

Feature

KEY POINTS

- A key value proposition of smart contracts is the elimination of performance risk through irrevocable and self-executing computer code which defines a contractual obligation. However, there are trade-offs in doing so, in particular, shifting the placement of trust in the counterparty to perform its obligations onto the coder and the code itself.
- Even where parties seek to rely solely on irrevocable, self-executing code as constituting and defining the contract between them, it is unlikely that such a smart contract would be the end of the matter so far as their respective legal rights and obligations are concerned. Freedom of contract is only one consideration amongst many and smart contracts, like ordinary natural language contracts, cannot de facto exclude other applicable legal principles.
- There may be practical difficulties in courts applying existing legal principles to this emergent technology, particularly where code is given primacy, but certain concerns around the conceptual possibility of doing so can be overstated.

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Smart contracts and the limits of the "rule of code"

This article considers a key potential value proposition of smart contracts, namely the elimination of performance risk, and the trade-offs required in order to fully realise that potential. On the other hand, it considers the limits of any attempt to utilise smart contracts to oust the applicability of the law and legal systems.

"Where there's no Trust, there can be no Contract."

Thomas Hobbes¹

INTRODUCTION

The development of technology, in particular, information and computing technology, has revolutionised our commercial and personal interactions over time. One such tool, enhanced by emergent technology such as distributed ledgers, is a "smart contract", which utilises computer programmes and code to automate the performance of contractual obligations.

This article first considers a key potential value proposition of smart contracts, namely, the elimination of performance risk through irrevocable, self-executing code. It considers the conditions required to realise that outcome, as well as the potential trade-offs in doing so. Second, it considers the limits of such endeavours, primarily based on public policy as opposed to freedom of contract, and further argues that many concerns around the ability of the law and legal systems to apply existing legal principles to smart contracts can be overstated.

ELIMINATION OF PERFORMANCE RISK

Forms of smart contracts

In its advice to the UK government,² the Law Commission proposed three broad categories of smart contracts,³ namely:

- **Form 1:** A natural language contract in which some or all of the contractual obligations are performed automatically by computer code.
- **Form 2:** A hybrid contract in which some contractual obligations are defined in natural language and others are defined in code.
- **Form 3:** A contract in which all the contractual terms are defined in, and performed automatically by, code.

These are useful categories, at least on a conceptual level, even if on any given set of facts it may not be clear-cut precisely which category a given smart contract falls under. Often confusion arises as a result of the conflation of these different forms of smart contracts and of the respective issues that arise in each of them.

Under Form 1, where code is a mere method of performance of a pre-existing, natural language contractual terms, few novel conceptual issues are likely to arise. By assumption, the legal force subsists not

in the code, but in the natural language terms external to it. If any dispute arises as to whether or not the code has properly performed the relevant obligations, then the parties need simply to fall back to the natural language terms of the contract and see whether the code's performance is in conformity with them, properly construed using ordinary principles of contractual interpretation.

Indeed, Form 1 smart contracts are quite orthodox and commonplace, for example, direct debit for the automation of the performance of regular payment obligations. As such, this form of smart contract is familiar and comforting for parties who wish to entrust their respective legal rights and obligations to the tried and tested realm of natural language contracts rather than the relatively novel and unfamiliar realm of code.

Benefits of smart contracts and trade-offs

Such a form of smart contracts (Form 1) may in various circumstances lead to greater operational and cost efficiency through automated performance, which would benefit commerce and society as a whole. However, using code as a mere method of performance will do little to eliminate common legal risks inherent in contracts, such as disputes relating to interpretation and alleged breach, as there is nothing particularly special in this regard about code, as opposed to any other method, being utilised to perform contractual obligations.

A greater prize espoused by certain proponents of smart contracts is that where self-executing code itself *defines* a given contractual term, there can be no argument about whether the particular obligation has been performed in accordance with its terms. Put at its highest, particularly with the assistance of technology such as permissionless distributed ledgers allowing the deployment of *irrevocable* self-executing code,⁴ performance risk can be eliminated entirely, with the corollary being that the need for enforcement through the legal system will never arise because:

- neither party is capable of halting the performance of the code; and
- whatever the code does is necessarily a proper performance of the relevant legal obligation.

As such, the rule of law would be replaced by the "rule of code".

