

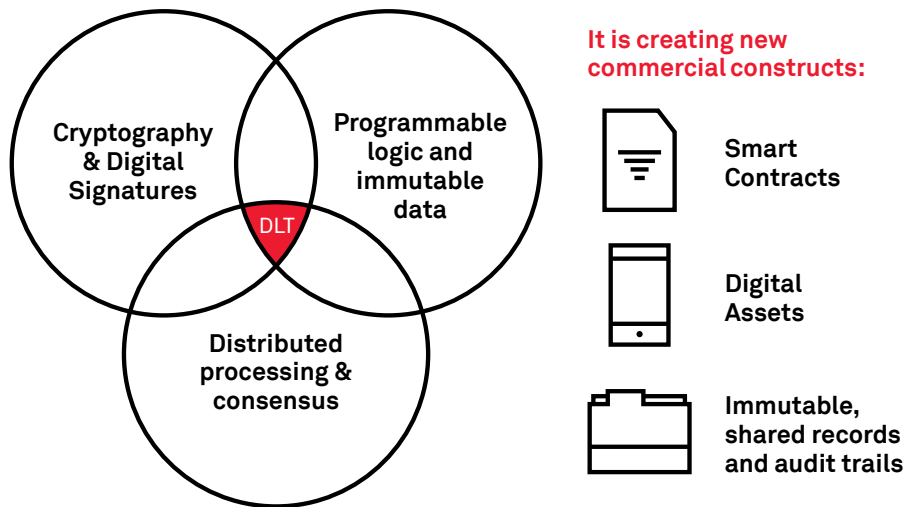


Thought Leadership: Blockchain Technology

“The blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value.”

Don & Alex Tapscott, authors Blockchain Revolution (2016)

Why Now? What is so Special About This Technology?



Platts Innovation

Features of Blockchain Technology

Distributed Processing and Consensus

On a blockchain, every new transaction is verified across a distributed network of participant 'checkpoints', and only accepted if consensus is reached amongst these participants. Every participant on the network has a copy of the transaction ledger. The core benefits of this are:

- **Trust** – It enables a database to be directly shared across boundaries of trust, without requiring a central administrator. Decentralization increases market transparency and market confidence levels.
- **Security** - Blockchain brings greater transactional security compared to a traditional database, where there are fewer 'checkpoints' to hack in order to corrupt the underlying data.
- **Efficiency and cost savings** – In many markets, typically every transaction is recorded in each entity's ledgers, resulting in multiple records which need reconciliation¹. Since a blockchain results in one version of transaction history while replicating it to all participants², tedious reconciliation is no longer necessary.

Cryptography and Digital Signatures

Ledger entries are secured by strong cryptography and digital signatures in blockchains. A security breach will require immense computing power – the majority of the computing power supporting that specific blockchain – which is virtually impossible and/or extremely costly. The key benefit here is that security breaches are much more difficult than with traditional databases.

Programmable Logic

Blockchains feature smart contracts, which are self-executing contracts automating workflow. Like paper legal contracts, they contain rules and conditions around an exchange of items. In smart contracts, these rules and conditions are converted to computer code, stored and replicated on the blockchain, and supervised by the network of computers that run the blockchain³.

The benefits are again:

- **Efficiency and cost savings** – The high costs of a commodity trade stem from labor-intensive processes, performance uncertainty and risks of fraud. Smart contracts help automate many of these processes.
- **Trust** – Smart contracts harness the network's transactional history and Know Your Customer (KYC) processes to help select trustworthy and creditworthy counterparties. This reduces risk and increases trust.

