

The Recognition and Regulation of Smart Contracts in South Africa

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Abstract

Our understanding of contracts continues to evolve. Electronic contracts that have typically taken the form of shrink-wrap, click-wrap, web-wrap, scroll-wrap, multi-wrap and sign-in-wrap agreements have undergone further developments with the introduction of automation in electronic contractual engagements and, more recently, the advent of the so-called "smart contract". Different types of smart contracts exist, including smart contracts that operate on blockchain technology. Despite these developments in commercial and contractual activities, the South African legal framework does not officially recognise smart contracts. The use of the *Electronic Communications and Transactions Act, 2002* (ECTA) as a mechanism for the regulatory oversight of smart contracts in South Africa is, in its current form, woefully inadequate and limited in its application to smart contracts. Other jurisdictions, like the European Union (EU), have passed draft legislative and regulatory documentation called the *Data Act* to address smart contracts, whilst the UK Law Commission has provided recommendations to regulate smart contracts. As South Africa currently has no equivalent to the EU's draft *Data Act* and has not considered the operation of smart contracts in South Africa, the position in the EU and United Kingdom (UK) is considered in this paper to provide guidelines as to the aspects that it would be necessary to regulate in a South African context.

Keywords

Smart contracts; blockchain; ECTA; *Electronic Communications and Transactions Act*; fourth industrial revolution; 4IR.

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1 Introduction

Our understanding of contracts continues to evolve and develop. Tacit, oral and written contracts are recognised as valid and binding,¹ but the digital age and the advent of the internet have introduced new modes of contracting (or channels for communicating the parties' intent to contract), and thereby have recognised new types of contracts such as electronic contracts.² There have been many forms of electronic contracts, including those contractual transactions that underpin e-commerce. Electronic contracts in this context may be described as another conduit (or a tool) to assist contracting parties in engaging with one another.

Electronic contracts could be viewed as electronic versions of the contractual terms and could, for example, be found on a supplier's website or require the consumer to click a button to confirm the acceptance of such terms,³ which in turn supports e-commerce activities and electronic transactions.⁴ Such electronic contracts have been grouped into different categories, such as shrink-wrap, click-wrap, web-wrap, scroll-wrap, multi-wrap and sign-in-wrap agreements.⁵ In many respects the initial forms of electronic contracts remain manual contracting processes that have simply placed contractual terms on a different (electronic or digital) platform. Legal and practical difficulties have emerged from this in case law regarding the process of placing such electronic contracts in writing, and what would constitute a valid electronic signature.⁶

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¹ This is on condition that all the requirements for a valid contract are met, which includes consensus, contractual capacity, compliance with any relevant formalities, legality, the possibility of performance and certainty.

² Van Deventer 2021 *SALJ* 221 refers to this as an "online contract", which is effectively the presentation of the contractual terms in an electronic format. Typical examples of such online contracts can be found on websites, emails and WhatsApp communication. In this regard see *Jafta v Ezemvelo KZN Wildlife* 2008 10 BLLR 954 (LC) and *Stoop* 2009 *SA Merc LJ*. Also see Verstraete 2019 *Loy U Chi LJ* 751.

³ Werbach and Cornell 2017 *Duke LJ* 321.

⁴ Werbach and Cornell 2017 *Duke LJ* 321.

⁵ See Pistorius 2004 *SA Merc LJ*; Van Deventer 2021 *SALJ* 223.

⁶ See, for example, ss 12 and 13 of the *Electronic Communications and Transactions Act* 25 of 2002; *Spring Forest Trading CC v Wilberry (Pty) Ltd t/a Ecowash* 2015 2 SA 118 (SCA); *Borchers v Duxbury* 2021 1 SA 410 (ECP); *Aarifah Security Services CC v Jakoita Properties (Pty) Ltd* 2021 5 SA 207 (GJ); *Global & Local Investments Advisors (Pty) Ltd v Fouché* 2021 1 SA 371 (SCA). The purpose of this article is not to consider the issues of formalities in contracts, such as the issue of signature and writing, but only that of the recognition of smart contracts in the South African legislative and regulatory framework.

The natural progression of electronic contracts was to introduce a form of automation by embedding portions of the contract into computer code or creating automation in contract formation and execution.⁷ The first step towards automation was the data-orientated contract wherein contract terms are expressed in computer code (or machine-readable language).⁸ Put differently, data-orientated contracts represent contractual terms captured as data or reduced into a data form.⁹ These data-oriented contracts were followed by computer-orientated contracts, which allowed computer programs to execute the data-orientated contract in an automatic manner.¹⁰ The computer-orientated contract, however, suffers from the limitation of pre-determined (or pre-programmed) scenarios set out in the computer code. Against this background, one can say that commercial transactions conducted electronically and embedded in computer code are not necessarily something new.¹¹

The next step in technological developments has been driven by even more sophisticated and automated commercial transactions through the use, for example, of the decentralisation of emerging technologies. As contracts form the basis of a country's commercial activities,¹² the question raised as early as 1997 was whether, through the use of computer protocols and algorithms a contract might be fully automated in its different phases (such as automation during contract negotiations, the conclusion of a contract, the execution of contractual performances and the adjudication of contractual disputes).¹³ The idea was to use emerging technology to allow complete automation wherein digital codes, protocols and algorithms could automatically execute contractual performance without the need for human intervention throughout the contract lifecycle.¹⁴ Szabo described this technology as being a "smart contract".¹⁵ Since Szabo's initial description of a smart contract nearly two decades ago, there have been further

⁷ Werbach and Cornell 2017 *Duke LJ* 321.

