LAW SOCIETY CPD PRESENTATION ON SMART CONTRACTS

LAW SOCIETY ROOMS 26 APRIL 2023

I expect that after listening to Dr Allen, everyone in this room appreciates that the emergence of smart contracts has the potential to revolutionize the legal system as we know it.

They have the potential to do away with paper contracts, and complicated enforcement mechanisms.

Dr Allen has talked about the front end of these contracts but what is at the back end? In simple terms, these are self-executing digital contracts that automatically enforce the terms and conditions agreed upon by the parties. They are powered by Blockchain and Ethereum technology, which ensures that they are secure, transparent, and tamper-proof.

Simply put Blockchain is a decentralized and distributed ledger technology that stores data in a secure and tamper-proof way. It is a network of computer nodes that communicate with each other to validate and record transactions. The transactions are grouped into blocks, and each block is cryptographically linked to the previous block, forming a chain of blocks - hence the name "Blockchain."

Ethereum is a blockchain-based decentralized platform that enables the creation and deployment of smart contracts and decentralized applications or dApps. It uses a blockchain to store data, and its native cryptocurrency is Ether or ETH.

Ethereum blockchain operates similarly to Bitcoin blockchain. However, it has additional features that make it more versatile and flexible. The primary difference between the two is that Ethereum has a built-in programming language called Solidity, which allows developers to create smart contracts.

So, smart contracts are self-executing agreements that run on the blockchain. They are written in Solidity and are stored on the Ethereum blockchain. Smart contracts can be programmed to execute automatically when certain conditions are met, making them useful for a wide range of applications, including finance, supply chain management, and identity verification.

In summary then, blockchain is a decentralized and distributed ledger technology that stores data in a secure and tamper-proof way, while Ethereum is a blockchain-based decentralized platform that enables the creation and deployment of smart contracts and dApps.

The emergence of smart contracts in the legal system is a game-changer. Here are a few reasons why:

First, smart contracts can streamline the contract negotiation process. Negotiating a traditional contract can be a time-consuming and expensive process. With smart contracts, the terms and conditions are encoded in the software, making much negotiation unnecessary.

Secondly, smart contracts can ensure that the terms of the contract are automatically enforced. Traditional contracts rely on intermediaries such as lawyers, judges, and arbitrators to enforce the terms of the contract. With smart contracts, the code itself can enforce the contract.

Thirdly, smart contracts can increase trust between parties. Traditional contracts can be opaque, with the terms and conditions hidden away in legal jargon. Smart contracts, on the other hand, are transparent and can be easily audited by all parties involved. This also reduces the risk of fraud.

Finally, smart contracts can help to reduce costs associated with contract enforcement. Traditional contracts can be costly to enforce, with legal fees and other expenses piling up. With smart contracts, the costs associated with contract enforcement can be significantly reduced.

Smart contracts can also include dispute resolution mechanisms that can be programmed to resolve disputes automatically without the need for intermediaries. For example, if a dispute arises over the delivery of goods, the smart contract can be programmed to release payment to the seller only when the buyer confirms that the goods have been received. If the buyer fails to confirm the delivery of the goods, the smart contract can automatically initiate a dispute resolution process, which can involve a neutral third party or an arbitrator.

Moreover, smart contracts can be programmed to allow for a more flexible dispute resolution process. Parties can agree to use different ADR mechanisms, such as mediation, arbitration, or negotiation. Smart contracts can also include a range of conditions that must be met before the dispute resolution process begins. For instance, parties can agree to a cooling-off period or to require a certain number of attempts to resolve the dispute through negotiation or mediation before arbitration.

As smart contracts become more widely adopted, we can expect to see an increase in their use for ADR.

Aragon Court and Kleros are two decentralized dispute resolution platforms built on blockchain technology. These platforms allow for the resolution of disputes in a transparent, decentralized, and cost-effective manner, without the need for traditional court systems.

Aragon Court is a decentralized court system built on the Ethereum blockchain. Aragon Court utilizes a unique dispute resolution mechanism known as the "Schelling game". In this game, jurors are incentivized to vote honestly by staking tokens. If a juror votes in agreement with the final verdict, they receive a portion of the stake. However, if a juror votes against the final verdict, they lose their stake. This incentivizes jurors to vote honestly and discourages them from voting based on personal biases.

Kleros, is a decentralized arbitration platform that utilizes a similar mechanism for dispute resolution. Kleros allows parties to submit disputes to a group of jurors, who are selected randomly from a pool of staked tokens. The jurors review the evidence and make a decision, which is then enforced through smart contracts. Jurors who make a correct decision are

rewarded with a portion of the stake, while those who make an incorrect decision lose their stake.

Both Aragon Court and Kleros aim to provide a transparent and efficient way for resolving disputes. They are particularly well-suited for resolving disputes within decentralized organizations and other blockchain-based platforms, where traditional legal systems may not be applicable. These platforms offer several benefits over traditional legal systems, including transparency, efficiency, and lower costs.

The age has been reached when consumers of dispute resolution will be able to opt for a system based on simplicity, efficiency and economy, and in my view they may well be prepared to do so, even at the cost of the loss of intimate involvement in a human managed process.

The creators of Kleros, Lesaege and Ast in their 2018 whitepaper, claim that Kleros "produces true decisions in a secure and inexpensive way".

They give the following example of how the system works.

