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Blockchain in Natural Resources: Hedging Against Volatile Prices

Abstract

The natural resources industry is beset by several challenges - including volatile commodity prices and increasing production costs - mandating immediate technology interventions to drive efficiency and productivity. The industry is highly capitalized, regulated, and characterized by a complex supply chain, making it an ideal candidate for Blockchain-driven disruption.

The best strategy for Blockchain adoption is to start small with use cases that offer promising potential. This paper helps organizations from the natural resources industry assess their readiness for Blockchain deployment, clearly identifies functional areas where Blockchain can drive faster value, and delineates a roadmap for its adoption.

Increasing Trust, Reducing Costs, and Improving Productivity with Blockchain

The natural resources industry is no stranger to a complex supply chain comprising multiple stakeholders across upstream and downstream processes, and constant exchange of information among several intermediaries. To offset the growing volatility of oil prices, the industry is exploring ways to effectively and efficiently increase trust, reduce costs, and improve productivity. Industry players are scouting for advanced digital technologies that can drive cost optimization, automation, and simplification. The highly commoditized, capitalized, and regulated industry appears to be ripe for Blockchain-led disruption. Here's why.

Leveraging Blockchain can drive the following benefits:

- Increases productivity by eliminating barriers caused by siloed ledgers that lead to arbitrage opportunities, as assets are moved across the globe in real time.

- Enhances efficiency by eliminating intermediaries. For example, Blockchain helps reduce or optimize the use of human agents deployed to monitor process security or repeatedly input information that can lead to inconsistences or redundancies, by allocating them to higher-value activities.

- Enables flexibility by supporting multiple document data formats as only the digital fingerprint of documents and storage pointers are stored and attested, not the actual document, making it easier to share documents among multiple parties.

- Improves security with a cryptographic code that secures both the ledger as well as the proof of authenticity and authority to perform transactions.

- Enables simplicity by shifting from a command and control model of data management to an autonomous, sovereign model in which no single party controls the data or the information on the ledger. Each party has access to the entire chain of information and can verify transaction records.

- Boosts transparency as all transactions are publicly visible within a network unless they are encrypted on private Blockchains. Transactions are added in a chronological order, with every block containing a hash of the previous block,

using various computational algorithms and approaches to maintain a single source of truth.

- Augments reliability as each constituent, node, and user, has a digital signature that provides identity, authorization, and authentication. Ledgers are used to record and cryptographically secure events, including timestamps that prove transaction provenance.

- Enables the creation of smart contracts between a natural resource producer and a consumer that automatically and securely regulates the requirements of both supply and payment - without the involvement of a bank or a broker. Deployment of smart contracts creates a decentralized autonomous organizational unit.

Assessing Blockchain Readiness

As in the case of other digital technologies, the critical criteria for mainstream Blockchain deployment are scalability, reliability, and security.

The most important question faced by the organizations is whether their business is set to grow in a decentralized world. This, and some other questions listed in Table 1 would help the organizations assess their readiness for Blockchain deployment.

Criteria	Business related assessment question	Technology related assessment question
Conceptual acumen	Is the business ready to work with decentralized business models at a conceptual level?	Does the organization understand the challenges of Blockchain's interplay with other technologies?
Organizational backing	Is there full strategic alignment and support from the entire C-suite and each line of business?	Does the organization possess a deep understanding of its data capabilities and architecture?
Roadmap for technology and business	Has the organization defined an implementation roadmap with a strategy arranged in a risk-balanced portfolio of initiatives?	Has the organization developed Blockchain architecture integration frameworks and tools to minimize disruption?
Agility	Does the organization have significant innovation maturity, including a lean start-up culture and relevant processes?	Is the organization actively engaged in technology-centric consortia and collaboration with start-ups?
Market overview	Does the organization have in-depth insights into the customer, partner, regulator, and start-up ecosystems in the marketplace and their value exchanges and associated requirements?	Can the organization run multiple Blockchain stacks that are abstracted from legacy systems?

Table 1: Questions for Assessing Blockchain Readiness

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Identifying Functional Areas for Blockchain Deployment

Which functional areas are ideally suited for Blockchain applications? Table 2 identifies some areas where Blockchain can drive value.

Functional area	Possible solution	Business value	Share of Blockchain Projects based on Proof of concepts identified
Compliance	• Enable automated and real-time notifications for the compliance operations team • Minimize the chances of introducing resources from conflict ridden regions that are subject to embargo • Optimize the delivery of capital projects involving multiple engineering, procurement, and construction companies, using smart contracts	• Eliminate law suits • Avoid losses due to fakebuyers • Reduce the need for governance • Lower operating risks • Ensure rapid and accurate clearance of contracts	15%
Trading	• Deliver gas directly to homes through an app that uses Blockchain instead of cash-based delivery • Confirm that companies have funds without letters of credit • Create dashboards with real-time and historical data relevant to each buyer and supplier (digital monitors)	• Create new services • Eliminate broker fees • Simplify payments • Reduce cost of ownership • Accelerate information processing and real-time trading • Reduce the need for risk management	50%
Exploration and production	• Enable real-time production by recording samples and securing production output • Track land banks and land deals • Track geological well samples	• Streamline processes as well as distribution during exploratory drilling campaigns • Reduce chances of fraud and cost of data management • Reduce cost of ownership as joint venture partners in complex contracts do not need to audit each other • Decrease latency in the delivery of mineral sample analyses for faster integration • Ensure fully auditable custody, transfer, and analysis histories of minerals	15%
Logistics	• Automate payments with autonomous vehicles to record consumables stock when supplies run low	• Reduce demurrage and lay times • Accelerate processes	15%
Health, safety, and security	• Build a trusted corporate action information hub using distributed ledger	• Ensure higher transparency for all stakeholders	5%

Table 2: Functional Areas Suited for Blockchain Deployment

Developing a Blockchain Roadmap for a Natural Resources Enterprise

A large-scale implementation of a distributed ledger technology is unlikely to be completed within a short time frame in most natural resources enterprises. The focus for deploying distributed ledger applications should therefore be on low volume, less automated, and less regulated business areas, making it important to:

- Learn from early experiences: A number of initial solutions from start-ups and mainstream firms are currently in the pre-production stage and are expected to go live in the near future. Studying these use cases can provide valuable lessons.

- Explore market-specific opportunities and intra-company transactions: It is easier for natural resources companies to launch a service within a particular country, instead of looking for global solutions.

- Ensure continuous industry collaboration for global standards and interoperability: Companies need continuous collaboration to ensure that new implementations do not lead to new inefficiencies through silos and technology fragmentation.

- Target high impact use cases: Collaborate with partners on high impact use cases that have the potential to deliver proven benefits - without disrupting current processes.

According to Finextra, 2017 was the year the world saw the first non-financial applications of Blockchain and 2018 is set to see more real world applications.[1]

The key question is not whether distributed ledgers will be able to disrupt major parts of the natural resources supply chain but whether existing high-volume applications can be migrated to distributed ledger platforms through transformational programs quickly enough to avoid loss of business or even full disintermediation. Success will depend on finding the best use cases in the right context, identifying the right technology partner, and targeting incremental growth.

References

[1] Finextra, Blockchain technology by 2018: a breakthrough, June 2017, accessed December 2017, https://www.finextra.com/blogposting/14151/blockchain-technology-by-2018-a-breakthrough

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