There are two potential routes to this result. First, it may be put that it is meaningless to speak of code being capable at all of being interpreted; code has no meaning, only effects.⁵ It may therefore be argued that as long as the parties are clear that the relevant code defines the contractual term, there is essentially no more to be said of the matter. However, in the Law Commission's view, it is a false premise that computer code is incapable of interpretation. In its view, it is meaningful and possible to interpret code, and the test that should be adopted by the English courts is one of the "reasonable coder"; that is, what the computer code would mean to a reasonable person with knowledge and understanding of computer code.⁶ Therefore, code, like natural language terms, can be interrogated for the purposes of, for example, determining whether or not there was a mistake.

Alternatively, parties could make it expressly clear that, no matter what the end result of the operation of the code is, however unforeseen or inconsistent with the intentions (whether subjective or objective) of the parties, the code shall define the relevant contractual term and that the parties shall be bound by that result. Seen in this light, however, the trade-off required in order to achieve the stated aim of eliminating

performance risk may be stark. The price to be paid would be that trust will need to be placed in the coder to encode accurately whatever commercial agreement the parties have reached and the ability for the computer programme or system executing the code to do so properly (eg without unexpected bugs).

There is likely to be a more compelling case for adopting this approach where the relevant obligation is simple and unlikely to be prone to error in coding or in execution and/or where the value of the transaction in question is relatively low compared to the likely legal costs in resolving any disputes that might arise under a Form 1 smart contract. On the other hand, parties to complex and high-value transactions may consider that the risk of relying on coders to translate error-free their agreement into code and on the code functioning reliably may be too high and that they would prefer to keep their trust in natural language terms, even if that were to leave open the possibility of future litigation.

THE LIMITS OF THE RULE OF CODE

At its most extreme, parties may seek to enter into a smart contract comprising *solely* of computer code, ie Form 3. It is said that this would permit the replacement of the rule of law with the "rule of code", not just in relation to a particular term, but to the entire transaction in question. If, by assumption, all terms consist of self-executing and irrevocable code, the concept of a legally binding contract which is subject to enforcement action under any relevant law is redundant and inapplicable.

This view is not wholly without foundation, but it goes too far. Although this view has merit from the narrow perspective of freedom of contract, there are issues such as mistake to consider, which vitiates any apparent agreement reached between the parties.

More generally, the conclusion above does not follow because freedom of contract is not the only principle with which legal systems and society are concerned. Public policy in the broadest sense, as including considerations of ethics, morality and societal norms and values, give rise to a host of legal rights and obligations under English and other law, which cannot simply be ousted by Form 3 smart contracts. The argument based

on freedom of contract says nothing about the application of, amongst many others, tortious principles, consumer protection laws and criminal law, whose purpose in many cases is precisely to override a narrow conceptualisation of freedom of contract outlined above.

THE REACH OF THE RULE OF LAW

Nonetheless, doubts have been raised regarding the ability to apply existing legal principles to, for example, Form 3 smart contracts concluded by computer programmes. It is said that since computers, not natural persons, "contract with each other", principles such as capacity, offer and acceptance and so on are inapplicable because they presuppose human agency, which computer programmes do not possess.

Other than possibly in the case of "strong" artificial intelligence, which is addressed below, this analysis departs from a false premise. Computer programmes and code are mere tools deployed by natural persons. Seen in this light, one can always refer back to the acts and intentions of the natural persons who set up the programmes in the first place. The correct characterisation, therefore, is to say that the computer programmes are utilised to enter into smart contracts *on behalf* of those persons (or non-natural persons on behalf of whom they act).

This principle was established as far back as in *Thornton v Shoe Lane Parking* [1971] 2 QB 163 which decided that the owners of a car park could enter into a contract with its users through automated machines granting entry. The same principle also underlined the reasoning of the Singapore Court of Appeal in *Quoine Pte Ltd v B2C2 Ltd* [2020] SGCA(I) 02, which concerned a claim for unilateral mistake arising out of smart contracts relating to the trading of cryptoassets concluded through computer programmes.⁷ For example, it was self-evident to the Singapore Court of Appeal in *Quoine* that the parties to the smart contract (if there was one) must have been between persons already recognised in law who had set up and deployed the computer programmes in question; it was not considered at any point that each of the computer programmes in

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question was an autonomous entity which the law should grant personhood to.

There are two caveats, however. The first, as mentioned above, is so-called "strong" artificial intelligence; that is, in layman's terms, artificial intelligence that displays human-like agency, in contrast to deterministic algorithms. Such systems may well give rise to the kinds of problems outlined above. However, the issues that such artificial intelligence raise go well beyond the modest scope of this article and even of contract law to the foundation of the very fabric of society as we know it.

