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Smart Legal Contracts and Their Inherent Jurisdictional Issues

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Smart Legal Contracts and Their Inherent Jurisdictional Issues

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1.1. Introduction

The purpose of this text is to provide a comprehensive overview of the gaps, challenges, and benefits of smart legal contracts. These contracts are unique in that their terms are written directly into code, making them self-executing agreements. They are typically deployed on blockchain platforms, allowing for automatic execution, enforcement, and verification, without requiring intermediaries; increasing efficiency and accuracy in business and reducing the need for the contracting parties to have to trust each other. However, one potential issue with these contracts is jurisdiction. This paper focuses on the regulatory approaches taken by jurisdictions such as the United Kingdom, the European Union, and Singapore, which have been some of the first to address smart contract-related challenges. Their efforts to determine whether regulatory changes are necessary to encourage widespread adoption and enforcement are explored, along with the regulatory frameworks that have been developed, the challenges that have been identified, and potential solutions to address them.

The ultimate goal is to provide readers with a comprehensive understanding of the legal and practical aspects of smart legal contracts, and to contribute to the ongoing discussions surrounding their future development and implementation. Moreover, this text highlights the significance of contract drafting, particularly concerning the inclusion of jurisdictional and arbitration clauses, that can help mitigate the complex issue of jurisdiction and foster a more comprehensive international push for the resolution of disputes arising from smart legal contracts through arbitration.

1.2. What is a Smart Contract

Smart contracts are a critical component of many platforms and applications being built using blockchain or distributed ledger technology. Many authors define these tools as legally binding contracts in which some or all of the contractual obligations are defined in and/or performed automatically by a computer program,[1] or a set of promises, specified in digital form, including protocols within which the parties perform on these promises.[2] In other words, a smart contract is a type of agreement that is automated in its execution. This automated execution is often effected through a computer running code that has translated legal prose into an executable program.[3]

Others refer to smart contracts as a term used to describe computer code that automatically executes all or parts of an agreement and is stored on a blockchain-based platform. The code

[1] United Kingdom, Parliament. *Smart Legal Contracts Advice to Government*, vol. 401, Law Com, 2021, pp. 1–227.
[2] Nick Szabo, *Smart Contracts: Building Blocks for Digital Market*, 16 EXTROPY (1996).
[3] Max Raskin, *The law of smart contracts*, SSRN ELECTRONIC JOURNAL (2016).

can be the sole manifestation of the parties' agreement or might complement a traditional contract and execute certain provisions.[4]

As a result of their capability to automate and execute transactions without the need for human intervention, blockchain-based systems offer several advantages including enhanced security, permanence, and immutability. Once the code is deployed and stored on the blockchain, it becomes unalterable, and no one can change or delete it, making it a reliable and tamper-proof technology. The actual tasks that smart contracts are performing are fairly rudimentary, such as automatically moving an amount of cryptocurrency from one party's wallet to another when certain criteria are satisfied.[5]

Before a compiled smart contract actually can be executed on certain blockchains, an additional step is required, namely, the payment of a transaction fee for the contract to be added to the chain and executed. In the case of the Ethereum blockchain, smart contracts are executed on the Ethereum Virtual Machine (EVM), and this payment, made through the Ether cryptocurrency, is known as "gas."[6] The more complex the smart contract (based on the transaction steps to be performed), the more gas that must be paid to execute the smart contract. Thus, gas currently acts as an important gate to prevent overly complex or numerous smart contracts from overwhelming the EVM.

There are two different types of smart contracts, which are denominated Code-only smart contracts and Ancillary smart contracts. The first is when a verbal agreement is made between two or more parties regarding the business relationship they wish to establish, and then that agreement is translated directly into code that can be executed. The latter is utilized to execute specific provisions of a traditional text-based contract, in which the text itself references the use of smart contracts to carry out certain provisions.[7]

In many ways, smart contracts are no different than today's written agreements. To execute a smart contract,[8] parties must first negotiate the terms of their agreement until they reach a "meeting of the minds." "Once agreed upon, parties memorialize all or part of their

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[4] For example, transferring funds from Party A to Party B. Alex Lipton & Stuart Levi, AN INTRODUCTION TO SMART CONTRACTS AND THEIR POTENTIAL AND INHERENT LIMITATIONS THE HARVARD LAW SCHOOL FORUM ON CORPORATE GOVERNANCE (2018), https://corpgov.law.harvard.edu/2018/05/26/an-introduction-to-smart-contracts-and-their-potential-and-inherent-limitations/ (last visited Apr 5, 2024).

[5] *Id.*

[6] "What is the 'Gas' in Ethereum?" *Cryptocompare*, November 18, 2016.

[7] Lipton & Levi, *supra* 4.