"Alice is an entrepreneur based in France. She hires Bob, a programmer from Guatemala, on a peer to peer freelancing platform to build a new website for her company. After they agree on a price, terms and conditions, Bob gets to work. A couple of weeks later, he delivers the product. But Alice is not satisfied. She argues that the quality of Bob's work is considerably lower than expected. Bob replies that he did exactly what was in the agreement. Alice is frustrated. She cannot hire a lawyer for a claim of just a couple hundred dollars with someone who is halfway around the world.

After Bob stops answering her emails, Alice, as she is entitled to under her smart contract, taps a button that says "Send to Kleros" and fills out a simple form explaining her claim.

Thousands of miles away, in Nairobi, a software developer. In his "dead time" on the bus commuting to his job, checks the Kleros website to find some arbitration work. He makes a couple thousand dollars a year on the side of his primary job by serving as a juror in software development disputes between freelancers and their clients. He usually rules on cases in the Website Quality sub-court. This court requires skills in html, JavaScript and web design to solve disputes between freelancers and their customers. He deposits 2 pinakion, the token used by Kleros to select jurors for disputes (named after the bronze plaque that each Athenian citizen used as a means of identification). The more tokens he deposits, the more likely it is that he will be selected as juror.

About an hour later, an email hits his inbox: "You have been selected as a juror on a website quality dispute. Download the evidence here. You have three days to submit your decision". Similar emails are received a programmer from Peru and one from Romania, who had also activated their pinakion for the dispute.

They were selected randomly from a pool of almost 3,000 candidates. They will never know each other, but they will collaborate to settle the dispute between Alice and Bob.

Two days later, after the three jurors have voted, Alice and Bob receive an email: "The jury has ruled for Alice. The website was not delivered in accordance to the terms and conditions agreed by the parties. The smart contract has transferred the money to Alice". Jurors are rewarded for their work and the case is closed.

This token system is designed to prevent a Sybil attack (a type of attack on a computer network service in which an attacker subverts the service's reputation system by creating a large number of pseudonymous identities and uses them to gain a disproportionately large influence), and is also used to provide jurors with the incentive to vote honestly. By making "incoherent" decisions (that is inconsistent with the jury decision, jurors pay part of the amount of their token deposit to "coherent" jurors.

Another component of the incentive system utilised by Kleros to ensure "coherent" voting is also based on Thomas Schelling's game theory concept which, a bit like chess, relies on a person's expectation of what the other expects him or her to be expected to do.

There is a system of appeals, with each new appeal jury comprising twice the number of previous dispute jurors. The jurors on the previous dispute or appeal are not paid but the new jurors are, with the result that arbitration fees increase exponentially, providing a brake on the process.

The options for juror decisions and the subsequent behaviour of the smart contract are specified by the contract itself. In the example case that might be, "Pay Bob" or "Reimburse Alice" or "Give Bob one extra week to complete the website".

Writing in 2018, Ast pointed out that in the last decade, we have witnessed how collective intelligence can be leveraged to produce an encyclopedia like Wikipedia, a transport system like Uber, a restaurant rating system like Yelp!, and a hotel system like Airbnb.

In Ast's view, a better justice system may not come from further streamlining existing processes but from fundamentally rethinking them from a first principles perspective. Hence the title of my chapter in the book being launched today, which I dubbed, after Henry Ford's quip, *Faster Horses or a New Car.*

Ast argues that Kleros does not seek to compete with governments or traditional arbitration systems, but to provide a new method that will leverage the wisdom of the crowd to resolve a large number of disputes in the global digital economy for which existing methods fall short.

So, the book launched here in Tasmania today *Smart Legal Contracts*, edited by Jason and Peter Hunn and published by the Oxford University Press, is a comprehensive exploration of the latest developments in smart contracts technology.

The beauty of the book is that it is structured in a way that allows readers to gradually build up their understanding of smart contracts, starting with a brief introduction to blockchain technology and its potential applications in various industries and then delving into the technical aspects of smart contracts, including programming languages and design patterns.

Readers will gain a thorough understanding of the differences between smart contracts and traditional legal contracts, and the benefits and limitations of each.

One of the strengths of the book is its in-depth coverage of the legal and regulatory issues surrounding smart contracts. The various chapter authors examine the legal status of smart contracts in different jurisdictions, discussing the challenges of enforceability and liability. They also explore the potential for smart contracts to disrupt traditional legal frameworks, and the need for new legal models to adapt to the changes brought about by this technology.

Another key feature of the book is the range of case studies and real-world examples provided throughout. These examples help to illustrate the practical applications of smart contracts in different industries, from supply chain management to real estate.

My short chapter in the book focusses on emerging AI enabled forms of dispute resolution which may well transcend traditional court proceedings as the method of choice for smart contracts; although I acknowledged in the book, in my response to the chapter by Sir Geoffrey Vos, MR, that the *Digital Dispute Resolution Rules* developed by his UK Jurisdiction Taskforce, and which can be incorporated into a digital contract, might well be a means of retaining the relevance of the existing legal system in rapid and cost effective dispute resolution.

The Rules allow parties to resolve disputes by flexible arbitration. They interoperate with the UK Arbitration Act and allow for anonymous "on chain" expert determinations.

If our legal systems do not keep pace in a manner such as this then the alternative will surely be the likes of Kleros and Aragon Court.

If we as lawyers don't keep pace, then we will become irrelevant in this increasingly online, multi-jurisdictional area of contract law.