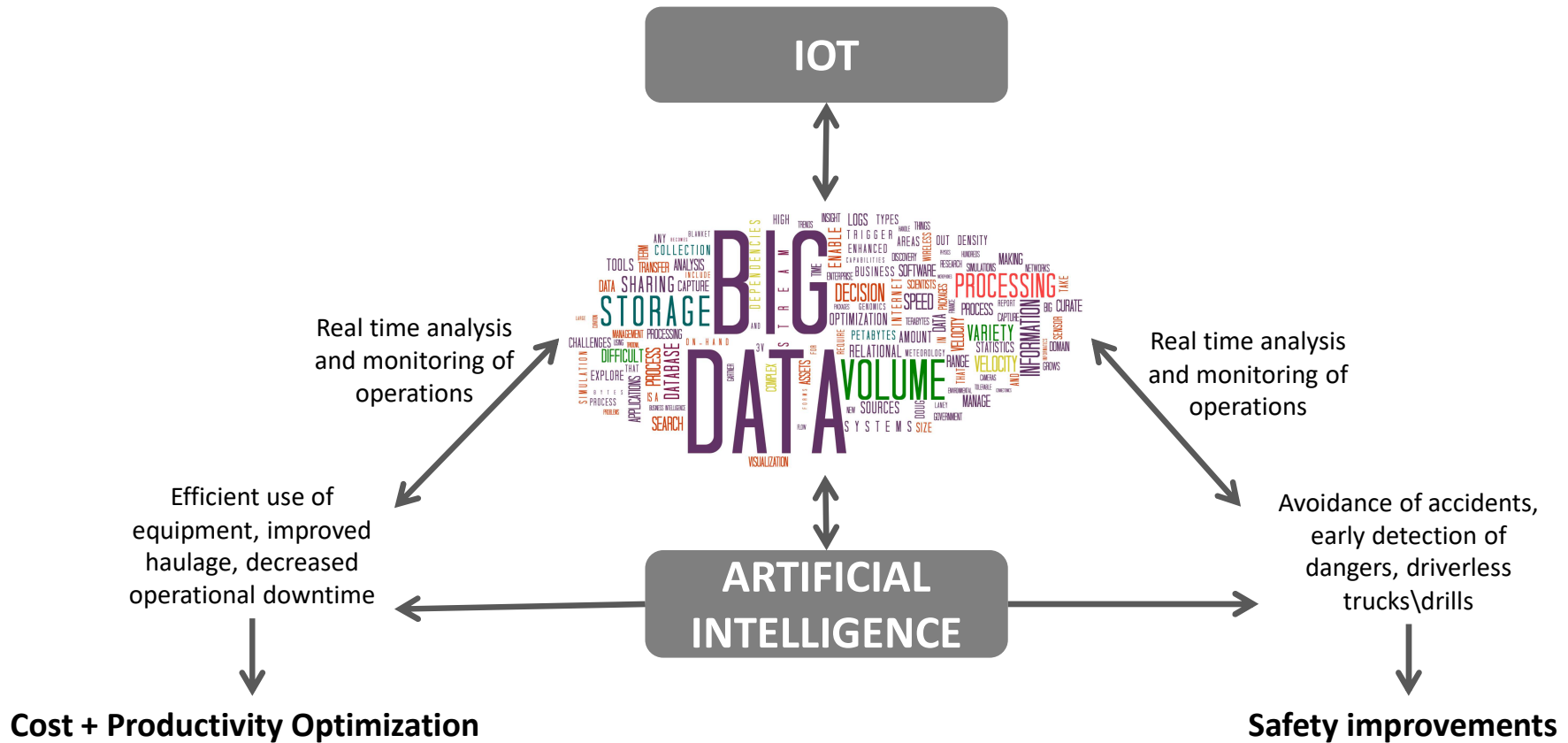
Not only is it now possible to collect vast amounts of data, but it's possible to harness artificial intelligence (AI) and machine learning to make calculations and analyze the results automatically.



BIG DATA

TECHNOLOGY BUILT TO SCALE ENABLES GROWTH AND CHANGE

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IOT EXAMPLES

Mining Company Name	Technology Partner	Time line	Description	Benefits
Rio Tinto - Koodaideri iron ore project - Australia	Multiple	2019 initiated	Rio Tinto's Kookaideri project in Australia is set to build the world's first "intelligent mine" where all assets are networked together and are capable of making decisions in microseconds. The mine planned to deliver the first tonnes of ore in 2021.	Through real-time data, operators at the mine will be able to quickly test scenarios to optimize production or operations.
Goldcorp - Porcupine Gold Mine's Borden site - Canada	Cisco	2018 implemented	With a Ventilation on Demand system, Goldcorp can automatically adjust underground ventilation by controlling fans remotely through a centralized digital interface on the surface. This allows for a more efficient use of energy and can better control for potential operational stoppages due to a lack of ventilation. This kind of targeted ventilation has allowed the company to reduce the amount of air they pump into the mine from 1,200,000 cubic feet per minute (cfm) to 650,000 cfm.	This project has cut the operation's electrical consumption in half and significantly reduced cost.
Glencore's Matagami Zinc mine - Canada	Newtrax	2016 implemented	Newtrax's Mobile Equipment Telemetry provides mine operations with essential data from interconnected assets and equipment. Glencore has been able to better understand how their equipment works in order to improve productivity.	The company has reported that average tonnage of ore hauled in each trip has risen from 55 to 60 tonnes.



Benefits of Implementing Smart Mining



Reduced operational cost

Improved recruiting and employee retention



Optimized workflow and decision making

Better worker safety



Increased accuracy in drill and blast mining

Prevention of environmental incident



Predictive equipment maintenance



DATA 1st

“ If data is not collected, shared, managed and analyzed correctly, projects will not be deemed successful.”





THANK
YOU

24Slides



REFERENCES

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