[8] Smart Contract Code (SCC) are autonomous computer programs executed on a blockchain that automatically execute the contractual clauses defined in the code. These contracts are self-executing and self-verifying, and their validity and security depend on the correctness of the programming. On the other hand, Smart Legal Contracts are based on Smart Contract Code but are specifically designed to comply with legal regulations and the needs of the legal system. SLCs rely on blockchain technology and incorporate traditional legal language, thereby ensuring the legal validity of contracts.
Davide Ferrari, "*Smart Legal Contract (SLC) & Smart Contract Code (SCC)", 2023.* Available in: *https://docs.google.com/document/d/1gilI9L1HfkThmJYXjqnTNKfLmaGaCMNSrwMwzib2Rp8/edit*

understanding in smart contract code, which is triggered by digitally signed blockchain-based transactions."[9]

Where traditional legal agreements and smart contracts begin to differ is in the ability of smart contracts to enforce obligations by using autonomous code. With smart contracts, performance obligations are not written in standard legal prose. Rather, these obligations are memorialized in the code of a smart contract using a strict and formal programming language (like Ethereum's Solidity). Smart contract code is executed in a distributed manner by all of the nodes supporting the underlying blockchain-based network, without necessarily relying on any intermediary operator or trusted middleman. Because smart contracts are autonomous in nature, promises memorialized in a smart contract are by default harder to terminate than those memorialized in a natural language legal agreement.[10]

1.3. Benefits of smart contracts

Smart contracts represent a revolutionary advancement in the realm of digital transactions, offering several advantages that could reshape the future of contractual interactions. With the ability to automate and enforce agreements through code execution, these contracts eliminate the need for intermediaries, reducing costs and expediting processes. The transparency and security inherent in blockchain technology further enhance trust between parties, mitigating the risk of fraud. Smart contracts hold the promise of increased efficiency, accuracy, and accessibility, unlocking new possibilities across various industries.

As opposed to a traditional agreement, the smart contract facilitates microtransactions at little to no fee, and payment is divided nearly instantaneously per the strict logic of the smart contract code; smart contracts help people transact with one another on a peer-to-peer basis in decentralized e-commerce marketplaces that do not rely on a centralized intermediary.[11] Additionally, the fact that the contracts are used on a blockchain brings with it the inherent benefits the blockchain has to offer; blockchains are resilient and tamper-resistant, and parties gain assurance that the underlying smart contract code has not changed and most likely will not be changed in the future. Due to the difficulty in altering the information stored on a blockchain, smart contracts ultimately narrow opportunities for parties to engage in self-dealing or opportunistic behavior by modifying the code embodying their agreement. This characteristic of smart contracts can boost the confidence between untrusting parties and thus increasing the range of economic activities.[12] However, while smart contracts have some benefits, they also come with some significant issues.

1.4. Issues of Smart Contracts

Because no single party controls a blockchain, there may not be a way to halt the execution of a smart contract after it has been triggered by the relevant parties unless they have

[9] PRIMAVERA DE FILIPPI & AARON WRIGHT, BLOCKCHAIN AND THE LAW: THE RULE OF CODE (Harvard University Press) (2019).
[10] *Id*.
[11] Law firm Hogan Lovells learns to grapple with blockchain contracts - WSJ, THE WALL STREET JOURNAL, https://www.wsj.com/articles/BL-CIOB-11399 (last visited Apr 5, 2024).
[12] De Fillipi & Wright, *supra* 9.

incorporated a premise in the smart contract to halt the program's execution,[13] The fact that contracting parties might not be proficient in coding and therefore unable to comprehend the smart contract poses a significant challenge.

To counteract this particular problem, the parties may need to enter into a written agreement with a smart contract programmer and potentially also with an insurance company to protect them from the risk of the smart code from an unintended programming error or not performing the functions specified in the text of the agreement, again, because of the likelihood of them missing something when reviewing the code after it has been delivered to them from the programmer. This scenario imposes some complications on what is supposed to be a simple, self-executing transaction.

Smart contracts are known for their fundamental feature of automation, which means that they are self-executing and do not require any intermediaries to facilitate the transaction. However, this feature also means that smart contracts cannot be easily amended or terminated unless the parties incorporate such capabilities during their creation. This can be a challenge in certain situations and needs to be addressed when discussing their widespread adoption. This automated execution might not align with how parties and businesses operate in the real world; to form or create a smart contract, there needs to be objectivity as to what the obligation and the rights of the parties encompass. And unfortunately, in many cases that is not the way in which contracting parties interact.

Smart contracts do not offer flexibility when the parties need to amend some or all terms of the contract, this results in high transaction costs due to several reasons. Since smart contracts are typically deployed with immutable code, they lack the capacity for direct modifications. If parties need to amend any part of the contract, a new smart contract might need to be created, leading to additional costs and gas fees.
Moreover, altering a smart contract requires a consensus among all involved parties, making the process time-consuming and thus resulting in increased transaction costs, especially if quick adjustments are needed in response to changing circumstances. They are also unsuitable to account for open-ended rights and obligations that arise in contract formation, which are hard to predict at the time of contracting and are thus not suitable for being memorialized into the code.[14]

