UK P&I CLUB

Legal Briefing

Sharing the Club's legal expertise and experience

Contracts are getting smarter!

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Sharing expertise

This briefing is one of a continuing series that aims to share the Club's legal expertise with our Members. A significant proportion of the expertise in the Managers' offices around the world consists of lawyers who can advise Members on general P&I related, legal, contractual and documentary issues. These lawyers participate in a virtual team, writing about topical issues under the leadership of our Legal Director, Chao Wu.

If you have any enquiries regarding the issues covered in this briefing, please contact the team via Chao Wu (chao.wu@thomasmiller.com or +44 20 7204 2157) or Jacqueline (jacqueline.tan@thomasmiller.com or +44 20 7204 2118) and we will be pleased to respond to your query. The team also welcomes suggestions from Members for P&I related legal topics and problems that would benefit from one of these briefings.

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Contracts are getting smarter!

The digital revolution gathers momentum, and almost every day there are new technological developments. This briefing looks at one of these developments; blockchain contracts, also known as 'smart contracts', the benefits as well as the legal issues that may arise under these contracts.

1. BLOCKCHAIN: THE BASICS

Blockchain is a new buzzword in the shipping industry that is increasingly difficult to get away from. Some Members may, however, still be wondering what blockchain technology is, how it works and why it is often also referred to as 'distributed ledger technology'. It will not be possible to provide a full explanation of how the blockchain technology works within the confines of this article. We nevertheless hope to provide sufficient information to enable Members to gain a general understanding of blockchain technology and how it is used to create smart contracts.

Blockchain is essentially an online communication protocol allowing users who are interdependent to participate in a transaction, without any one user having more control over the transaction than the other users. There is no one participant who is the central focal point for driving or controlling the transaction. All parties to the transaction have access to the same information and no one party can attempt to amend or vary the transaction unilaterally without acquiring the permission of the others. The whole process is guarded by some very sophisticated cryptography and the exact copies of the transaction's ledger are distributed amongst the participants. In order to disrupt the operation, a hacker would need to access all the copies and make changes to them. As this would be extremely difficult, it is virtually impossible for the transaction to be manipulated by an external party.

The transaction mentioned above is not necessarily limited to moving monetary values, like in a financial transaction. It could also relate to the moving of information, which, of course, might be followed or preceded by a financial transaction. In a purely financial context, the use of blockchain is closer to crypto currencies, an example of which is the now well-known Bitcoin.

Blockchain and contracts

Due to the transactional nature of blockchain, this technology could be harnessed in any scenario where multiple parties have to exchange a plethora of information in order to achieve an overarching goal, for example, the shipping of goods. For goods to be moved from one continent to another, numerous parties have to reach agreements by entering into contracts which will govern the various steps of this process. Some of these agreements, such as sales contracts, will provide an overarching roadmap for the desired outcome. Other contracts such as charter parties and bills of lading will then have to be entered into to facilitate this performance.

All of these contracts will have numerous terms and conditions, some of which will work as triggers for information to be exchanged and for physical performance to be carried out. Traditionally, these actions would have involved several manual steps, for example, a party having to confirm that cargo quality certificates have been issued and sent to the relevant parties, and that the certificates meet the cargo specifications in a cargo charter party and the sales contract. Each step will have information junctions with potential for creating bottlenecks that cause delays and increase costs. Furthermore, the information can be altered, not delivered or delivered from a wrong source, or simply be fraudulent. In many cases, it may also be unclear which party has the information and why the information has not been disseminated to other parties as per the agreed terms and conditions.

This is where the 'smartness' of the blockchain comes into play. Principally, blockchain can enable a conversion of the contractual terms and conditions into

self-executable computer software which automatically implements and polices the terms and conditions between the parties to the contract. Blockchain contracts are capable of mimicking and following the logic of regular contractual clauses. The more advanced this technology gets, the more automation that can be introduced into the processes. Currently, smart contracts are fundamentally an automation of business logic embedded in the natural language (written) contract. As the technology progresses, the prospects are that natural language contracts might even be done away with completely and be replaced with a contract made entirely of code. Hence, when considering legal issues surrounding smart contracts it is important to bear in mind that their potential, scope and complexity will increase as the technology advances. The higher the degree of automation in a contract, the larger the potential benefits that contract can bring.

2. THE BENEFITS OF SMART CONTRACTS: IS IT WORTH IT?

The answer is yes. The potential benefits from using smart contracts in shipping are substantial. Smart contracts can have a transformative effect on the maritime industry.