⁸ Werbach and Cornell 2017 *Duke LJ* 321; Verstraete 2019 *Loy U Chi LJ* 752-753.

⁹ Verstraete 2019 *Loy U Chi LJ* 753.

¹⁰ Werbach and Cornell 2017 *Duke LJ* 321-322; Verstraete 2019 *Loy U Chi LJ* 753.

¹¹ Werbach and Cornell 2017 *Duke LJ* 320-321, who uses the examples of electronic data exchange and e-commerce platforms to illustrate this point. Also see Raskin 2017 *GLTR* 320-321.

¹² Ryder, Griffiths and Singh *Commercial Law Principles* 71.

¹³ Werbach and Cornell 2017 *Duke LJ* 322-323.

¹⁴ This may also be referred to as "end-to-end" contracting; see Norton Rose Fulbright 2019 <https://www.nortonrosefulbright.com/en-za/knowledge/publications/1bcdc200/smart-contracts>.

¹⁵ Szabo 2023 https://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart_contracts_2.html. Also referred to as "intelligent contracts"; see Juhasz 2020 *Acta Universitatis Sapientiae* 69.

developments, such as blockchain technology, that have created different forms of smart contracts.¹⁶

The smart contract can be described as an evolution of the electronic contract,¹⁷ but electronic and smart contracts are not necessarily the same thing. In South Africa electronic contracts are generally considered valid provided there is compliance with the common law requirements of a contract and the provisions of the *Electronic Communications and Transactions Act* (ECTA).¹⁸ However, although all smart contracts are electronic, not all electronic contracts are "smart". Thus, the evolution of the electronic contract into the so-called smart contract has not been directly addressed in the ECTA. In fact, at the time of writing this paper, there was no South African case law dealing with smart contracts, and the academic and legal discourse as it relates to South Africa was limited.¹⁹ There are, however, limited practical examples of the use of smart contracts in the South African context. Nevertheless, conceptually, academic discourse on smart contracts indicates the potential viable use of smart contracts in the insurance sector,²⁰ whilst smart contracts would, for example, not be viable in the context of surrogate motherhood agreements in a South African context.²¹ Internationally, however, smart contracts appear to be generally used in commercial and transactional contractual engagements.

As smart contracts are becoming a new contracting mode internationally,²² it is necessary to consider their recognition, validity and applicability in the South African legal framework, so as to assess whether there is a need for legislative interventions to regulate these forms of contractual engagements. To this end, this paper will consider the definitions of a smart contract, identify the types of smart contract, attempt to situate the smart contract in the context of the South African legal framework, and consider the developments in other jurisdictions (like the UK and EU) as examples of

¹⁶ Verstraete 2019 *Loy U Chi LJ* 750 notes that "[s]mart contracts represent the most recent instance of digital technology remaking contract law".

¹⁷ Also see Werbach and Cornell 2017 *Duke LJ* 317, who describe the smart contract as the evolution of the electronic contract.

¹⁸ *Electronic Communications and Transactions Act* 25 of 2002 (ECTA).

¹⁹ Save for Brownsword 2021 *Acta Juridica* and Van Eck "Disruptive Force of Smart Contracts" most of the material was of a non-academic nature, such as Seema 2021 *Without Prejudice*; Norton Rose Fulbright 2019 <https://www.nortonrosefulbright.com/en-za/knowledge/publications/1bc200/smart-contracts>; Atkinson 2020 <https://www.golegal.co.za/smart-contracts-digitisation/>.

²⁰ See, for example, Van Eck and Huneberg 2023 *TSAR*.

²¹ See, for example, Van Eck and Rosenberg 2023 *TSAR*.

²² Verstraete 2019 *Loy U Chi LJ* 766 argues that smart contracts are not only the next step in the technological development of contracting but also represent a "distinctively new system for coordinating [contractual] activit[ies] between individuals."

how smart contracts might be recognised and regulated in the South African context.

2 Smart contracts

The ECTA does not define a smart contract, and although there are several definitions in use internationally there are no uniformly accepted definitions of what exactly a smart contract is.²³ It is then perhaps worth starting with Szabo's description of a smart contract. Szabo notes that a:

smart contract is a set of promises, specified in digital form, including protocols within which the parties perform on these promises.

This definition illustrates the attributes of a smart contract. Firstly, a smart contract is a computer programme that is underscored by sophisticated algorithms and protocols. Second, those algorithms and protocols allow for the automatic (or autonomous) execution of contractual performances without the need for human intervention.²⁵ The UK's Law Commission, however, provides a generalised definition of a smart contract, which is described as:²⁶

[c]omputer code that, upon the occurrence of a specified condition or conditions, is capable of running automatically according to pre-specified functions.