Another potential complication of smart contracts is their incapability to receive information or parameters from resources that are not on the blockchain, smart contracts cannot pull data from off-chain resources; rather, that information needs to be "pushed" to the smart contract.[15] Second, if the data at issue is in constant flux, and since the code is replicated across multiple nodes across the network, different nodes may be receiving different information, even just a few seconds apart. Given that consensus is required across the nodes for a transaction to be validated, such fluctuations can cause the condition to be deemed "not satisfied."[16]

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[13] Kevin Werbach & Nicolas Cornell, *Contracts: Ex machina*, 67 DUKE LAW JOURNAL 313–382 (2017).
[14] De Fillipi & Wright, *supra* 9.
[15] Lipton & Levi, *supra* 4.
[16] *Id.*

Contracting parties will be able to solve this issue by using an oracle; they are trusted third parties that retrieve off-chain information and then push that information to the blockchain at predetermined times[17]. This process adds another party with whom the parties would need to contract to effectuate a smart contract. However, this also presents something called the "oracle problem" that is, the problem of ensuring that external data sources provide accurate, reliable, and timely data to the smart legal contract so that it executes in a way intended by the parties.[18]

Another issue worth noting is that smart contracts exhibit a degree of transparency that may prove unappealing to contracting parties. When parties enter into an agreement written in legal prose, they generally have the option to keep the terms of their agreement private. However, because of the transparent nature of blockchains, all transactions executed via a smart contract—as well as the smart contract code—are propagated across a peer-to-peer network, rendering them publicly visible to network nodes.[19] These privacy issues may limit the potential for smart contracts to replace traditional legal contracts in many commercial settings. Without strong privacy protections, smart contracts likely will prove unsuitable for legal agreements where confidentiality is crucial.[20]

1.5. Jurisdiction

Finally, smart legal contracts introduce a central challenge related to jurisdiction. The decentralized operation on a global blockchain network diverges from traditional legal setups tied to specific jurisdictions. The absence of a centralized authority complicates matters, emphasizing the need for a thorough exploration of how jurisdiction impacts the execution and enforcement of smart contracts. What makes the regulation of smart contracts particularly complex is their cross-border nature, given that they are generally operated by computers located in different jurisdictions. This may make it more difficult to identify the law or jurisdiction applicable to the contract.

The UK Law Commission stated in its advice to the government that jurisdiction can depend upon a contracting party's presence or place of domicile, or on the location where, and the means by which, the smart legal contract was formed[21]. A prerequisite to considering these matters, however, is being able to identify a defendant.

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[17] *Id.*

[18] Thibault Schrepel, *Smart Contracts and the Digital Single Market Through the Lens of a 'Law + Technology' Approach*, European Commission, October 21, 2021. Available at SSRN: https://ssrn.com/abstract=3947174 Where the "oracle problem" is described as a situation whereby only a single source is used to relay information to an oracle, thereby creating a "single point of failure and requiring trust in just one entry point."

[19] De Fillipi & Wright, *supra* 9.

[20] Ahmed Kosba et al., *Hawk: The blockchain model of cryptography and privacy-preserving smart contracts*, 2016 IEEE SYMPOSIUM ON SECURITY AND PRIVACY (SP) (2016)

[21] United Kingdom, Parliament. *Smart Legal Contracts Advice to Government*, vol. 401, Law Com, 2021, pp. 1–227.

In its Advice to Government document, the UK Law Commission mentioned that, in England, the court will have jurisdiction if the defendant is served with the claim form at a time when they are physically present in England. This, however, is considering the potential plaintiff has the means to discover the identity of the other contracting party at the time they want to bring a claim, and in situations where the contracting parties use pseudonyms may make it difficult to locate not only the rights and acts in question but also the actors.[22]

Considering the aforementioned, an alternative method of determining jurisdiction was proposed, as the previous option had several drawbacks for the party making a claim during the rise of a dispute, this new method involves considering the place where the contract was formed. For smart legal contracts that involve a natural language with automated performance, the place of formation will be determined by reference to the parties' natural language negotiations and the ordinary rules of contract formation. It has been accepted, at least for jurisdictional purposes, that a contract can be made in two (or more) places at once.[23] There is a degree of uncertainty about the place of contract formation for unilateral solely code smart legal contracts.[24] The smart legal contract could be said to be formed at the place where the person performs the act specified in the deployed code, albeit this location might be something over which the other person (who deployed the code) has little control. Alternatively, it could be said to be formed at the place where the person who deploys the code has the acceptance communicated to her (if that occurs).

Additionally, for solely code smart legal contracts that are formed by the autonomous interaction of computer programs there is a variety of uncertainties and possibilities, the contract could be said to be formed either at the place where the person who interacts with the code is located at the moment when his computer program accepts the offer, or at the place where that person is located at the moment when his acceptance is communicated to the person who deployed the code (if that occurs). Or the smart legal contract could be said to be formed at the place where the person who deployed the code is located at the moment that acceptance takes place, or at the place where that person is located at the moment when that acceptance is communicated. As a further alternative, if the computer programs are using distributed ledger technology (DLT), it may be that the place of contract formation is determined by the location of some quantity of participating nodes.

