



Ignacio López del Moral

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OIL & GAS INDUSTRY: RELATIONSHIPS WITH SUPPLIERS AFTER BLOCKCHAIN & ADJACENT TECHNOLOGIES IMPLEMENTATION



Blockchain has a potential in oil and gas, for transforming the hydrocarbon value chain, commodity trading, closed-loop OT security, product distribution, smart contracts, and international finance.

In respect of the players who could take advantage of Blockchain implementation, we must stand out the following: Integrated Oil & Gas Company, its suppliers and customers, Regulators & Tax Authorities, Insurance firms, land owners, commodities market traders, etc.

Notwithstanding the above mentioned, in this paper, **we will be focused on the broad range of benefits and challenges for Integrated Oil & Gas Companies in their relationships with their suppliers. The reason behind our scope lies in the fact that we consider that there**

is a high opportunity for these companies to create value in terms of efficiency if they achieve a greater collaboration with its providers through Blockchain & adjacent technologies application.

“Reimagining supply-chain collaboration in a low-oil-price environment”, Mckinsey & company O&G white paper, for example, shows that collaboration could unlock five-year industry-wide savings of \$90 billion to \$240 billion on purchases of commonly used exploration and production equipment.

Having said that, are we aware of the benefits of Blockchain & adjacent technologies implementation for standards management?

For the sake of our argument, we should distinguish the different stages of Oil & Gas value chain, i.e.: Upstream, Trading & Supply Chain and Downstream.

A) Blockchain & adjacent technologies. Upstream:

1. E&P Compliance (Supplier: Government).

Description: Smart Licenses Exploration & Production. Ability to receive real-time notifications that assist regulatory compliance.

Value driver: Faster and more accurate administrative procedures. Cost savings. Less penalties and trials.

Digital levers: blockchain.

2. Quality and Authenticity (Proof of origin) Verification.

Description: The distributed ledger can record product and asset attributes and allow permissions for specific parties to view. Fewer manual processes would be needed to record materials moving from input to final production.

Value driver: Cost savings/counterfeit prevention.

Digital levers: Inability to repeat the hash/ Smart contracts.

3. Manipulation of expenditure of fly-in, fly-out workforce reduction

(Design and construction of oil and gas facilities supplier).

Description: Identification of remote workers and control of their licenses (e.g; Driving license, work contract).

Value driver: Fraud avoidance/fines decrease.

Digital levers: Electronic signature via private key (blockchain), Biometric Pattern, Digital identity.

State of the art

· MIT ENIGMA, for instance, was designed to be more secure than existing solutions in storing sensitive data such as biometric identity (a user's password) in an encrypted form in tiny fragments, while continuing to allow the data to be useful even when encrypted and broken into fragments.

Storing data in fragments at multiple sites, rather than concentrating it one place, also raises the prospect of enhanced data security even without a fully encrypted system.

B) Blockchain & adjacent technologies. Supply Chain & Trading:**1. Smart restocking & Automated clauses enforcement.**

Description: immutable record of a range of predefined events.
Automated restocking once software has detected an exit of goods.
Automated rebate and penalties for delay payments.

Value driver: Increase of efficiency. Time and cost savings.

Digital levers: Smart contracts.

2. Liquidation.

Description: Elimination of significant Reconciliation. Liquidation processes reduction—Netting. Also, it would be possible to make payments with tokens, allowing micropayments.

Value Driver: Reduce costs by reducing transactions (savings in commissions to intermediaries). Trust generation ensuring a correct “netting” supported on Blockchain.

Digital levers: Smart contracts.

State of the art

· **Initiatives in Cross—Border Payments:** 21.12.2017 BNP Paribas today announced it has processed several live payments for two of its longstanding corporate clients, Amcor, global leader in packaging solutions and Panini Group, international leader in collectables and trading cards. Using Blockchain technology, BNP Paribas successfully processed and cleared for Panini Group and Amcor payments in various currencies between BNP Paribas bank accounts located in Germany, the Netherlands and the United Kingdom. The payments were fully processed and cleared in a few minutes highlighting the real potential of Blockchain technology which eliminates delays, unexpected fees and processing errors, paving the way for real time cash management.