In a similar vein, it is argued that "decentralised autonomous organisations" (DAOs) and "decentralised applications" (DApps) enables free-floating pieces of computer programme, software and code to interact autonomously with users without being controlled by any persons. The reality, however, is that many of the DAOs and DApps that are widely adopted and used are unlikely to be as free-floating and autonomous as thought to be by some. As in the case of the car park machine and the cryptoasset trading programmes, there will invariably be natural persons who, in addition to having set them up in the first place, will maintain, monitor and modify DAOs and DApps over time, whether they be a small or a large group. There should therefore be no conceptual reason why the principle of "referring back" to those natural persons should not be equally applicable here.⁸

Nevertheless, there will undoubtedly be practical challenges to applying existing legal principles to Form 3 smart contracts, at least initially. For example, in *Quoine*, the majority considered that the ordinary principles applicable to unilateral mistake, including the requirement that the mistake in question must relate to a term of the contract, should equally apply in the context of smart contracts entered into through computer programmes. In contrast, Mance J⁹ considered that as computer programmes always operate deterministically according to their instructions, it is inappropriate in this context to insist on a mistake as to the terms of the contract. Instead, a fundamental mistake as to how the computer programs would operate should be sufficient. This

case is illustrative of the kinds of debate we are likely to see in the English courts, as established legal principles are tested in the context of various forms of smart contracts.

Finally, there is said to be the possibility of Form 3 smart contracts arising in (near) factual vacuums, particularly through the use of permissionless distributed ledgers, where there may have been no pre-smart contractual interaction whatsoever between the parties and the identities of the parties may not even be known to each other.

It must be right that the fewer the facts that are available to the court, the more difficult it will be for it to apply any given legal principle in a given case. However, this problem can also be overstated, particularly in the context of sophisticated commercial transactions. First, there is no such thing as a total factual vacuum. Even in the case of smart contracts entered through permissionless distributed ledgers, there will always be *some* relevant, surrounding facts forming the background factual matrix of the smart contract, which can be examined by the courts as relevant to interpretation or particular issues in dispute, such as the (objective) intention of the parties. Second, at least in the near future, it is highly unlikely that Form 3 smart contracts, let alone those without any pre-smart contractual interaction between the parties, will be prevalent amongst sophisticated commercial counterparties in relation to complex and high-value transactions. Many key terms are heavily negotiated, including their precise drafting. In addition, whilst code is capable of executing simple instructions based on clear conditional logic, many important contractual terms such as those requiring interaction with the physical world in any complex manner and those requiring the exercise of evaluative judgement are unsuited to being defined and executed by code.

CONCLUSION

It seems possible, in theory, to eliminate the need to place trust in a counterparty to perform its obligations by replacing natural language contractual terms with code. However, that requires the placement of trust instead in the code to deliver the parties'

intentions. It may be some time before sophisticated commercial parties decide to reallocate risk and their trust in this manner and, in the meantime, they may be content with the potential operational efficiencies offered by utilising code as a mere method of performance, as opposed to defining their respective rights and obligations. ■

- 1 *De Cive*, 8.3.
- 2 The Law Commission: *Smart legal contracts – Advice to Government* (November 2021).
- 3 The Law Commission call them "smart legal contracts", which presuppose that they are legally binding contracts. In this article, the term "smart contract" is used instead and does not presuppose that they necessarily give rise to legally binding contracts.
- 4 The deployment of code on other platforms, such as permissioned distributed ledgers, may allow the possibility of code being revoked in certain circumstances.
- 5 See, for example, para 4.8 of the Law Commission's Advice.
- 6 See para 4.48 of the Law Commission's Advice.
- 7 See Nik Yeo, 'Mistakes and knowledge in algorithmic trading: the Singapore Court of Appeal case of *Quoine v B2C2*' (2020) 5 JIBFL 300.
- 8 In the context of the Terra blockchain and the collapse of TerraUSD and LUNA, see by John Lee, 'Untethered: what next for stablecoins' (21 June 2022), especially s 6: <https://www.traverssmith.com/knowledge/knowledge-container/untethered-what-next-for-stablecoins/>
- 9 International Judge.

Further Reading:

- Mistakes and knowledge in algorithmic trading: the Singapore Court of Appeal case of *Quoine v B2C2* (2020) 5 JIBFL 300.
- Smart contracts: navigating a course between a consensus arrangement and a legal contract (2021) 8 JIBFL 531.
- LexisPSL: Commercial: Practice Note: Smart legal contracts.