The UK Law Commission identified additional layers of complexity in ascertaining the place of contract formation, particularly when considering multi-party arrangements and the decentralized nature of DLT[25].

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[22] DAVID FOX & SARAH GREEN, CRYPTOCURRENCIES IN PUBLIC AND PRIVATE LAW: EDITED BY DAVID FOX, SARAH GREEN (Oxford University press) (2019)

[23] H. G. BEALE & JOSEPH CHITTY, CHITTY ON CONTRACTS (Sweet & Maxwell) (2018)

[24] Unilateral contract: A contract where one party (the offeror) makes a promise in return for performance by the other party (the offeree), but the offeree does not promise to perform so that only the offeror is bound under the contract. The contract forms when the offeree fulfils the specified condition.
Solely code contract: A smart legal contract in which all of the contractual terms are defined in, and performed automatically by, the code of a computer program.

[25] Distributed ledger technology (DLT) is a decentralized ledger is a record of all transactions on a network. This ledger is maintained and updated by many independent nodes, who collaborate based on a ruleset established by the protocol. Bitcoin uses a blockchain and a Proof-of-Work mechanism to organize the network and maintain its decentralized ledger.

First, the Commission stated the complexity is exacerbated when dealing with multilateral contracts "many smart contracts will involve multiple contracting parties (rather than just two) which further adds to the complexity."[26] Participants may be located across a number of different jurisdictions, and it may be extremely difficult to identify the location of any given participant at a particular time. Second, it said coded elements of a smart legal contract deployed on a distributed ledger system will likely be running on all of the system's full nodes, which may be dispersed across multiple geographical locations. Third, there may be several disjuncts between the location of a full node(s) running any coded element of a smart legal contract, the location of the user who has triggered its deployment, and the location of any user that interacts with it.

The Chancery Bar Association and Commercial Bar Association[27] indicated that the "least disruptive and most coherent approach would be to focus on the place where the real-world actor is when the acceptance is communicated to them"[28] They suggested that a unilateral solely code smart legal contract should be deemed to have been formed in the place where the person who deployed the code was located when the acceptance was communicated to her. They also indicated that smart legal contracts formed by the autonomous interaction of two computer programs should be deemed to have been formed at the place where the person who deployed the code was located when acceptance takes place. However, the Bar Association also recognized that focusing on the offeror's location when acceptance is communicated to them presupposes that acceptance either is (or should be) communicated.[29] They found that when the communication of acceptance is not required, and does not occur, a rule of formation that looks to the offeror's location may lead to "uncertainties."[30]

Considering the information relating to the multiple obstacles that might arise when establishing jurisdiction in this type of contracts, the UK Law Commission emphasized that the best practice in this space would be for parties to include jurisdiction clauses in their contracts given the difficulties involved in applying the current principles of conflict of laws to smart legal contracts in some cases.

Notwithstanding, The UK Law Commission, in its advice to Government has highlighted a crucial factor that could be significant in determining jurisdiction - the choice of law governing the contractual obligations of the parties involved. Experts such as Peter Howes

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[26] United Kingdom, Parliament. *Smart Legal Contracts Advice to Government*, vol. 401, Law Com, 2021, pp. 1–227.

[27] The Chancery Bar Association was established in 1935 and is the oldest specialist bar association, The Chancery Bar offers great depth of legal expertise across the whole spectrum of finance, business, and property law. Their members provide specialist advice and high-quality advocacy in all courts and tribunals in England and Wales and many courts and tribunals abroad.
The Commercial Bar Association is the specialist association of the English and Welsh Bar for commercial barristers advising the international business community.

[28] United Kingdom, Parliament. *Smart Legal Contracts Advice to Government*, vol. 401, Law Com, 2021, pp. 1–227.

[29] *Id.*

[30] *Id.*

and D2 Legal Technology[31] said it is possible to encode an express choice of applicable law in a "Turing complete" programming language.[32] They also stated that coding a choice of law clause could be done by the setting of a variable to an appropriate value to ensure a common understanding, or to insert a comment in the code using natural language.

These techniques do not have operational effects, according to the UK Law Commission. Instead, they stated that it would be best for parties to set up an algorithmic determination of governing law to alter the risk profile between the parties, or to avoid potential conflict of laws issues.[33]

Also, jurisdiction can be based on the fact that a significant contractual event occurred, or was due to occur, in a particular place. For example, the jurisdiction of a court in England and Wales may be based upon the fact that England and Wales is the place where the contract was breached. Under Article 7(1)(a) of the recast Brussels I Regulation[34] and Article 5(1)(a) of the Lugano Convention,[35] jurisdiction may be based on the place of performance of the contractual obligation in question.

The advice to government document identified the following factors as relevant to determine if England was the most appropriate forum for a potential dispute. This list includes factors suggested in their call for evidence, and the following additional factors suggested by consultees that is stated are relevant.

