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# Blockchain, Digital Transformation and the Law: What Can We Learn from the Recent Deals?

Recent years have seen a surge in the use of blockchain technologies, not least because of the increased use of cryptocurrencies such as Bitcoin which rely on it. While some of the generated interest can be dismissed as hype, there is little doubt that blockchain is a technology with the potential to revolutionise certain areas of law. A careful reader following the trends would have noticed that Maersk, the Danish business conglomerate, was involved with no less than three deals revolving, in one way or another, around blockchain technology[1] Such news should intrigue the reader since adoption of experimental methods or newest IT technologies does not normally characterise the inert maritime and transport industries. We will in this short piece give an overview of the relevance of blockchain and briefly look at three different deals which Maersk concluded around the technology. We will then give an outline of potential legal problems which these and similar deals might bring. Our preliminary conclusion is that blockchain technology - in some instances at least - has the potential to disrupt the role law traditionally plays in negotiating and executing international contracts.

## Introduction: Blockchain and its Relevance

While there is no common definition of blockchain,[2] the phenomenon can be tentatively defined as a data structure or a list of transactions, gathered in blocks and cryptographically secured (linked together) on a chain. Such a technology should be tamper-resistant and should be capable of producing immutable records of transactions. It is precisely this last feature that sits at the centre of blockchain's usability and importance. Another way of defining blockchains is as shared distributed ledgers, where each transaction and every

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[1]   See, for example https://www.maersk.com/press/press-release-archive/maersk-and-ibm-to-form-joint-venture

[2]   On problems with the definition in the tech world, see https://www.theverge.com/2018/3/7/17091766/blockchain-bitcoin-ethereum-cryptocurrency-meaning. See also https://papers.ssrn.com/sol3/Papers.cfm?abstract_id=2940335

element of a transaction is recorded and encrypted so that it is both easy to verify the transactions and impossible to make changes which do not fit the rules.

Blockchain so defined needs to be distinguished from clouds, distributed ledgers, cryptocurrencies and smart contracts, respectively.

Clouds in the IT world are simply data which have been stored in pools. These are usually physical servers in multiple locations and managed by a hosting company. While blockchains do typically rely on a cloud solution of some kind, clouds, in and of themselves have little to do with blockchains. It is also true that clouds and blockchains do perform parts of the spectrum of tasks that a company may need in a similar manner. A transport company may, thus, use a cloud solution to optimise tracking or it may use a blockchain solution, depending on which serves it better.

Distributed ledgers are replicated, shared and synchronised pools of digital data, spread across different sites.[3] In simple terms, distributed ledgers are databases spread across different computing devices where the technology ensures that identical copies are saved on each device and updated accordingly. As a rule, there is no central authority updating the ledger. While blockchains are, indeed, distributed ledgers, not all distributed ledgers are blockchains. Blockchains, as the name implies, are organised into blocks of data. Unlike ledgers, which can be modified more thoroughly, blockchains are append-only.

Cyrptocurrencies, although probably the most famous examples of blockchain, are only one example in which the technology can be used. They are nothing more than currencies or payment methods that rely on the technology.

Smart contracts, on the other hand, are computerised protocols able to verify, enforce or execute contractual terms. In simple terms, smart contracts are protocols that are set to automatically trigger an action from the contractual relationship once certain conditions have been fulfilled. For example, a blockchain can be set to release a document or execute a payment when the technology onboard a shipping container reports a certain condition, status or location. While it is possible to envisage smart contracts operating with the aid of other technologies, their most promising and interesting use are connected to blockchain.

It will be clearly observed that the main feature of blockchain, and partially of some of the other phenomena it is confused with, is trust. Since transactions are recorded immutably and upended to an encrypted chain, the process of verification is minimised or eliminated which, in turn, reduces or removes the need for all sorts of middlemen usually required in shipping.

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[3]    See https://towardsdatascience.com/the-difference-between-blockchains-distributed-ledger-technology-42715a0fa92

There should be little surprise that blockchains have caught the attention of the legal world. In their present form, eliminating the problem of trust, the technology has the capacity to give answer to a number of legal problems. They have the capacity to verify identity, transfer funds, record property transactions, certify the authenticity and contents of a transaction, automate contractual relations as well as trace goods and services and the way they are performed. While none of this suggests the elimination of the legal profession, it offers promise of significant changes.

## Maersk and Blockchain

In 2017 details of three contractual arrangements involving the Danish shipping conglomerate Maersk emerged. In April 2017, Microsoft and Maersk announced a deal involving Microsoft's Cloud platform Azure.[4] In September 2017, Microsoft and Maersk revealed further details on a blockchain platform to be used in marine insurance.[5] Finally, in January 2017, IBM and Maersk announced details of a deal involving the creation of a joint venture providing blockchain services in the shipping sector.[6] The three deals are instructive in providing examples of blockchain use in the shipping industry and an indication of its potential use elsewhere.

In the **Mærsk - Microsoft deal**, the parties essentially agree that Maersk will use Microsoft's Azure Cloud solution and its Internet of Things (IoT) for digital transformations. The latter can be defined simply but accurately as automating manual processes through digital means. Cloud deals in general involve renting capacity on huge pools of computers for business customers so that these can avoid investing in their own capacity. The deal in question would oblige Maersk to use MS Azure platform when designing its software and managing its supply chain. The IoT solution would help Maersk connect, track and manage containers through such solutions. This deal is, therefore, inherently not a blockchain deal, although it may (and ineed does, see below) have blockchain uses.