In other words, a smart contract's characteristic feature is its automaticity,²⁷ being its ability to act autonomously (without human intervention) by

²³ UK Law Commission 2021 <https://s3-eu-west-2.amazonaws.com/cloud-platform-e218f50a4812967ba1215eaecede923f/uploads/sites/30/2021/11/Smart-legal-contracts-accessible.pdf> (hereafter UK Law Commission *Smart Legal Contracts*) 22-23 describes three conceptual forms of smart contracts, being those contracts traditionally written and reflected in natural language, in which some or all of the terms of the contract are automatically executed; the second relates to a hybrid contract where some of the contract is written in natural language and some of it is reflected in coded language; and finally a fully coded contract can occur where all the terms are recorded in code. Different US states provide different definitions, and the EU Draft Data Act (*Proposal for a Regulation of the European Parliament and of the Council on Harmonised Rules on Fair Access to and Use of Data* (Data Act) (COM/2022/68)) (the DDA) also defines smart contracts as "computer programs on electronic ledgers that execute and settle transactions based on predetermined conditions."

²⁴ Szabo 2023 https://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart_contracts_2.html.

²⁵ See Stazi *Smart Contracts and Comparative Law* 72. Verstraete 2019 *Loy U Chi LJ* 755 argues that the smart contract is also "self-enforcing" as it attempts to regulate contractual matters between parties and works outside the private law system. This argument appears to be conceptually flawed and somewhat outdated as the DDA has clearly limited such independence and has introduced standards and norms to regulate smart contracts in Europe.

²⁶ UK Law Commission *Smart Legal Contracts* vii.

²⁷ UK Law Commission *Smart Legal Contracts* 11-12.

functioning through the algorithms and protocols that underscore the computer programme, and thereby resulting in automatic transactions.²⁸ Automated transactions are, however, not a new development, as the use of computer programmes to automate the performance of contractual obligations has been around for a while.²⁹ Take for instance online shopping and automated bank payments (such as standing orders and direct debits). All involve some element of automation at the instance of either one (or both) of the contracting parties.³⁰ Many types of contractual obligations have thus been automated in this manner using simple (or standard) software programmes, in what Werbach and Cornell describe as the "computer-oriented contract".³¹

As such, from the outset a smart contract seems to be similar to a computer-orientated contract, and the characteristics of a smart contract provide little distinction from an automated electronic contract. However, there are smart contracts that utilise blockchain technologies.³² Here, the contract is drafted in code and is deployed on and utilises distributed ledger technology (DLT) systems.³³ As a result, novel legal questions arise due to the peculiar characteristics of blockchain technology.³⁴

Blockchain is a type of database that uses cryptographic functions to achieve data integrity and identity authentication,³⁵ and is an application of the DLT. DLT is an:³⁶

approach to [record] and [share] data across multiple data stores (ledgers), [in] which each have the exact same data records and are collectively maintained and controlled by a distributed network of computer servers, which are called nodes.

The participating nodes on the network are directly linked to one another and do not have a central intermediary or controller among them. Thus, every participant on the network has equal status.³⁷ The record of information of all transactions on the network is spread across the network

²⁸ UK Law Commission *Smart Legal Contracts* 1, 12.

²⁹ UK Law Commission *Smart Legal Contracts* 12. Also see Schmidt-Kessen, Eenmaa and Mitre 2022 *Computer Law and Security Review* 2-3.

³⁰ UK Law Commission *Smart Legal Contracts* 12.

³¹ Werbach and Cornell 2017 *Duke LJ* 321-322.

³² See Xu, Weber and Staples *Architecture for Blockchain Applications* 7-8; Imran *Mastering Blockchain* 28.

³³ Xu, Weber and Staples *Architecture for Blockchain Applications* 7-8; also see Bourque and Tsui 2014 *Scientia Nobilitat Reviewed Legal Studies* 5.

³⁴ See EU 2019 https://www.eublockchainforum.eu/sites/default/files/reports/report_legal_v1.0.pdf 5 -7.

³⁵ Bacon *et al* 2018 *Richmond Journal of Law and Technology* 5-6.

³⁶ World Bank Group 2017 <https://documents1.worldbank.org/curated/en/177911513714062215/pdf/122140-WP-PUBLIC-Distributed-Ledger-Technology-and-Blockchain-Fintech-Notes.pdf>.

³⁷ Imran *Mastering Blockchain* 16.

in such a manner that each participant (node) on the network has a complete copy of each transaction.³⁸ The transactions are recorded on the ledger as blocks of data, linked together through a hashing function to form an unbroken chain of blocks. Hence the name blockchain.

Hashing entails putting a data item through a hash function.³⁹ Imran describes such hashing functions as mechanisms to be "used to create fixed-length digests of arbitrarily long input strings."⁴⁰ What this means is that the data that are put into a hash function generate a string of digits of fixed lengths (called the hash value),⁴¹ that are unique to the input data. The unique hash value ensures the integrity of the data on the blockchain. This is because if the input data are changed even slightly, the hash value would change, making it obvious that the data have been tampered with. Further, hashing is a one-way function. In other words, it is irreversible, and it is not possible to re-create the original input from the hash value.⁴² This gives the blockchain its characteristic feature of immutability.