1) The place of formation of the smart legal contract.
2) The location of the contractual subject matter.
3) The place of performance or breach.
4) The location of the nodes participating in the distributed ledger, if applicable.[36]

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[31] Peter Howes is a specialist in the practical issues of compliance and governance with over 40 years of relevant experience in the business application of information systems. As a British Standards Institution (BSI) Management Committee member Peter has contributed to the BSI their Evidential Weight and Legal Admissibility of Electronic Information publications since 1994. Peter is a Joint Author of the BSI Codes of Practice and Compliance Workbook supporting the Standard, BS 10008.
D2 Legal Technology (D2LT) is an award-winning legal data consulting firm acting as a trusted advisor to institutions on process, data, and the use of technology to unlock business value through legal change.

[32] A Turing complete programming language can be used to compute anything which it is possible to compute. For example, the programming language upon which Ethereum is built, which is called Solidarity, is Turing complete, and can therefore theoretically be used to compute any problem of any complexity.

[33] For example, the parties could program the code such that, if the current operational state of the smart legal contract is X, the law of jurisdiction Y applies; if not, the law of jurisdiction Z applies. In this case, the coded provision could be said to have operational effect.

[34] European Parliament Council of the European Union, *Regulation (EU) no. 1215/2012 of the European Parliament and of the Council of 12 december 2012 on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters (recast)*, Brussels Ibis Regulation - Commentary, 1–32 (2012).

[35] Denmark, European Community, Iceland, Norway, Switzerland, *Convention on jurisdiction and enforcement of judgments in civil and commercial matters*, 1–39 (2007).

[36] The Chancery Bar Association and Commercial Bar Association (joint response) said that they did not think that the location of participating nodes in a distributed ledger system was a useful connecting factor. In their view, it would be difficult to identify a particular node as having a suitably substantial connection to any particular transaction, and nodes may be (from the perspective of the contracting parties) spread arbitrarily across the globe.)

5) The location of the contracting parties, and any other relevant witnesses and evidence.
6) The law applicable to the smart legal contract, and the complexities of the legal issues raised.
7) The domicile(s) of the contracting parties.[37]
8) The contracting parties' centers of main interest.[38]
9) The location of the smart legal contract platform[39]

Given the information above, in the event that it is determined that England has jurisdiction over these contracts, it is worth noting that the UK Law Commission has provided guidance to the government regarding potential remedies that may be available to the parties involved in scenarios associated with rectification, unilateral mistake and/or misrepresentation, as set forth below.

Rectification[40] might come into play where the smart legal contract takes the form of a hybrid contract or a solely code contract, a party might seek rectification of the coded terms of the contract. The first category of rectification concerns cases where the parties intend the written contract to reflect the terms of a prior contract but, by a mistake such as a drafting error, the written contract fails to do so. Where the code itself contains contractual terms that are intended to reflect the terms of the natural language contract, the code may be rectified if it fails to reflect those natural language terms. The second category of rectification concerns the situation where the parties have concluded a standalone written contract. Still, that contract inaccurately records the common intention held by the parties at the time the contract was made. The third category of rectification concerns the situation where one of the parties was mistaken about the terms of the written contract, to the other party's knowledge, when the contract was made. The court may order rectification on the basis that it would be contrary to good faith for a party to enforce a contract which it knew was inconsistent with the bargain that the other party believed was being made at the time of entry into the contract.

One practical difficulty a court may face is that it may not be possible for the code to be amended if the code is recorded on a distributed ledger.[41] Herbert Smith Freehills said that in such a case, the parties "may then set out how the contract may be rectified, including any acts of reversal required between themselves[42]". Where the parties do not make use of such a platform, Herbert Smith said that "the immutability of coded terms deployed on a

[37] Suggested by the Chancery Bar Association and Commercial Bar Association (joint response), the LawTech Sounding Board, and Katherine Graff.
[38] Suggested by Catherine Phillips.
[39] Suggested by Herbert Smith Freehills, HSF is an international law firm with headquarters in London, United Kingdom and Sydney, Australia. HSF has been widely acknowledged as one of the world's most elite and selective law firms. Herbert Smith Freehills regards itself as one of the world's most prestigious law firms and has achieved particular recognition in dispute resolution.
[40] Remedy by which the court orders the terms of a written contract to be amended so that they are consistent with what the parties have agreed H Beale (ed), *Chitty on Contracts* (34th ed 2021) para 5-057; C Mitchell, P Mitchell, S Watterson (eds), *Goff & Jones: The Law of Unjust Enrichment* (9th ed 2016) para 40-32.
[41] Insight, BLOCKCHAIN: LEGAL AND REGULATORY GUIDANCE (THIRD EDITION) THE LAW SOCIETY (2020), https://www.lawsociety.org.uk/topics/research/blockchain-legal-and-regulatory-guidance-report (last visited Apr 5, 2024).
[42] United Kingdom, Parliament. *Smart Legal Contracts Advice to Government*, vol. 401, Law Com, 2021, pp. 1–227.

permissionless (public, single ledger) distributed ledger architecture poses difficulties for rectification."[43]

