Flash Analysis
Credit Risk Management

〉〉〉

Maritime Industries

Blockchain bonanza in merchant shipping

Every piece of freight shipped involves around 30 people and more than 200 interactions. Approximately 50% of container transport costs are incurred as a result of communication and bureaucracy. Most transactions still require a large number of paper documents, such as charter contracts, bills of lading, port documents or letters of credit. Blockchain applications have the potential to significantly reduce these inefficiencies.

Reducing inefficient process chains with blockchain technology

Despite the tremendous technological changes in past decades, shipping continues to be characterised by complex processes involving many people in areas related to booking, documentation, tracking & tracing and customs clearance. Can blockchain technology and the so-called smart contracts based on it help to make processes faster, safer and more efficient?

A blockchain is a secure, decentrally distributed database that manages a constantly growing list of records (blocks) that contain a timestamp and a link to the previous block. Since information is fixed decentrally, the provision of services can be transparently tracked, and flows of goods and payments mapped. The history of the information chain can also be traced at any time and data is more difficult to modify. Similar to a land register, it makes it possible for reliable transactions and legal contracts to be concluded.

Blockchain-based smart contracts

In addition to their use as public and locally available ledgers, smart contracts based on blockchain technology have the greatest potential to disrupt the shipping industry.

Smart contracts are automated contracts that come into force without human intervention when certain events occur. Computer programs automatically create and verify contractual conditions between two negotiating partners and provide support for contract negotiation and performance. Smart contracts are generally created using lines of code to permanently store complex "if-then-logic" in the form of rules on a blockchain. When these rules are met, processes and transactions are triggered.

For example, charter and freight contracts are integrated by the software as standardised modules so that they cannot be altered by the transaction parties. In a digital market, contracts are published by shipping companies or tonnage providers, and forwarders or charterers can negotiate freight or charter rates within the network blockchain. Smart contracts would not have been feasible before blockchain technology was introduced because contractual parties would have each accessed their own databases. The decentralised databases based on blockchain protocols, on the other hand, allow decentralised, non-modifiable decision-making systems to be established which (theoretically) make it possible to conclude smart contracts automatically. Both contractual parties can simultaneously monitor the creation of the draft contract and output without having to spend more time discussing issues with their contractual partner or through the involvement of an intermediary (broker). This has several advantages:

Advantages of using smart contracts in shipping

Fast processing and turnaround times
Real-time exchange of information: processes that previously spanned several weeks can be completed in minutes.
More transparency
 The elimination of intermediaries and the fact that all contractual parties have access to the relevant information mean that barriers to market entry are lowered while competitive intensity – all else being equal – increases.
Greater security and lower rates of error
There is no central point of attack for the encrypted data because the blockchain is comprised of a network of many computers. Since the stored information is permanent and cannot be altered, the risk of fraud and modification is significantly reduced. The increasing degree of automation in contract creation reduces the number of errors even more.
Cost savings
The bulk of trade finance costs are related to documentation expenses, procedural delays and discrepancies. These can be significantly reduced or completely eliminated. Substituting the costs of intermediaries with lower blockchain costs also has a positive impact.

In maritime industries, many pilot projects have been initiated in recent years to integrate the technology into existing business sectors and the regulatory framework. The following table provides a synoptic overview of the most important projects:

FOCUS		BLOCKCHAIN SOLUTION
Marine Transport International (MTI)	Integration of partners within the supply chain	Synchronous transfer of information to suppliers, shipping agents, loading points, customs, terminals with the Container Streams system
Maersk, IBM	Digital platform applications	TradeLens uses IBM blockchain as the basis for a digital supply chain that spans the complete supply chain. Real-time monitoring and access to shipping data/documents.
Everledger	Traceability and transparency	Blockchain application to track the transport of diamonds
APL/K&N/AB IBev/ Accenture and customs authority	Cost reduction and transparency	80% reduction in data input. Digital bill of lading saves several hundred million euros per year as customs inspection is easier.
MOL/NYK/K-Line and NTT Data	Digital platform applications	Shared trading platform based on blockchains increases the exchange of information and efficiency
Oceanos Foundation	Various areas in shipping	Trading platform for ship bookings
Wave bl ZIM	Integration of supply chain partners through digital bill of lading platform	Blockchain application to make Bill of Lading (BoL) data transparent and usable. Electronic bills of lading make it possible to process 2 transactions in 2 hours (previously: several weeks)
Port of Antwerp/Rotterdam/Singapore PSA, T-Mining, MSC, ABN Amro, PIL	Network created among supply chain partners Container handling	Blockchain application to release containers and exchange contractual information / trade transactions in the regional supply chain
Zeaborn Blockbox	Maritime security	VDR data captured in blockchain network via satellite and real-time, on-shore analysis.
Maersk, Microsoft, EY, Guardtime	Hull insurance	Insurwave enables fast and reliable claims reporting / customised, individual policies

Industry-specific and regulatory challenges inhibit scaling

It becomes clear that, thanks to (cloud-based) blockchain technology, data is permanently stored and made available, so that security and efficiency within the supply chain can be increased for all those involved.

Capitalising on the efficiency potentials will depend above all on as many supply chain actors as possible being willing to share and exchange data automatically. Particularly in highly standardised transport markets, such as container transport, some players are not interested in full transparency, so as to achieve price differentiation.

In addition, the contractual conditions on the freight, charter and S&P markets are characterised by special features such as ship mortgage and registration, regulations related to lay times (demurrage costs), INCO trade clauses, etc., which can lead to problems that cannot be solved by standardised solutions. Another challenge is that ships usually operate in different legal zones.
This is very difficult to map in a blockchain system that does not allow any intervention. These special features would have to be taken into account in

the blockchain network in order to achieve the required scalability. It is therefore necessary for governments, regulators and associations, etc. to participate in the joint development of a market standard (with regard to platforms and codes) and a legal or regulatory framework before global adaptation and thus the necessary scalability can be achieved.