Finally, information on a blockchain is updateable only via consensus between the nodes, as any update made to the blockchain is validated against strict criteria defined by the blockchain protocol and added to the blockchain only after majority consensus has been reached among the participating nodes on the network.⁴³

A blockchain is, therefore, a decentralised, cryptographically secured record of transactions that cannot be tampered with. However, beyond being a record of transactions⁴⁴ the blockchain system allows smart contracts to be stored and executed as part of transactions on the blockchain.⁴⁵ As such, one of the fast-growing areas of the implementation of blockchain technology presently is its use for creating and storing smart contracts.⁴⁶

It is evident from the above that there are three general elements to blockchain technology, being "the ledger, the network and consensus".⁴⁷ The ledger is a reference to blockchain technology,⁴⁸ which comprises of

³⁸ Imran *Mastering Blockchain* 17.

³⁹ Bacon *et al* 2018 *Richmond Journal of Law and Technology* 9.

⁴⁰ Imran *Mastering Blockchain* 103.

⁴¹ Bacon *et al* 2018 *Richmond Journal of Law and Technology* 9.

⁴² Bacon *et al* 2018 *Richmond Journal of Law and Technology* 10-11.

⁴³ Imran *Mastering Blockchain* 17.

⁴⁴ According to Xu, Weber and Staples *Architecture for Blockchain Applications* 7-8 and Imran *Mastering Blockchain* 28, some of the emerging blockchain systems that enable the use of smart contracts include Ethereum and Multichain.

⁴⁵ Xu, Weber and Staples *Architecture for Blockchain Applications* 7-8 and Imran *Mastering Blockchain* 28.

⁴⁶ Savelyev 2017 *Information and Communications Technology Law* 117.

⁴⁷ Werbach and Cornell 2017 *Duke LJ* 326.

⁴⁸ Werbach and Cornell 2017 *Duke LJ* 326-327.

several blocks of data, and is effectively a mode of securely storing data.⁴⁹ The network refers to the participant nodes on the ledger, and consensus refers to the collaborative action of the participating nodes that drive actions on the chain. It is these features that make the DLT unique, as it overcomes the issue of central control and is completely decentralised in its operation.⁵⁰ In other words, there is no central body that confirms the validity of the transactions, but rather the nodes confirm the validity of the transaction separately, but also do so collectively.⁵¹ There is much value in the use of DLT technology in contracts as it makes it very difficult to make changes to the data in the blocks. It is believed that this type of contracting structure reduces the risk of fraud.⁵²

A smart contract that uses blockchain technology can be referred to as being "on the chain",⁵³ and provides certain assurances that the contractual performances will be fulfilled and cannot be circumvented by means of human intervention.⁵⁴ This aligns with some of the more recent definitions of a smart contract in the European *Draft Data Act (DDA)* which defines a smart contract as:⁵⁵

a computer program stored in an electronic ledger system wherein the outcome of the execution of the program is recorded on the electronic ledger.

The benefit of using DLT in smart contracts is the way the data of the transaction may be secured.⁵⁶ Therefore, due to the nature of the DLT, smart contracts that are "on the chain" are said to have additional characteristics (which their off-chain counterparts do not have) such as being immutable,⁵⁷ unchangeable and irreversible.⁵⁸

In this regard the DDA is one of the first regulatory documents that sets out standards and, more specifically, the requirements for the development of

⁴⁹ Werbach and Cornell 2017 *Duke LJ* 326-327.

⁵⁰ UK Law Commission *Smart Legal Contracts* 14.

⁵¹ UK Law Commission *Smart Legal Contracts* 14-15.

⁵² Pandey and Raghunath 2020 *NUJS Law Review* 6.

⁵³ Ethereum is an example of a blockchain platform that enables the use of smart contracts by enabling the smart contracts to be stored therein and executed as part of the transactions on the blockchain. Also see Verstraete 2019 *Loy U Chi LJ* 760-761.

⁵⁴ Also see Werbach and Cornell 2017 *Duke LJ* 330.

⁵⁵ Article 2(16) of the DDA.

⁵⁶ UK Law Commission *Smart Legal Contracts* 16.

⁵⁷ Pandey and Raghunath 2020 *NUJS Law Review* 6, meaning that such contracts cannot be changed or amended after their creation. Also see Seema 2021 *Without Prejudice*.

⁵⁸ See Stazi *Smart Contracts and Comparative Law* 72. In this regard, blockchain technology's unique characteristics are that it securely stores information, it verifies information and executes instructions and performance in an autonomous manner. See Seema 2021 *Without Prejudice*.

smart contracts.⁵⁹ These regulations are directed towards the creators of smart contracts and those parties in the supply chain that employ smart contracts. The DDA focusses on data-sharing protections and, more specifically, the "interoperability" of these systems.⁶⁰ The DDA sets out four general requirements for the development and deployment of smart contracts, these being:⁶¹