Given the immutable nature of blockchains, amendment of the smart contract as such may be impossible, and a remedy will need to entail the deployment of a further smart contract whose practical effect is to adjust and thereby "correct" the behavior of the earlier one. The court could identify the error that needs to be rectified and ask the parties to agree upon a revised piece of code. The court could then order the parties to deploy the revised code on the blockchain. Strictly speaking, however, the remedy would not be the rectification of the contract, but the creation of a new contract between the parties.[44]

The document suggested that another way to amend the coded terms is to "destroy the old contract using a self-destruct function (that would need to be embedded into the contract code) and deploy a new version of the contract."[45]

In a scenario involving unilateral mistake,[46] one party could make an offer to contract on terms set out in code, but be mistaken about those terms, to the knowledge of the other party. A unilateral mistake about the coded terms of a smart legal contract may provide a basis for claiming rectification of the code. However, since the code has already performed (and this kind of rectification is said to be a drastic remedy)[47] the preferred course for the mistaken party may be to seek to avoid the contract on the grounds of unilateral mistake and claim restitution.

The UK Law Commission concluded that there was no need to further the scope of the unilateral mistake doctrine because the existing law was deemed to be sufficient. Although some adaptation is required when it comes to determining whether the non-mistaken party had knowledge of the mistaken party's mistake, the principles of unilateral mistake will have to be adapted to cater for smart legal contracts concluded by the autonomous interaction of the parties' computer programs.

If Misrepresentation[48] has occurred and the contract has been declared void the contract is non-existent from the start and creates no legal obligations between the parties. However, a party may have rendered performance under the void contract. That party may be entitled to recover those benefits under UE, with the appropriate remedy being restitution.

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[43] *Id.*

[44] *Scarf v Jardine* [1882] 7 App Cas 345, 351. In: H. G. BEALE & JOSEPH CHITTY, CHITTY ON CONTRACTS (Sweet & Maxwell) (2018)

[45] United Kingdom, Parliament. *Smart Legal Contracts Advice to Government*, vol. 401, Law Com, 2021, pp. 1–227.

[46] Concerns the situation where only one of the parties is mistaken at the time the contract is made. Ordinarily, such a mistake provides no basis for a party to avoid their contractual obligations. However, if it can be shown that, at the time of entry into the contract, a party was mistaken as to a term of the contract, and the other party knew of this mistake, the contract is void.

[47] Phillips, s*upra* 38.

[48] "Misrepresentation" can be defined as a false representation, by words or conduct, about a matter of fact or law.

The Law Commission states there would be no major legal issues or practical difficulties in awarding restitutionary remedies if a smart contract is declared void.
In addition, the document concluded that where a smart contract is voidable on the grounds of misrepresentation, duress, or undue influence, a party to the contract may seek rescission of the smart legal contract and that the existing legal principles can be applied to them without difficulties.
However, if the smart legal contract has been partly or wholly performed by code, the question arises as to how the parties can be returned to their pre-contractual positions since the blockchain itself cannot be amended to reverse the effects of the code's performance.
The UK Law Commission listed the options available for courts stating:

1) The court could order the parties to enter into an "equal and opposite" second transaction on the blockchain. The first transaction would remain on the blockchain, but its effects would be reversed by the second transaction.

2) The court could identify the benefits transferred by the code, value those benefits in money, and then order the parties to make restitution to each other for the value of those benefits.[49]

Shifting our focus to Singapore's implementation of smart legal contracts, it's notable that while the enforceability of smart contracts has not been determined in case law, legal precedent, or legislation in Singapore, the judgment in the Quoine Case[50] does not preclude a smart contract from being a legally binding contract, provided that the elements typically required to constitute a legally binding contract are present. These elements are offer, acceptance, and the intention to create legal relations.[51]

This approach is supported by the Infocom Media Development Authority (IMDA).[52] In its Consultation Paper on the Review of the Electronic Transactions Act (ETA), the IMDA affirmed that the ETA does not prevent the use and formation of smart contracts and that a contract by sole virtue of its automatic formation is unlikely to be denied validity or enforceability. The IMDA also pointed out that cryptographic hashes may, at the very least,

[49] United Kingdom, Parliament. *Smart Legal Contracts Advice to Government*, vol. 401, Law Com, 2021, pp. 1–227.
[50] The Singapore Court of Appeal case of Quoine Pte Ltd v B2C2 Ltd [2020] SGCA (I) 02 (the Quoine Case) applied existing laws on contracts to cryptocurrencies. The court analyzed the terms and conditions of the agreement between users of a digital assets exchange and the digital assets exchange operating entity. It recognized that a contractual relationship between buyers and sellers existed when a trade was executed on the digital assets exchange even though that contractual relationship was represented by a smart contract. It was established that even though the contracts between the buyer and seller were smart contracts, ordinary contract principles such as the doctrine of unilateral mistake and equitable mistake at common law still applied. The court then proceeded to analyze the facts of the case utilizing traditional legal principles.
[51] BLOCKCHAIN 2023: DEFINITIVE GLOBAL LAW GUIDES OFFERING COMPARATIVE ANALYSIS FROM TOP-RANKED LAWYERS, (Lewis Cohen ed., 2023).
[52] The Infocomm Media Development Authority (IMDA) is a statutory board under the Singapore Ministry of Communications and Information (MCI). The IMDA provides numerous programs, policies, and grants that cater to industries and communities.