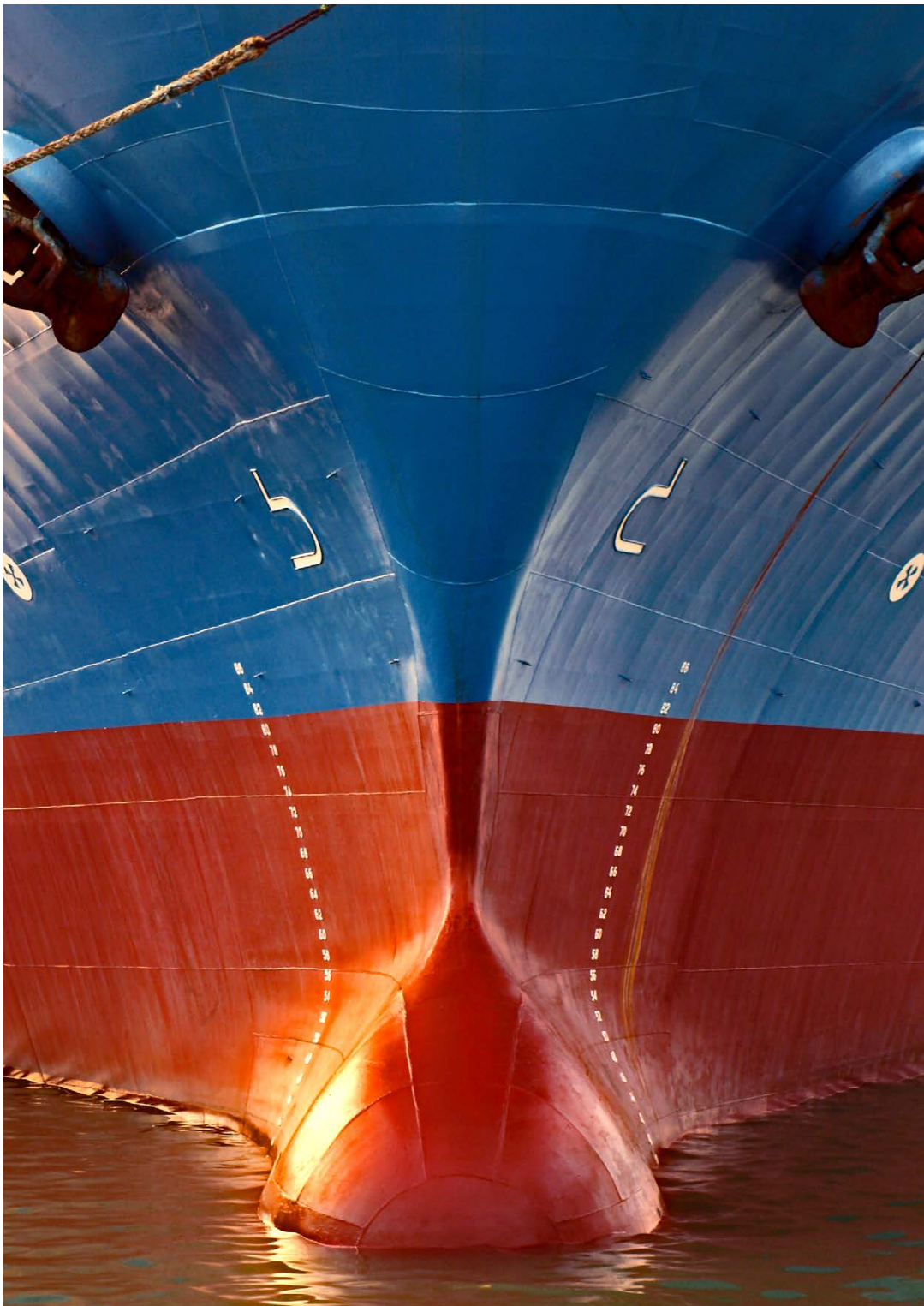
Immutable Data

Data recorded is immutable or irreversible. As Harvard Business Review describes, "Various computational algorithms and approaches...ensure that the recording on the database is permanent, chronologically ordered and available to all others on the network."⁴

This has the benefits of:

- **Permanency of records** – Ensures that information is not lost and any attempt to tamper with data is fully recorded and auditable. This is highly beneficial in proving the provenance of physical commodities, where proof of authenticity and quality is crucial in helping reduce risk. This applies not just to the large financial outlay in each trade but also to end users, who are acutely aware of the damaging impact of using off-spec commodities.

¹ IBM Research, 2017. 'Blockchain, Cryptography, and Consensus'; ² Richard Gendal Brown, 2015. 'How to explain the value of replicated, shared ledgers from first principles'; ³ Blockgeeks, 2017. Smart Contracts: The Blockchain Technology That Will Replace Lawyers'; ⁴ Harvard Business Review, 2017. 'The Truth About Blockchain'



The Real Benefits for Commodity Markets

Commodity markets are fraught with process inefficiencies and risks of fraud and error. By moving the trading and settlement process onto the blockchain, participants could:

- Slash costs of business by up to 30%⁵
 - Reduce trade finance costs by digitizing or replacing Letters of Credit
 - Reduce working capital costs, as asset titles are transferred in hours instead of days
- Reduce fraud risk and dispute resolutions
 - Eliminate easily forged paperwork
 - Preserve reputation and resources
 - Automate handling of non-performance
 - Preserve trading profits
- Reduce process costs
 - Eliminate reconciliation costs
 - Reduce KYC costs
 - Reduce compliance costs
- Benefit from greater market trust and liquidity
 - Greater counterparty accountability
 - Greater liquidity with greater trust (from networked KYC, selective transparency of performance history, etc.)

