

Smart Contracts

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Smart contracts.

Is it smart? Is it a contract?

"A set of promises, specified in digital form, including protocols within which the parties perform on the other promises."

- Nick Szabo, 1994



"A smart contract is an agreement whose execution is **both automatable and enforceable**. Automatable by computer, although some parts may require human input and control. Enforceable by either legal enforcement of rights and obligations or tamper-proof execution."

- Clack, Bakshi and Braine, 2016.

A smart contract summary.

10 points on smart contracts.



A smart contract automates tasks ...



Using software code. They make processes more efficient ...



And faster....



To improve performance.



They work well with distributed ledgers...



But they can work with other technology too.



Not all of a contract needs to be automated ...



Indeed, many terms are more than just logic.



But you can blend the best of both worlds.

Sample legal issues.

The code is not law.

Creation	Terms	Performance	Breach	Remedies	Further issues
<ul style="list-style-type: none"> Who are the parties? Is a legal contract created? When and where is the contract created? Which law governs the legal contract? 	<ul style="list-style-type: none"> What and where are the contractual terms? How can they change? Are the terms of the contract known and understood? Do the terms contemplate operation of laws? 	<ul style="list-style-type: none"> Is automatic performance legally effective? Can automatic performance be interrupted? By whom? Can automatic performance be reversed? By whom? 	<ul style="list-style-type: none"> Do the terms contemplate dispute or breach? Can a party choose not to perform the contract? Are the consequences of breach dealt with? 	<ul style="list-style-type: none"> Do the terms provide remedies for breach? Is specific performance possible, or obligatory, under the terms? Can mandatory injunctions be obtained? 	<ul style="list-style-type: none"> Where are the contractual rights located, how are they recognised? Can the rights be transferred to other parties? Can smart contracts be legal entities themselves?

Legal challenges with smart contracts can arise from the *translation* of natural language legal contracts into languages and onto platforms which are code-based.

Limits to coded contracts.

The human touch.

Terms based in logic

"If that occurs then the price will be adjusted by subtracting the product of x and y."

Automatable

Terms based in reason

"If that occurs then an adjustment to the price will be determined in a commercially reasonable manner."

Not automatable

Terms based in conscience

"If that occurs then the parties must negotiate an adjustment to the price in good faith"

Not automatable

"All human beings are born free and equal in dignity and rights. **They are endowed with reason and conscience** and should act towards one another in a spirit of brotherhood"

United Nations Universal Declaration of Human Rights.

Smart contracts

- "Smart legal contract" versus "smart contract code". The latter refers to elements of legal contract being represented and executed by software. The former is the code designed to execute certain tasks
- A smart contract is an automatable and enforceable agreement. Automatable by computer, although some parts may require human input and control. Enforceable either by legal enforcement of rights and obligations or via a tamper-proof execution of computer code
- Certain operational clauses within legal contracts lend themselves to being automated. Other non-operational clauses, eg, governing law clauses, are less susceptible to being expressed in machine-readable code. Other legal clauses are subjective or require interpretation
- A possible near term application of a smart contract is for the legal contract to remain in natural legal language, but for certain actions to be automated via smart contract
- This would require those actions, eg, payments and deliveries, to be represented in a more formal, standard way within the ISDA Definitions, enabling them to be read by machines
- Transaction data could be held on a distributed ledger that would be available to regulators. This would ensure there is a single, shared representation of each trade
- Industry wide standards are required to ensure smart contracts are interoperable across firms and platforms. ISDA is working on these standards

Smart contracts

- “Distributed ledger technology (DLT)”: A distributed ledger is a digital record that is shared instantaneously across a network of participants. It is distributed because the record is held by each of the users on the network and each copy is updated with new information simultaneously. DLT uses a consensus technique to ensure that every user agrees on the records. There are not multiple competing sets of records that need to be reconciled but just one. This one record represents a golden source of data.
- Operational clauses: A clause that requires an amount to be payable on a payment date equal to the product of a calculation amount, a floating rate (plus or minus a spread) and a day count fraction. Or a clause that requires one party to transfer assets on a particular date that have a value equal to the amount by which a required credit support amount is less than a value of the collateral provided, subject to certain formulaic haircuts and adjustments.
- Non-operational clauses: Clauses that do not embed such conditional logic but that relate to the wider legal relationship between the parties, e.g., governing law clauses; dispute forum clauses; clauses providing that the written legal documents represent the entire agreement between the parties; clauses dictating that when making a decision or determination “good faith” and “commercial reasonableness” be applied.
- Automating everything? Event of defaults give the non-defaulting party the right to terminate outstanding transactions. But that party may decide it does not want to exercise such termination rights at the time. The reasons for that tend to be subjective, depending on the commercial relationship and other external factors. Hence such provisions are not susceptible to automation.

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Smart contracts and ISDA documentation

- DLT could store data on derivatives transactions between parties in the network
- Smart contract logic could then provide for certain actions required to happen automatically and “link” legal and operational flows
- The ledger then records this by way of an up-to-date single source of data
- However, counterparties still enter into the MA and schedule drafted in natural human language
- Parts of the ISDA Definitions booklets that set out the terms used in defining payments and deliveries would be tractable by computer in a certain computer format (eg, FpML)
- Transitional steps may be needed to make certain ISDA provisions more prescriptive for automation, eg, 2006 ISDA Defs
- Any effects on legal opinions? No effects on netting opinions as the same requirements for “legal contracts” apply to smart contracts. Similarly, no effect to ISDA opinions on the enforceability of e-contracts cover electronic formation and execution (incl e-signatures etc).
- Wider law reform issues? Conflict of law rules (e.g., *lex rei sitae*) in a fully dematerialized DLT trading environment (cf Hague Securities Convention), e.g., identification of the counterparty, forum and asset location (global rules needed? Technical and legal global standard setters?)
- ISDA Whitepapers of September 2016 (market infrastructure) and August 2017 (legal aspects)

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