form possible components of electronic signatures for purposes of party intention and authentication to create a contract.[53]

Finally, we will turn our focus on the EU application of smart contracts, the EU has recently passed a proposal for the Data Act ("The DA") with the aim of regulating, among other things, the field of smart contracts in order to increase the level of legal certainty given the fact that more and more smart contracts are being concluded every day without any supervision or regulation. One of the ways in which the DA attempts to legally regulate smart contracts is by aligning them as closely as possible to traditional contracts. In doing so, the DA has introduced four essential requirements of smart contracts. First, it prescribes that smart contracts must ensure a high degree of protection against functional errors and manipulation by third parties. Second, it mandates that smart contracts include the possibility of cancelation or termination of the contract which, however, contradicts one of the fundamental characteristics of a smart contract. Third, it provides that there must be a possibility to archive transactional data and keep records of all past operations of terminated smart contracts. Lastly, it requires that access control mechanisms be implemented.[54]

In its current form, the Data Act stipulates that smart contracts must have the capability to be "interrupted and terminated," and it mandates controls that allow for the resetting or halting of the contract. The stipulation appears to be a significant departure from the blockchain's foundational ethos of decentralization. How such kill switches would be implemented, and how they could impact the development and use of smart contracts remains unclear. Scott McKinney and Laura De Boel, attorneys with Wilson Sonsini Goodrich & Rosati, told Cointelegraph that such a kill switch is "fundamentally incompatible with what a smart contract is" and how it's viewed.[55]

> *Article 36*
> *Essential requirements regarding smart contracts for executing data-sharing agreements*
>
> *1. The vendor of an application using smart contracts or, in the absence thereof, the person whose trade, business, or profession involves the deployment of smart contracts for others in the context of executing an agreement or part of it, to make data available shall ensure that those smart contracts comply with the following essential requirements of:*
>
> *(a) robustness and access control, to ensure that the smart contract has been designed to offer access control mechanisms and a very high degree of robustness to avoid functional errors and to withstand manipulation by third parties;*

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[53] BLOCKCHAIN 2023: DEFINITIVE GLOBAL LAW GUIDES OFFERING COMPARATIVE ANALYSIS FROM TOP-RANKED LAWYERS, (Lewis Cohen ed., 2023).
[54] Marin Karuza, SMART CONTRACTS - HOW SMART ARE THEY, AND HOW MUCH SMARTER CAN THEY BECOME? LEXOLOGY (2023), https://www.lexology.com/library/detail.aspx?g=078565ff-b835-4c1c-b888-4301d3409662 (last visited Apr 5, 2024).
[55] Francisco Rodrigues, BLOCKCHAIN DEVS EXPECT COMPLICATIONS FROM EU SMART CONTRACT KILL SWITCH COINTELEGRAPH (2023), https://cointelegraph.com/news/blockchain-adoption-eu-smart-contracts-law (last visited Apr 5, 2024).

*(b)**safe termination and interruption**, to ensure that a **mechanism exists** to **terminate the continued execution of transactions** and that the smart contract includes internal functions which can **reset** or instruct the contract **to stop or interrupt the operation**, in particular to avoid future accidental executions;*[56]

The Clifford Chance European Bank for reconstruction and development in their legal framework and proposed guidelines for lawmakers stated that in many jurisdictions, the courts will generally seek to uphold the parties' express choice of law governing a contract (including a smart contract) to the extent possible. In the absence of an express choice of governing law, courts would generally apply existing legal rules or principles to determine the law governing the smart contract. For contractual obligations, this will often depend on indicators, such as the habitual residence of the seller or service provider,[57] which are generally capable of being determined for smart contracts, just as for non-smart contracts.

1.6. Arbitration

The legal framework by the Clifford Chance European Bank also stated that smart contracts may be reviewed by courts or arbitration tribunals under the relevant legal system, just as any non-smart contract. The relevant legal system may allow the contracting parties to agree to refer certain disputes relating to smart contracts to a neutral third party or parties for arbitration. By way of illustration, if a dispute arises, or if a party to a smart contract identifies a deficiency or other issue relating to the smart contract that it cannot agree or resolve directly with the other party, it could raise an objection and trigger an arbitration clause in the smart contract.