The **Maersk - Microsoft- EY** deal on marine insurance, unlike the previous one, is blockchain-based. The purpose of the deal is to simplify data collection, to automate updates, to cut the cost of non-material declarations and automate real-time claim resolution. The agreement applies to marine insurance and would simply ensure that all parties access the same database. This, in turn, would make the process of compliance with marine insurance

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4  http://fortune.com/2017/04/26/microsoft-azure-maersk/

5  https://www.reuters.com/article/us-blockchain-insurance-marine/ey-teams-up-with-maersk-microsoft-on-blockchain-based-marine-insurance-idUSKCN1BG3B6

6  https://www.ibm.com/blogs/blockchain/2018/01/digitizing-global-trade-maersk-ibm/

significantly easier. It was indicated, at the time of signing, that the deal has the potential to be extended to additional line of business.

The **Maersk- IBM** deal is an agreement aimed at helping manage the cargo system through blockchain technology. A new New York-based company, 51% owned by Maersk, would be formed to help others track freight and replace paperwork through digital ledgers. This company, which would have advantage over smaller startups in providing blockchain services to the maritime industry, would help provide a single view of all transactions.

While the three deals are somewhat different, the general conclusion which can be drawn is that a new technological opportunity opens up significant opportunities for automation and simplification.

## Legal Problems of Blockchain Use

While blockchain technology is in early stages, three separate groups of legal problems can already be identified.

First, no universal **definition** exists and there is widespread disagreement about almost everything. Part of the confusion in general public comes from the fact that cryptocurrencies are only one use of blockchain as a technology (as are smart contracts), while the public equates them with blockchain. Further complications come from the fact that blockchains need not always be recorded publicly nor be decentralised. The lack of definition, while not necessarily a problem in itself, points to deeper difficulties with the scope of regulation that would eventually need to be imposed (and which would require precision).

The second group of difficulties arise from the scope of **regulatory oversight** that can be imposed on blockchains. In blockchain transactions it is exceptionally difficult to find who the parties to transactions really are. It is equally difficult to order enforcement since transactions auto-execute on the blockchain. While it is not impossible to theoretically envisage a situation whereby a court order is enforced by simply appending a new transaction to the chain, nobody but the authorised parties are capable of this. On a positive note, since blockchains are designed to minimise intermediation, breaches are also less likely (although not impossible).

A particularly difficult group of issues arises from application of **privacy** laws. After the adoption of the new, stricter privacy rules in the EU and their coming into force in May 2018,[7] it became increasingly clear that blockchain architecture may not be GDPR-compliant. A starting point would be that cryptographically modified data stored on a ledger may be

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[7] https://www.eugdpr.org

subject to GDPR if not anonymised. The main problem is that it is difficult (and sometimes impossible) to determine who the addressees of GDPR obligations are. The problem is not only that there are multiple controllers and processors but also that it is not immediately transparent who they are nor whether all or only some are covered. Further to that, some obligations the controllers and processors are subject to would be difficult to enforce on the blockchain.

The question concerning whether blockchains process personal data (and, therefore, whether they are subject to GDPR) can be answered relatively easy: public keys are likely to be personal data since they can easily be tracked to an individual. Further to that, Article 29 Working Group was of the opinion that hashes *are* personal data.[8] The right to be forgotten, introduced in CJEU case-law and confirmed in GDPR would also come into conflict as erasure would be impossible, making compliance difficult. Smart contracts would have a way out of this since they would have access-rights built in, effectively reaching the same goal, at least in some situations.

Blockchain governance model seems to be crucial for determining the extent to which GDPR would be a problem. Most current blockchains would almost certainly not be compliant (and this is true of majority of current AI solutions). On the other hand, blockchain technologies can serve to promote GDPR or fulfil its aims. The most obvious example of this is the fact that blockchain can be used to promote GDPR privacy-by-design and privacy-by-default principles.

Finally, **resolving disputes** with the aid of blockchain technologies or arising out of the use of such technology present each in their own right a set of problems. These can, tentatively, be classified as problems concerning cost, duration, jurisdiction and the applicable law and enforcement. In terms of the *use* of blockchain technology to resolve or help resolve disputes, it can be stated that a) the technology may have some uses in speeding up the process of taking of evidence but that any such uses are in their infancy and b) that no clear blockchain-based solutions present themselves at present. Dispute resolution can be built into smart contracts as a separate layer which connects users with 'jurors' in an online dispute mechanism. Such uses are probably not suited to maritime disputes. In terms of blockchain's capacity to **generate disputes**, it can be said that some of the problems (but not all) can be eliminated by blockchain's capacity to auto-execute transactions when conditions have been met, thus eliminating the problems of trust and enforcement. At the same time, blockchain will present new problems hitherto unencountered by courts.

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[8]     article 29 data protection working party - European Commission

# Concluding Remarks

In summary, Maersk's desire to engage with blockchain technology in several ways outlined above signifies a move from a traditionally tech-inert industry into new spheres. If nothing else, this testifies to technology's potential to revolutionise some aspects of maritime transport. Particularly interesting here is the relatively targeted and narrow focus of the exercise in two of the examples (a blockchain-based maritime insurance and blockchain-based joint venture for shipping). This is a sign that the industry is taking a cautious and practical approach. Blockchain is a technology with some capacity to disrupt but also with lots of unknowns. History teaches us that it is probably best not to regulate such technologies before its operation and implications are fully transparent.