- (i) Robustness. Smart contracts must be robust in their design and use so to "avoid functional errors and to withstand manipulation by third parties."⁶²
- (ii) Termination. Smart contracts are required to have a "kill switch", which means that the smart contract must be able to "reset or instruct the contract to stop or interrupt the operation", as this would prevent any unintended execution of performance.⁶³
- (iii) Information storage. As smart contracts are required to include the ability to be terminated, they must also ensure that transactional data are archived and stored so to "keep the record of the operations performed on the data in the past",⁶⁴ which has been referred to as the principle of "auditability".⁶⁵
- (iv) Access controls. Smart contracts must include rigorous access control measures. This is a form of electronic security.⁶⁶ These control measures must be incorporated "at the governance and smart contract layers."⁶⁷

Compliance with the above requirements rests upon the vendor, and where there is no vendor then the business or person that trades or is involved in the deployment of the smart contract must issue a declaration of conformity.⁶⁸ Herein an additional standard may be implemented that these stakeholders must adhere to, so as to ensure compliance with the abovementioned requirements.

⁵⁹ Article 80 of the Preamble to the DDA.

⁶⁰ Article 86 of the Preamble to the DDA. According to Art 2(19), the term "interoperability" is described as being "the ability of two or more data spaces or communication networks, systems, products, applications or components to exchange and use data in order to perform their functions."

⁶¹ Article 30(1) of the DDA.

⁶² Article 30(1)(a) of the DDA.

⁶³ Article 30(1)(b) of the DDA.

⁶⁴ Article 30(1)(c) of the DDA.

⁶⁵ Article 30(1)(c) of the DDA.

⁶⁶ Article 30(1)(d) of the DDA.

⁶⁷ Article 30(1)(d) of the DDA.

⁶⁸ Article 30(2)-(3) of the DDA.

What is noticeable from these requirements is the evolution in the understanding of smart contracts. Smart contracts that are "on the chain" were initially thought to be irreversible, unchangeable, and immutable, which qualities were largely due to the nature and characteristics of blockchain technology. Much has been written about the dangers of the inability to terminate smart contracts "on the chain" and the EU legislature has seemingly taken note of these challenges by incorporating legislative measures to mitigate the risk by changing the very nature of these forms of contract. Incorporating a so-called "kill switch" in smart contracts that are "on the chain", which has the effect of simply changing their nature. There is arguably little that now differentiates smart contracts that are "on the chain" from those that are "off the chain".

Although the DDA is not applicable to South Africa it does provide some guidelines as to how other jurisdictions have approached smart contracts, which knowledge may prove useful to the South African legislature. Currently, in South Africa a smart contract will be subject to the ECTA, which is discussed further in the paragraphs that follow.

3 Recognition and regulation

3.1 Introductory comments

The European Law Institute (ELI) principles as well as the UK's Law Commission report on smart legal contracts found that it is possible for a person's will to be validly expressed in computer code through a smart contract, thereby constituting a legally binding declaration for contract formation.⁶⁹ Certain states in the United States of America (USA) have also legislated that a transaction may not be denied legal validity or enforceability simply because it utilises the smart contract. This includes, for example, Arkansas (which allows the use of smart contracts in the negotiation of

⁶⁹ See Principle 2(a)(3) of the ELI 2023 https://www.europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Publications/ELI_Principles_on_Blockchain_Technology_Smart_Contracts_and_Consumer_Protection.pdf (ELI Principles), which provides that: "a smart contract can be a legally binding declaration of will, such as an offer or acceptance or constitute a legal agreement itself" and Principle 5 – legal nature of transactions on a blockchain, which provides that "[t]he triggering of transactions, or of elements of transactions, performed on a blockchain may amount to an offer, acceptance or any other contractual declaration where, depending on the specific nature of the smart contract, such triggering can reasonably be understood as a declaration of will and is attributable to the relevant party." Also see UK Law Commission *Smart Legal Contracts* 40-48, which extensively analyses the applicability of the traditional formation requirements to smart contracts; the commission reaches the conclusion that automated transactions by code both on-chain and off-chain may suffice as legally binding declarations of will, sufficient to constitute both offer and acceptance for the purposes of reaching a contractual agreement.

contracts),⁷⁰ as well as the state of Arizona (which has introduced a Bill to recognise the general validity of smart contracts).⁷¹

Generally contracts, regardless of the form they take, will be valid and enforceable provided that all the requirements of a valid contract have been fulfilled. In this regard the validity of tacit, oral and written contracts has been recognised in South Africa. As the electronic contract is a variation of the written contract, it is necessary to briefly consider the forms that a written contract may take. Innes CJ in *Goldblatt v Fremantle* notes that a written agreement can take two forms.⁷² The first form is the instance where the contracting parties have orally entered into a contract and the written form of the contract is not essential to its validity.⁷³ Put differently, the written document merely serves as proof of the oral agreement that has been entered into by the contracting parties.⁷⁴ According to *De Bruin v Brink* there is a presumption that the parties are bound to the oral agreement unless there is clear evidence that they intended to be bound by the written contract only.⁷⁵

The second form is the instance where a written contract embodies the contract, and therefore there is no agreement prior to the written contract's coming into force.⁷⁶ In both instances the written contract may be written physically with ink and paper, or may be represented electronically by means of data messages, which are regulated by the ECTA (and will play a role in determining the origin of the contract when assessing the application of the ECTA to a smart contract – see below).