Time

Automation of contracts can hugely reduce documentary and information processing times. This would be especially visible in sections of the industry, such as the container trade, where numerous documents and processes are needed per cargo unit. Traditional email exchanges would be replaced by automated and pre-coded information dissemination. Documents could be automatically generated and delivered to the parties who are expecting to receive them as part of the contractual arrangements under a sales or a charter party contract. This would shorten waiting times for cargo receipt and for completion of shipping procedures from days to literally minutes.

Accuracy

Computerisation of contract execution would increase efficiency by reducing risks of errors inherent in manual processes. In shipping it is not uncommon for forms still to be completed by hand. These forms may contain errors or

incomprehensible corrections, all of which may cause delays or lead to unexpected liabilities.

Security

As a result of digitalisation and high levels of crypto security, information on blockchain systems cannot be tampered with by third parties. Blockchain technology may therefore be the shipping market's answer to documentary fraud, estimated to cost the industry hundreds of millions of dollars a year.

Since blockchain information cannot be manipulated, instances of corruption in the form of demands for 'grease payments' may also decrease. This is because no party will be able to manipulate the bureaucracy of the shipping process to its advantage. The World Economic Forum estimates that corruption can increase the cost of doing business internationally by 10% or more.[1]

Transparency

One of the main features of blockchain technology is its transparency. All parties to a transaction can see the transaction's records and current status. Such immediate visibility can improve contractual performance. There will be heightened accountability of parties for their inefficiencies and consequentially, an easier and quicker apportionment of liability. This systemic transparency can also assist in overcoming the problem of lack of trust in international sales and shipping, particularly when parties are contracting for the first time.

Disintermediation

Due to the complexity of the shipping process, parties often rely on intermediaries to perform certain tasks such as information gathering and completion of paper documentation. Blockchain would enable the parties to create more direct links between themselves without incurring expenditure on middleman services. In the future, disintermediation could potentially lead to decentralised brokerage systems where, for example, charterers and shipowners could easily contract directly having a transparent overview of capacities and delivery timings.

Market

The predicted overall impact of blockchain and smart contracts on trade is significant. The World Economic Forum estimates that 10% of GDP will be stored on blockchain by 2027[2]. The market is predicted to expand by 5%. According to TradeWinds, the yearly costs associated with documents relating to a trade involving goods worth US$ 4 billion is US$ 800 million[3]. This means that a substantial proportion of the market value is lost in documentary inefficiencies and fraud. Blockchain and smart contracts have the potential to reduce these losses.

As disintermediation progresses and the market becomes less dense, barriers to entry might be reduced, allowing market competition to increase. In a more open market, securing finance can also get easier.

[1] https://www.oecd.org/cleangovbiz/49693613.pdf

Which marine contracts stand to benefit first?

The first contracts to benefit from blockchain technologies are likely to be main underlying agreements like sales or trade contracts, charter parties and bills of lading. This is because in the shipping industry, these are the most valuable contracts.

Already there are reports of companies working on 'proof of concept' solutions, replacing the traditional paper-based bill of lading with a smart contract. These companies include some of the leading container lines which have been investing in this technology, as well as some of the current providers of electronic bills of lading.

Another area of possible early implementation is in commodities trading. One of the biggest soft commodities trading houses announced this year that for the first time ever they have sold and shipped a cargo of soybeans from the US to China using blockchain. The trade involved entering into a digitalised trading contract, which included issuing an electronic letter of credit and agricultural certificates[4]. The experiment was described as "cost saving, beyond what was expected". This is particularly important as bulk trade is sometimes described as a high volume, low margin trade. A similar, successful trade has also been completed in the oil market.

There is also increasing discussion for charter party financial arrangements to be executed via blockchain contracts. This would make perfect sense as the parties to these agreements are obliged to settle numerous financial transactions such as demurrage or hire on a regular basis and certainty of execution of these transactions is crucial.

Other types of agreements for possible conversion into smart contracts include terminal or stevedoring contracts and even marine insurance contracts. The prospects are that any related contract would then also be executable via blockchain.

3. SMART CONTRACTS: LEGAL ISSUES AND RISKS

Jurisdiction

Due to the cross jurisdictional nature of the majority of blockchain contracts, basic contractual concepts such as 'ownership' or 'title to goods' can put hurdles in the way of their execution. This is because these concepts can be interpreted and construed differently in different jurisdictions. Identifying which legal rules apply to which stage of a contractual performance can also be difficult in a distributed environment where there is no one focal geographical point of reference, such as the bank's location. In theory, it would be possible to identify an applicable jurisdiction for each stage of a contract by looking at where that stage of the contract's performance is executed. What that would mean, however, is that disputes arising under the smart contract would be subject to different laws and different jurisdictions.