3. Transparent project allocation.

Description: Smart pseudo anonymous Balloting.

Value drivers: Operating cost is reduced, and results are known instantly. Cryptography ensures the anonymity and prevents Bribery, corruption of the vote.

Digital levers: Smart contracts.

State of the art

Several Madrid cities' Councils have begun a revolutionary project for an official institution; integrate Blockchain technology into citizen consultations or surveys.

4. Faster and compliant to regulation ocean freight.

Description: Harmonization of tariff schedules and the quick processing of bill of lading, letter of credit and insurance Policy. External audits with customs.

Value driver: Aptitude to streamline the process, providing security and reducing management costs. Blockchain could boost efficiency by reducing cost and maximizing throughput.

Digital levers: Smart contracts + Electronic signatures/ IoT /AI.

State of the art

· **NTT DATA & TOKIO MARINE:** first Blockchain-based insurance policy for marine cargo insurance certificates has been successfully tested by Tokio Marine & Nichido Fire Insurance and the NTT DATA Corporation. According to Tokio Marine, the certificate of insurance, the bill of lading, letter of credit and commercial invoice were all stored and transmitted on the Blockchain, *"It was actually proven that the blockchain based system will cut 85% of the shipper's time of data inputting work in order to receive an insurance certificate..."*

· **QUEST:** London-based insurtech company Concirrus launched an AI-powered marine insurance analytics platform called Quest.

The first applications built on Quest allow commercial marine insurers to monitor and manage risk behavior and exposure in real time, a major step forward in risk mitigation capabilities, according to a press release.

Quest gives insurers the ability to track vessel behavior and monitor exposure clusters across the globe. The application enables automated alerts to be set for a range of behavioral criteria and contains detailed information from over 200,000 vessels worldwide.

· **Solas regulation:** From **July 1st 2016**, the **Verified Gross Mass** will be applied for better container stowage onboard vessels to avoid incident. CMA CGM Group expect to receive the weight prior to

planning. **Could we record on the Blockchain the accomplishment of this requirement?**

· **Bail Bond Cancellation** (“How Blockchain Technology Might Transform Wholesale Insurance”- PWC).

Where a ship in port causes damage covered by insurance it may need to present a ‘bail bond’ to be allowed to leave. This ‘bail bond’ is a standby letter of credit guaranteeing payment of the insurance claim directly to the port. **Resolution of complex claims may take five to ten years, and the bail bond cannot be cancelled until the claim is paid in full.** Bail bonds are paper and have to be physically cancelled. **By recording the bail bond in a blockchain rather than in paper it can be linked directly to payment of the claim and cancelled automatically (Increase of working capital).**

5. Dangerous goods- Trucks Driving license control.

Description: O&G tank trucks could carry gasoline, liquefied gas, propane / butane gas cylinders. Digital identity check.

Value driver: Accident prevention. Better imputation of liability system. Faster damage mitigation procedure.

Digital levers: Electronic signature via private key (blockchain) + Biometric Pattern.

6. Smart accountability.

· **Inventory (Stored and transported).**

Description: Theft avoidance.

Value Driver: Smart recognition / Automatic Reset / Cost Savings.

Digital levers: IoT + Smart Accountability.

· **Reserves & Inventory Smart Representation (information providers).**

Description: Blockchain could prevent from the misrepresentation of inventory and reserves valuations as a result of fluctuating commodity prices and exchange rates and the need to reconcile production, shipping and sales volumes.

Value Driver: Misrepresentation avoidance. Cost savings. More accurate share value. Better information to take investment decisions.

Digital levers: Data Analytics/AI/ IoT (Sensors) + blockchain.

State of the Art

· **Silicon Microgravity:** Gravity sensing is a well-established surface exploration technology; however, it is not easily available in the borehole. SMG's sensors, developed in partnership with BP, are sensitive enough to measure one billionth the level of Earth's gravity and are small and robust enough to be sent deep into boreholes to distinguish oil from water. SMG estimates that the technology could improve yields on conventional reservoirs by up to 2%, representing significant increases in production and revenues.

C) Blockchain & adjacent technologies. Downstream:

1. Refine & Petrochemical Industry: materials verification.

Description: Quality control & Proof of origin.