It is our view that the *Goldblatt* analogy is applicable to smart contracts as well. Our reasoning is that smart contracts that are preceded by an underlying traditional contract simply embody proof of the pre-existing agreement, and the terms have then been reduced into code.⁷⁷ Here the

⁷⁰ *Arkansas Code: Uniform Electronic Transactions Act, 2020* § 25-32-122 provides that a smart contract may be used for negotiating a contract.

⁷¹ Article 5(c) of the Arizona Bill HB 2417 titled *Signatures; Electronic Transactions; Blockchain Technology*.

⁷² *Goldblatt v Fremantle* 1920 AD 123.

⁷³ *Goldblatt v Fremantle* 1920 AD 123, 128.

⁷⁴ *Goldblatt v Fremantle* 1920 AD 123, 128.

⁷⁵ *De Bruin v Brink* 1925 OPD 68.

⁷⁶ *Goldblatt v Fremantle* 1920 AD 123, 129. Also see *Woods v Walters* 1921 AD 303, 304, which notes that a contract is not subject to being recorded in writing unless the parties expressly agreed to such a condition. Also see *First National Bank Ltd v Avtjoglou* 2000 1 SA 989 (C); *Minister of Justice and Constitutional Development v Myburgh* 2018 39 ILJ 553 (LAC) and *Brayton Carlswald (Pty) Ltd v Brews* 2017 5 SA 498 (SCA).

⁷⁷ UK Law Commission *Smart Legal Contracts* 22-24; ELI Principle 2; also see EU 2022 https://www.eublockchainforum.eu/sites/default/files/reports/SmartContractsReport_Final.pdf.

smart contract is not the contract itself. It is merely a representation or duplicate record of the existence of the contract and a tool for its enforcement. With this type, the validity of the underlying traditional contract suffices for the validity of the smart contract as well. The second type is an instance where the contract exists in the code of a smart contract only. It is akin to the second type of contract described under the *Goldblatt* analogy (that being where the written contract embodies the contract in its entirety) and may be described as an "on-chain" smart contract.

3.2 Current legislative framework

The ECTA is the primary legislative machinery regulating electronic contracts in South Africa. One of the purposes of the ECTA is to regulate electronic transactions,⁷⁸ and from the outset it is clear that information recorded in a data message is recognised as legally valid.⁷⁹

Similarly, the nature of a smart contract is represented by data through a computer program that automatically executes certain predetermined actions based on the underlying algorithms and the underlying data messages. The ECTA recognises the concept of an "automated transaction" and defines it as:

an electronic transaction conducted or performed, in whole or in part, by means of data messages in which the conduct or data messages of one or both parties are not reviewed by a natural person in the ordinary course of such natural person's business or employment.⁸⁰

Such an automated transaction seems closely linked to the autonomous characteristics of a smart contract. Added to this, the ECTA uses the term "electronic agent", which is described as:⁸¹

a computer program or an electronic or other automated means used independently to initiate an action or respond to data messages or performances in whole or in part, in an automated transaction.

Erlank and Ramokanate note that it is important that such an electronic agent acts independently of its human actors and thereby reviews and executes actions independently.⁸² There are different forms of automated transactions, the first being so-called "passive" automated transactions, which allow electronic agents only to review and contract strictly on pre-programmed requirements, which can be described as technological

⁷⁸ See the Preamble of the ECTA.

⁷⁹ Section 11(1)-(2) of the ECTA. Also see s 22(1), which notes that "[a]n agreement is not without legal force and effect merely because it was concluded partly or in whole by means of data messages."

⁸⁰ Section 1 of the ECTA.

⁸¹ Section 1 of the ECTA.

⁸² Erlank and Ramokanate 2016 *SA Merc LJ* 205.

conduits that facilitate the transaction between the parties.⁸³ This is closely linked to the operation of data-orientated and computer-orientated contracts, and it may be argued that this is the precursor to our understanding of the smart contract.⁸⁴

The second form of an automatic transaction may be described as an electronic data interchange arrangement (or EDI) wherein data are transferred between the parties without the parties reviewing the terms of the transaction at all.⁸⁵ This form of an electronic contract is closely connected to the operation of a smart contract, which at first glance appears to recognise the validity of the smart contract under the ECTA (being an automated transaction concluded by an electronic agent).⁸⁶ Erlank and Ramokanate note that in the EDI process one or both of the human actors are removed from the contracting process and are replaced by an automated agent.⁸⁷ Automated vending and ticket machines may be examples of this.⁸⁸

Conceptually, one or both of the contracting parties may use such an electronic agent,⁸⁹ which in this context could be considered to be a smart contract. However, the ECTA places a limitation on such automated transactions. Section 20(d) of the ECTA is of particular interest, stating that:⁹⁰

a party interacting with an electronic agent to form an agreement is not bound by the terms of the agreement unless those terms were capable of being reviewed by a natural person representing that party prior to agreement formation.

This prerequisite to the validity of autonomous contracts concluded by means of an electronic agent is important. This means that for automated "smart" transactions to be valid under the ECTA, there must first be a written version of the terms of the contract, which must be reviewed by the party that is not using the electronic agent.⁹¹ In other words, there will at the very

⁸³ Erlank and Ramokanate 2016 *SA Merc LJ* 205.