Depending on the terms of the arbitration clause, this may automatically suspend the performance of the smart contract whilst the arbitrator assesses and resolves the issue. The arbitrator (or arbitral tribunal) would then assess and resolve the issue to the extent possible. The arbitrator's decision could then be fed directly into a DLT-based smart contract by means of an oracle. A number of organizations have already started developing arbitration clauses or "libraries" that parties could include in their smart contracts.[58] With the developments of smart contracts, parties can devise a mechanism whereby disputes on an agreement can be resolved by private adjudicators through self-enforcing decisions, the enactment of which does not depend on state-controlled recognition and enforcement procedures.[59]

In practice, there are several online dispute resolution mechanisms. The Online Dispute Resolution (ODR) Platform of the European Commission is one of the examples to help consumers and traders resolve disputes with their online customers without going to court. It can be used for any contractual dispute arising from online purchases of goods or services where the trader and consumer are both based in the EU or Norway, Iceland, and

[56] Excerpt of the Data Act relating to smart contracts. *Source: European Parliament*
[57] For example, under Article 4 Rome I Regulation.
[58] Michael Reuter, CODELEGIT CONDUCTS FIRST BLOCKCHAIN-BASED SMART CONTRACT ARBITRATION PROCEEDING DATARELLA (2019), https://datarella.com/codelegit-conducts-first-blockchain-based-smart-contract-arbitration-proceeding/ (last visited Apr 5, 2024).
[59] Pietro Ortolani, *The judicialization of the blockchain*, SSRN ELECTRONIC JOURNAL (2018).

Liechtenstein. Smart contracts have also been proposed as an alternative to Online Dispute Resolution.[60]

Smart contracts require redress mechanisms that enable the resolution of disputes without the need to leave the digital world, and without the necessity to file lawsuits before an ordinary court. A principal advantage of specific smart arbitration rules in comparison to traditional arbitration rules is that they could directly allow for documents and pleadings to be shared using the blockchain, as a verification mechanism. In this regard, the arbitration provision must be embedded in the code of the smart contract. Bearing in mind diverse national approaches toward the regulation of smart contracts, parties need to ensure that the law of the chosen seat of arbitration does not render a smart contract illegal or unenforceable.[61]

Today, there are two different approaches to dispute resolution for smart contracts. The first approach accepts that smart contracts can operate within the existing contract law framework, and the second one recognizes smart contracts as distinct legal tools, not as a digital alternative to traditional contracts.[62] The company called Aragon claims that it offers digital jurisdiction and a decentralized online court. The platform offers to create a decentralized autonomous organization (DAO) and has its own rules for these entities. These organizations will operate under their internal rules but within Aragon's legal framework.[63]

1.7. Conclusion

The emergence of smart legal contracts has brought forward unique challenges, particularly concerning jurisdictional issues. The discussion on jurisdiction regarding smart legal contracts encompasses various complexities stemming from their decentralized nature and cross-border operations. In the United Kingdom, courts and scholars have grappled with jurisdictional issues and have considered important factors to determine their competence to adjudicate the matter; these factors include the location of the contract's formation and the performance or breach of contractual obligations. However, challenges arise in cases involving distributed ledger technology and multilateral contracts, where participants span multiple jurisdictions as well as in unilateral solely code contracts or contracts formed by autonomous computer program interactions.

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[60] Riikka Koulu, *Blockchains and online dispute resolution: Smart contracts as an alternative to enforcement*, 13 SCRIPTED 40–69 (2016).

[61] Mateja Durovic, Horst Eidenmüller & Nikita Aggarwal, LAW AND AUTONOMOUS SYSTEMS SERIES: HOW TO RESOLVE SMART CONTRACT DISPUTES - SMART ARBITRATION AS A SOLUTION OXFORD LAW BLOGS (2018), https://blogs.law.ox.ac.uk/business-law-blog/blog/2018/06/law-and-autonomous-systems-series-how-resolve-smart-contract-disputes (last visited Apr 5, 2024).

[62] Darcy Allen, Aaron Lane & Marta Poblet, *The governance of Blockchain Dispute resolution*, SSRN ELECTRONIC JOURNAL (2019). Available at SSRN: https://ssrn.com/abstract=3334674 or http://dx.doi.org/10.2139/ssrn.3334674

[63] Aragon, THE ARAGON MANIFESTO ARAGON'S BLOG (2021), https://blog.aragon.org/the-aragon-manifesto-4a21212eac03/ (last visited Apr 5, 2024).

The intricate interplay of international laws and legal systems can make it difficult for these technologically advanced contracts to operate effectively. However, the contracting parties themselves hold the key to resolving these issues. By incorporating a well-defined jurisdiction clause or an arbitration clause into their agreements, parties can proactively anticipate and tackle potential disputes arising from the execution of smart contracts. With the developments of smart contracts, parties can devise a mechanism whereby disputes on an agreement can be resolved by private adjudicators through self-enforcing decisions, the enactment of which does not depend on state-controlled recognition and enforcement procedures.

Among the available options, arbitration presents itself as the optimal course of action. This is because arbitration offers a neutral ground, enabling parties to circumvent the complexities and biases associated with different jurisdictions. Additionally, it provides a confidential, rapid, and flexible dispute resolution process tailored to the specific needs of the parties involved. Finally, arbitration decisions are often enforceable across borders, ensuring a more efficient and streamlined resolution to disputes arising from the implementation of smart legal contracts. Therefore, the inclusion of arbitration clauses is a crucial and strategic step towards ensuring the smooth functioning and enforceability of smart contracts in an increasingly interconnected global legal landscape.