



How will Blockchain technology
change the mining industry?



Blockchain has been digitally transforming every enterprise in every industry. Blockchain's encryption technology and digital ledger allows secure storing and sharing of cryptocurrency. Blockchain provides security and transparency in business transactions, changes made to designs, documents and other business agreements. These aspects of Blockchain make it useful and relevant to the mining industry.

Areas in mining where Blockchain can be used:



Engineering, construction and handover of the mine site

The Engineering, Construction and Handover (ECH) business operations generate complex spatial and engineering information in structured and unstructured formats. Managing and maintaining the accuracy of this extensive volume of information increases costs. If not accounted for in time and correctly, this additional cost can delay the business run-rate and enterprise goals.

Blockchain makes transactions traceable during the complex processes of managing regulations and standards, ensuring trust and work compliance.



Compliance and mining lease management

- Mining companies need to manage approvals of documentation created in the exploration, resource/reserve estimation, mine design and planning processes. They are looking to improve the mechanism of custody and control, with proof embedded in the documents that have passed approval. Blockchain would improve traceability of reserve estimation for stock exchange reporting; the traceability of inventory into the ERP for inventory management of the resource/reserves
- Blockchain could utilise the concept of smart contracts internally, which can then be extended to external entities (eg: stock exchanges for release of resource/reserve estimates). Blockchain can be used to validate the workflow/audit of activities and outputs used in the resource/reserve calculations





Supply chain

- Blockchain can be used to track materials in the mining value chain from the blocks to the concentrate, to metal (aka gold bars, SW/EX copper plating, etc.). This can be shown in stepwise values for the provenance to the final customer
- Blockchain can also provide transparency to JV partners. Most mining companies have a fragmented value chain with transactions spread across multiple parties
- Blockchain could lead to the automation of invoice reconciliation. Ore is assigned a quality certificate and the customer sends it for lab testing for reassurance. There may/may not be a dispute over the ore quality and price. This whole process can leverage Blockchain technology with the three parties involved – miner, customer and the arbitrator
- BHP started a project using Blockchain to record movements of wellbore rock and fluid samples to better secure the real-time data that is generated during delivery¹



Mineral provenance

Manufacturing companies are concerned about the source of minerals. Companies like Apple have decided not to use minerals coming from conflict zones, from mining companies with underpaid labour and poor environmental standards.

Eg: A pilot scheme is reportedly being developed to track cobalt production in the Democratic Republic of Congo, from artisanal mines through to batteries for high-tech products².



New approach to mining

In recent conferences, Barrick Chief Innovation Officer Michelle Ash has been discussing what the digital mine will look like. One of the possible scenarios presented did not involve digging the ore at all and identifying the value in the ground. This is where Blockchain was seen to be the answer. In Barrack's model, investors buy digital tokens that represent a green gold vault quantity (e.g. gram/oz of gold in the ground), gold that will never be mined, but traded on an exchange using digital tokens. They regard this as the "true" original green gold concept of monetizing capital without ever mining. A portion of the proceeds from the initial raising could go to the community and be tracked for investors using Blockchain.

This model has the potential to significantly disrupt the gold market including how investors think about and relate to gold assets. This is a truly radical idea in mining. To get to this point will require a significant level of trust.



Mining equipment OEM

Mining equipment OEM sources parts from various vendors, and work together in a high performance environment. In case of critical failure situations, in a standard supply chain model, the OEM is the only one aware of the different vendors. A mining maintenance department attempting to look into part failure history, could put a request through the OEMs. The Blockchain attached to the relevant part for the OEM contract, could give the authorisation to view the relevant data on the part. Both the client and the OEM can work together, and the end customer is assured of the quality of the parts and systems used. With Blockchain it becomes easier to identify which part was sourced from which vendor.

These features of Blockchain provide numerous uses in mining. However, companies should also be aware of the limitations of Blockchain. Blockchain can transform business process only when one or more additional criteria are met – specifically:



Also, Blockchain is not usually suited for high volume, low value transactions. In summary, the impact of Blockchain technology will have huge a impact in

all areas of mining: from exploration and resources to the supply of metals to industrial and retail customers.



About the author



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Leon has over 30 years of overall IT industry experience, with over 20 years in the mining domain. Leon has a well-developed understanding of the end to end value chain business processes in mining, especially in resource definition, mineral resource management, resource extraction, processing, asset maintenance and reliability, logistics, sales and marketing. Leon also has experience in electronic payment (clearing/settlement, financial management, CRM, card and device management), and in the construction/manufacturing industry. Leon is helping Wipro Ltd. achieve its vision of becoming the market leader in digital mining by expanding into global markets for the mining industry.

¹<http://www.coindesk.com/bhp-billiton-blockchain-mining-company-supply-chain/>

²<http://www.mining-journal.com/politics/news/1311470/%E2%80%9C-solution-blockchain-%E2%80%9D>

³<https://www.ibm.com/blogs/insights-on-business/government/ten-things-blockchain-not/>



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