⁸⁴ See Erlank and Ramokanate 2016 *SA Merc LJ* 206-207.

⁸⁵ Erlank and Ramokanate 2016 *SA Merc LJ* 206.

⁸⁶ Section 20 of the ECTA.

⁸⁷ Erlank and Ramokanate 2016 *SA Merc LJ* 204.

⁸⁸ Erlank and Ramokanate 2016 *SA Merc LJ* 205; such autonomous agents are considered to be "passive" in nature.

⁸⁹ Section 20(b) of the ECTA.

⁹⁰ Section 20(d) of the ECTA.

⁹¹ Some have argued that with smart contracts the code becomes the contract, but s 20(d) of the ECTA removes this possibility as the code must be reflected in natural language structures. Also see, for example, Norton Rose Fulbright 2019 <https://www.nortonrosefulbright.com/en-za/knowledge/publications/1bcd200/smart-contracts>.

least be the need to place the agreement in a written document for the smart contract to be valid.

In this regard one may argue that the written form, which is represented in natural language, is not too dissimilar from the first category of contracts as described in *Goldblatt v Fremantle*. Put differently, the digital version of the automated transaction (or, in this case, the smart contract) is not the contract itself but is rather proof of the contract, or facilitates the performance of the contract. This is an important distinction as this implies that the smart contract (in whatever form it takes) simply serves as a tool for the execution of the written contract and is not the sole embodiment of the contract itself.

Added to the requirements in section 20(d), the ECTA qualifies electronic contracts further. For instance, section 20(e) of the ECTA notes that automated transactions also require the following corrective mechanisms:⁹²

no agreement is formed where a natural person interacts directly with the electronic agent of another person and has made a material error during the creation of a data message and-

- (i) the electronic agent did not provide that person with an opportunity to prevent or correct the error;
- (ii) that person notifies the other person of the error as soon as practicable after that person has learned of it;
- (iii) that person takes reasonable steps, including steps that conform to the other person's instructions to return any performance received, or, if instructed to do so, to destroy that performance; and
- (iv) that person has not used or received any material benefit or value from any performance received from the other person.

The above provides a distinct limitation to the use of smart contracts "on the chain" and is in direct conflict with the characteristics in that they are immutable, unchangeable and irreversible. Put differently, section 20(e) of the ECTA does not support the immutability of a contract. In this regard the very nature of smart contracts "on the chain" is hampered by the qualification set out in section 20(e), which expects electronic contracting systems to allow for the termination of or correction of the contract.

4 Additional limitations under consumer protection

The current requirements set out in the ECTA would require a smart contract to comply not only with the common law requirements for a contract but also with the provisions of the ECTA. These provisions (discussed in para 3 above) are the basis upon which a smart contract would be recognised and enforced under the current legislative provisions in South

⁹² Section 20(e) of the ECTA.

Africa. In addition to the common law requirements for a valid contract and the ECTA, which deals specifically with the recognition of smart contracts, there are other ancillary legislative and regulatory provisions that may influence the operation of a smart contract in South Africa. Take, for instance, the *Consumer Protection Act* (CPA).⁹³ Insofar as smart contracts are used to provide goods or services then they must comply with the provisions of the CPA,⁹⁴ as well as the *National Credit Act* (insofar as such goods or services are financial in nature).⁹⁵ However, these pieces of legislation are silent on consumer protection in the context of smart contracts. On the other hand, in Europe principle 17 of the ELI Principles introduces a duty to code smart contracts in a manner that takes cognisance of all consumer rights available off-chain, and to code the smart contract in a manner that conforms with and upholds all such available rights, including for example the right to a cooling off period or the consumer's right to terminate the contract. What this means, then, is that any vendor that wishes to deploy a smart contract for the purposes of concluding a contract with consumers in Europe would have to ensure that the smart contract is coded in such a manner that allows the consumer to freely exercise its consumer rights. The "kill-switch" requirement proposed by the DDA would also result in the same consequences.

Also, the UK Law Commission notes that the rights and interests of consumers must be protected by:⁹⁶

- (i) ensuring that coded terms are explained to the consumers before a contract is concluded;
- (ii) complying with the transparency requirement wherein clear and informative pre-contractual literature is provided to the consumer to explain what coded terms mean and how they will operate; and
- (iii) ensuring that smart contracts are only used in the business-to-consumer (B2C) contracts if the contract is coded in a manner that takes cognisance of the consumer's right to terminate, and to ensure that the smart contract is capable of terminating in such a manner.⁹⁷

The South African legislative framework has not considered the practical and legislative limitations of smart contracts. By way of example, should a smart contract fall within the ambit of the CPA, then such a contract would be subject to the duties under the CPA. Although it is not the purpose of this article to provide a detailed analysis of the CPA's application to smart

⁹³ See the *Consumer Protection Act* 68 of 2008 (CPA).

⁹⁴ See s 5 of the CPA.

⁹⁵ *National Credit Act* 34 of 2005.

⁹⁶ UK Law Commission *Smart Legal Contracts* 158-162.