Blockchain is Already Being Adopted in Many Sectors

In the Financial sector, blockchain technology is already being used in bond transfers, remittances, fraud reduction, payment processes and trading platforms. Transactions are processed quickly, safely and with significantly greater security, saving banks millions in the process. Many other sectors have been trialing the technology or have already implemented some solutions, and the pace of change is growing.

Earlier in 2017, the first blockchain solution in commodity trade finance for US crude oil transactions was completed between Trafigura and Natixis⁶. The 'distributed ledger' platform allows major steps in a crude oil transaction to be digitized on the blockchain, ensuring improved transparency, enhanced security and optimized efficiency. By having the buyer, seller and their respective banks all on the same ledger, all parties can simultaneously view and share data on the status of a transaction. This is from the time a new trade is confirmed and validated to when the crude oil is inspected, and to its final delivery and cancellation of the letter of credit.

Key benefits of the Solution Include:

- Reduced cash cycle times
- Improved efficiency via lower overhead costs and fewer cost intermediaries
- Increased transaction visibility to help reduce the threat of tampering, fraud and cyber-crime
- The creation of transparent transactions by using shared processes and recordkeeping

This initiative is part of a broader effort to modernize trading in the global crude oil industry, which today is predominantly driven by manual, non-digital processes.

⁵Coindesk, 2016. ⁶Mercuria Chief: Blockchain Could Cut Oil Market Costs By 30%, ⁷Trafigura, First Ever Blockchain Solution for US Crude Oil Market

“Blockchain has increasing relevance to the oil and gas industry as a mechanism to reduce operating cost. Even more relevant, however, is its ability to transform the contracting process given its aptitude to provide a secure form of collaboration across multiple parties”.

Fay Shong, EY Oil & Gas Strategy Leader

The creation of smarter, blockchain-based contracts can streamline and automate large portions of the trading process. Smart contracts do also bring other niche advantages, such as the ability to execute a trade only once certain parameters have been met, for example a certain price threshold or only once a slot becomes available at a cargo-loading destination.

IBM also suggest that: “If import terminals received data from bills of lading earlier in the process, terminals could plan and execute more efficiently and without privacy concerns. Blockchain technology could make appropriate data visible in near real time – for example, the departure time and weight of containers – while making inaccessible the information about the owners and value of the cargo.”

PwC notes that such contracts “allow seamless tracking of ownership...coupled with the ability to verify data at both ends.” In the case of an oil cargo, for example, it would ensure that funds are transferred to the seller once the quantity and quality of that cargo has been confirmed.⁷

In the Shipping sector, Maersk recently announced that they’re working with EY and technology and insurance companies to roll out blockchain technology in order to streamline marine insurance for the shipping industry. “Blockchain’s potential to transform the insurance ecosystem has always been clear. What we have done is to move forward from potential to reality,” said EY global insurance lead Shaun Crawford⁸. Current processes are very cumbersome with multiple parties involved and blockchain has the potential to dramatically reduce time, cost and risk across the entire insurance value chain.

One of the biggest impacts that this technology will have on the oil industry is in how oil and oil futures are traded. Marco Dunand, CEO of Swiss trading giant Mercuria noted: “The energy industry will have to digitalize more and more in oil production, refining and shipping. So traders will also have to participate. It is a pre-archaic process. So introducing blockchain will allow to pass title from buyer to shipper to seller without going through massive paperwork of bills of lading.”

The oil and gas industry is heavily regulated and enforcers of the regulations may struggle to keep up, but using blockchain technology, all data is secured and easily accessible at any given time. This is a plus for the regulators as it will help keep Big Oil in check, but it is also a huge leap forward for the industry. This form of data sharing brings a new level of communication and transparency into global collaborations from which complicated lawsuits and lengthy legal processes often emerge.

Additionally, shareholders will be able to follow exactly what is happening in the industry, enabling them to make more educated decisions in how they invest their money. Even in the Government sector there is a fundamental shift in use of technology and vision for the future. With the “Dubai Blockchain Strategy,” the smart city aims to utilize blockchain tech in all government entities by the year 2020.

“We’re taking the responsibility here in Dubai to make sure that we shape this nascent technology and make it happen in a way that really suits [the] city’s needs,” said Dr Aisha bin Bishr, the director general of Smart Dubai Office. It is estimated that the city will save \$15-20 billion per year in banking transactions alone.⁹



⁷Innovoli, Working on the Chain Gang, ⁸CityAM, EY, Maersk and Microsoft are putting boats on the blockchain with marine insurance tech platform
⁹Oilprice.com, Blockchain Tech Could Disrupt The Oil Industry