The above problem can possibly be addressed by the incorporation of an exclusive law and jurisdiction clause[5]. However, even then there would be no certainty that claims would not be brought in contravention of such a clause. This can come about because the agreed jurisdiction does not recognise contracts involving blockchain or simply does not recognise exclusive jurisdiction clauses in contracts. While the latter problem is not unusual in trades under traditional shipping contracts, a non-recognition of blockchain contracts in a particular jurisdiction can exacerbate the problem and may provide greater scope for 'forum shopping'.

Contract formation

The recognition of blockchain contracts by key jurisdictions will be crucial to securing parties' rights of enforcement. If a contract, as currently understood in a legal sense, is not formed, the blockchain code which purports to represent it may not be enforceable. Parties involved in the transaction may then be left exposed to unquantifiable financial and legal risks.

Electronic means for transmitting and exchanging information have been available for some time. Most jurisdictions therefore, no longer challenge the possibility for contracts to be created electronically. Hence, a smart contract instigated on blockchain by direct parties to it should not present great legal difficulties in terms of its formation. Jurisdictions where contracts are required to be signed in order for them to be valid, have also mostly developed necessary legislations for the recognition of digital signatures. These laws can presumably be applied to smart contracts. It is also suggested that countries which have separate laws dealing specifically with electronic contracts and other contracts can simply apply widening interpretations of their existing laws to cover new concepts and legal issues introduced by smart contracts.

[2] http://www3.weforum.org/docs/WEF_GAC15_Technological_Tipping_Points_report_2015.pdf
[3] http://www.wfw.com/wp-content/uploads/2018/03/WFWBriefing-Blockchain-and-Shipping.pdf
[4] https://uk.reuters.com/article/grains-blockchain/u-s-soy-cargo-to-china-traded-using-blockchain-idUKL8N1PG0VJ
[5] https://www.dlapiper.com/en/uk/insights/publications/2017/06/blockchain-background-challenges-legal-issues/

Certainty of contract

However, for a binding contract to exist, there has to be certainty as to what its terms and conditions are. The significance of this issue may depend on how far on the automation or evolution scale a particular smart contract is. At one extreme end, a smart contract could be entirely embedded in code; at the other end there could be a typical natural language contract with, for example, only the payment aspect automated by blockchain. 'Code only' smart contracts, without accompaniment of terms expressed or implied in natural language, may fail the requirement of certainty and not be recognised. As predicted by some law firms, certainty of terms could be one of the biggest hurdles for smart contracts to overcome in many jurisdictions[6].

'Follow on' contracts

The issue of contractual formation gets more complicated if smart contracts are utilised in such a way that the performance of the initial smart contract will automatically give rise to or generate further contracts. These further contracts are called 'follow on' contracts. It is predicted that many jurisdictions may not deem such 'follow on' contracts to be legally binding. One of the reasons would be that most countries require that a contract, to be valid, must be entered into by a person (legal or private) who has requisite legal capacity to do so. The computer code is unlikely to have this status in law. Another hurdle to overcome is certainty of the accepting party. If the 'follow on' contract is executed automatically, can such certainty be achieved[7]? Another requirement, especially under English Common law, is the need to demonstrate that a party intended to create a legal relationship. In a commercial context, however, this threshold may not be too difficult to achieve.

Commercial certainty

Commercial contracts like charter parties contain clauses which can be described as passive or static in the sense that they regulate the environment of the contractual performance. These clauses are to be contrasted with clauses known as active clauses which require certain actions to be taken, for example, for

payments to be made. It is these active clauses which are responsible for the actual performance of the agreement. The passive clauses do not normally become relevant unless a set of external circumstances engages them. For example, if there is a breach of contract, the jurisdiction clause then suddenly becomes very significant. We nevertheless need to examine whether it is possible to include these static components of a contract in a self-executable code. Is it, for example, possible to represent in a self-executable code an exclusive law and jurisdiction clause? Would the smart contract code be capable of recognising subjective concepts requiring a degree of interpretation and judgement to be applied on a case by case basis, such as the concept of force majeure[8]? This issue points towards the question of how a smart contract would interact with real world events, which may vary its performance or completely curtail its existence. If the contractual performance is no longer possible due to frustration, how would the smart contract react? The code would have to somehow know that the event took place and that it met the legal criteria for frustration.