Value Driver: Record the origin of raw materials/minimize the chance of dealing in conflict minerals. Accuracy of material transactions.

Digital levers: Inability to repeat the hash. Certifications and accreditations that measure authenticity to be utilized/ Electronic signature of system supervisors.

State of the Art

· **Palm oil fractions tracking.**

Blockchain could help to track the fractions of palm oil through the record of the certifications and standards. Hence, resulting in fraud prevention, less fines and better compliance.

Dumai, 14 September, 2017—Sinar Mas Cepsa today inaugurated its first oleochemicals plant in Indonesia, which represents an investment of EUR 300 million made over 2 years. The plant will produce fatty alcohols from sustainably-sourced palm kernel oil, a key ingredient in the manufacture of everyday products such as household cleaning goods and personal care products.

Sinar Mas Cepsa's vertical integration as well as RSPO certification allows us to offer quite unique sustainable solutions based on palm oil fractions which are already traceable to the mill and by 2020 also fully to the plantation.

Recently, the Ministry of Agriculture, with UNDP support, has taken the lead in analyzing the major differences that exist between ISPO and the Roundtable on Sustainable Palm Oil (RSPO), the world's largest voluntary certification scheme for sustainable palm oil, which consumers trust most.

2. Loyalty points tokenization (Affiliate program suppliers).

Description: single wallet for managing multiple membership programs, where loyalty points are tokenized being unique, traceable and secure.

Value Driver: Linking customers to more service providers (even those allied to competitors) to give them a fuller customer experience. Transparent program management reduces the loss of points by expiration or fraud. More transparent reporting and tracking with byproduct of data analysis to provide more insight into customer behavior.

Digital levers: Blockchain.

State of the art

- **Initiatives related to Loyalty Programs:** 01.03.2017 Hitachi, one of the biggest Japanese multinational conglomerate companies has partnered up with Tech Bureau to use the NEM-based Mijin Blockchain platform for Hitachi's point management solution "PointInfinity." The framework of the project "PointInfinity" is to allow merchants to deploy point-based and electronic money managements systems, wherein they can design their own membership programs and Point of Sale ("PoS") software for loyalty programs and special offers. Hitachi's solution for managing sales particularly popular with restaurants, cafes and shopping outlets offering customized services, coupon and loyalty program points. Tech Bureau and Hitachi plan to implement blockchain Mijin platform in the near future to autonomously process loyalty points and manage electronic money settlement platforms within a more secure, transparent, efficient and immutable ecosystem.

Conclusion

Blockchain is one of the most confusing technologies ever to have emerged over the past few years. It has already shaken up the financial services industry, but it also offers challenges, opportunities and benefits for Oil & Gas companies.

In this sense, nowadays, we could point out the following initiatives:

- Swiss-based global energy group, **Mercuria announced that they are testing the potential of the blockchain in a transfer of African Crude oil to China.** Global finance leader, **ING**, and French investment bank, **Societe Generale**, are helping to execute the sale of the oil to state-owned Chinese chemical company, ChemChina.
- A group of energy firms including **BP** have completed an energy trading pilot using blockchain tech. **Canadian blockchain startup BTL** announced the completion of the 12-week trial using its Interbit platform, which also included **Wien Energie** and **Eni Trading & Shipping** as participants.
- **Amalto SA and ConsenSys** are teaming up for a new joint venture. The goal is to use the Ethereum blockchain to automate ticket-based

processes of oil and gas. This new venture will be known as Ondiflo and aims to revolutionize the energy industry as a whole.

- **Fusion Agiletech and Quisitive** will pursue private blockchain use cases such as smart contracts, supply chain management and payments in financial services. Quisitive currently has blockchain proof-of-concept initiatives underway in the financial services and oil and gas industries. Those efforts are based on Azure-enabled blockchain services.

- **Petroteq Energy, Inc. and First Bitcoin Capital Corp.** announce Blockchain-based Initiative to Optimize Oil & Gas Supply Chain Management.

All in all, due to the benefits and advantages in this paper mentioned, we are sure that there will be many projects in the oil and gas industry in the coming years.

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