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In shipping, contractual terms and conditions are often unique and specialised. Smart contracts, to fully realise their potential, would have to cope with concepts like cargo lien, laytime, demurrage and more importantly, contractual exceptions like off hire and weather working days, which heavily depend on the existence of certain external factual conditions.

Another aspect which will somehow also need to be incorporated into smart contracts is commercial flexibility. Parties in the shipping world regularly resolve their differences by adopting a commercial approach, deviating from the strict provisions in their contracts. Smart contracts would need to have the ability configured in them to allow parties to vary their initial agreement.

These sorts of questions are more likely to arise in the case of a fully evolved smart contract where there is no natural language agreement in place.

Enforcement

As mentioned previously, one of the key benefits of smart contracts is the introduction of automation into contractual performance. However, parties may not feel comfortable with disputes being resolved automatically by the inclusion of a code which, when certain conditions are satisfied, would mechanically apply embedded settlement instructions. This would especially be the case in a blockchain distributed environment where there is no central overseeing authority. In such a case, parties would then resort to the traditional courts for the resolution of their disputes. This would open up the issues discussed above such as "Which is the relevant court?", "Is there a binding contract?", "Who is the defendant?", "What are the terms?", etc.

Liability and responsibility

Another consideration to be borne in mind is that users of smart contracts are unlikely to be responsible for delivering the blockchain protocol themselves. Hence, there are certain risks which will be inherent in the quality of the codes used in the smart contract. It remains unclear what responsibility the vendors of blockchain solutions would be prepared to accept in relation to such risks. Problems could easily arise in a scenario where an imperfect contract code allows for or introduces loopholes, thus obfuscating the purpose of the agreement. In this type of scenario, it may not be easy to determine liability. After all, the parties have agreed to work within the confines of the smart contract code. For example, liability could be placed either on the party which exploited the loophole or the vendor who created the code. This could be less of a problem in the case of a smart contract, implemented over a private blockchain, where there is a degree of control over the blockchain platform itself.

The risks involved in smart contract coding on a public blockchain platform painfully came to light in 2006 for all to see. One of the so called Decentralised

[6] http://www.nortonrosefulbright.com/files/r3-and-norton-rose-fulbright-white-paper-full-report-144581.pdf
[7] http://www.nortonrosefulbright.com/files/r3-and-norton-rose-fulbright-white-paper-full-report-144581.pdf
[8] http://www.osborneclarke.com/insights/an-introduction-to-blockchain-the-key-legal-issues/

Autonomous Organisations (DAOs) launched its service and shortly thereafter had its code exploited to sap US$ 50 million in cryptocurrency from other parties. The status of a DAO as an entity is uncertain as it is a fully automated organisation which runs a service via smart contracts. No human input is required as the organisation is fully distributed. It owns no assets and has no management i.e. it is self-auto managing. In the 2006 example, the service offered via the DAO was intended for venture capitalists to raise finance using cryptocurrency. Fortunately, the exploitation incident could be and was reversed via a forceful intervention into the public blockchain on which it ran (Ethereum). This action was, however, met with wide criticism as it essentially undermined the principles of public blockchain.

The future

Some law firms predict that the evolution of smart contracts will start with a natural language contract with encoded payment mechanism, implementation of which we are beginning to see, all the way to the point where the entire contract is just code. Before that final stage is reached, however, we are bound to see some intermediary stages where the natural contract still exists, but its payment and performance mechanisms are encoded, and then perhaps later, where the traditional contract still exists but it is fully mirrored in the code.

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The last stage, where the contract is code, may also require fusion with other technologies like Artificial Intelligence, Internet of Things and Robotics to overcome some of the legal and practical issues touched upon in this article. Of course, the use of these technologies will introduce additional layers of legal complications.

As the smart contracts technology is still in its infancy, we are yet to see how legal issues surrounding it will be resolved. It is nevertheless easy to predict that smart contracts will gradually become pervasive in the wider maritime industry and in commerce generally. They offer a practical solution to issues which have negatively impacted trade for years, thus offering a potential boost to the world's economy. Early smart contract adopters probably stand to benefit the most from this technology but are also most likely to become involved in some of the first legal cases considering smart contracts. In time, law and regulations will undoubtedly develop to accommodate this impending commercial revolution and the uncertainties surrounding smart contracts will then gradually diminish.