⁹⁷ UK Law Commission *Smart Legal Contracts* 158-162.

contracts, it is necessary to note that there may be some limitations to the enforcement of the rights embedded in the CPA. There are several instances where the CPA affords consumers the right to terminate or cancel a consumer contract. A good example of this may be found in section 17(2), wherein an advance booking reservation may be terminated, and section 14(2)(b) of the CPA,⁹⁸ which allows a consumer to terminate a fixed term agreement upon its expiry,⁹⁹ and to cancel a fixed term agreement at any time within 20 business days.¹⁰⁰

Although the consumer would be liable for outstanding amounts on the contract and possible (reasonable) penalties, the consumer may nevertheless terminate or cancel a fixed-term consumer contract under these circumstances.¹⁰¹ However, if such a consumer contract is also a smart contract "on the chain", then the underlying nature of blockchain technology will prevent the termination of such a contract as the smart contract would automatically execute the contractual performances.¹⁰² These are the exact challenges that the European legislators foresaw, which is why they introduced the DDA, allowing for the so-called "kill switch", as well as the UK Commission's recommendation to ensure consumers have the right to terminate the consumer contract.

Further, the CPA clearly notes that no conduct may be undertaken that would contravene or frustrate the protections afforded under the CPA.¹⁰³ Therefore, the smart contract "on the chain" in the context of the CPA would have limited use, as it would have to account for the rights for the consumer to terminate the contract. Added to this, section 20(d) of the ECTA requires that an agreement must be embodied in the written contract and not in the computer programme (or for our purposes the smart contract) itself. Therefore, a smart contract that continues to execute contractual performance after a party has terminated the contract would result in a breach of the contract.

Finally, the *Protection of Personal Information Act* (POPIA) may have a bearing on the way smart contracts operate.¹⁰⁴ A smart contract operates

⁹⁸ A fixed-term contract has been described as a special type of agreement under the CPA; see Naudé and Eiselen *Commentary on the Consumer Protection Act* 14–3.

⁹⁹ Section 14(2)(b)(1)(aa) of the CPA.

¹⁰⁰ Section 14(2)(b)(1)(bb) of the CPA. This right applies only to consumers that are natural persons; see Naudé and Eiselen *Commentary on the Consumer Protection Act* 14–5.

¹⁰¹ See ss 14(3) and 17(4)-5 of the CPA.

¹⁰² Such contracts are described as being unstoppable due to the use of blockchain technology. See Norton Rose Fulbright 2019 <https://www.nortonrosefulbright.com/en-a/knowledge/publications/1bc200/smart-contracts>.

¹⁰³ Section 4(5) of the CPA.

¹⁰⁴ Normally a contract would include some personal information such as the contracting parties' names and surnames, their ID numbers (or passport numbers) and details

on "data messages", and although this may be of interest when considering the protection of personal information, POPIA does not provide detailed regulations in relation to other data which may not be personal in nature. This, nevertheless, would still require compliance, but nothing in POPIA would function as an inhibitor against concluding a smart contract, provided that such information remains secure and protected in terms of POPIA.

5 Conclusion

Smart contracts will not replace traditional contracts. In fact, smart contracts are subject to contractual principles and doctrines and cannot operate without these in place.¹⁰⁵ However, a smart contract is attractive in modern commercial transactions as it promises reduced costs and improved efficiencies.¹⁰⁶ The smart contract may have additional benefits. For instance, the smart contract has been described as a form of digital of crypto-escrow account.¹⁰⁷ There is an argument in this that such automation might replace the need for people to engage with the formation and execution of contractual performance, which would reduce costs and thereby (at least at a theoretical level) make contracting more affordable.¹⁰⁸

Although the ECTA provides some recognition of automated contracts, there are limitations to such recognition. Electronic agents are for the most part considered to be digital tools under the ECTA,¹⁰⁹ a position which appears to be similar to the revised position in Europe under the DDA. This being said, for smart contracts to operate properly and to their full potential there will be a need for legislative intervention to address the various risks inherent in them. These risks may include, for example:

- (i) There is currently little or, dare one say, almost no specific regulatory oversight of the operation of smart contracts in South Africa. No legislative or regulatory recognition or definition has been given to smart contracts, nor have any parameters been set for their utilisation

of their *domicilium* addresses, which may include a physical or postal address, email address or other contact information. Such information may very well fall within the ambit of "personal information" in s 1 of the *Protection of Personal Information Act 4* of 2013 (POPIA).

¹⁰⁵ Also see Werbach and Cornell 2017 *Duke LJ* 318.

¹⁰⁶ See Stazi *Smart Contracts and Comparative Law* 4.

¹⁰⁷ In the New York case of *In Re Bibox Group Holdings Limited Secs Litig* 534 F Supp 3d 326 – Dist Court, SD New York (2021) 330, which has described it as follows "[a smart contract] essentially functions as an automated, secure digital escrow account. A smart contract allows the parties to define the terms of their contract and submit the crypto-assets contemplated in the contract to a secure destination. The smart contract then automatically distributes the crypto-assets to the appropriate party upon the satisfaction of the relevant conditions precedent defined in the smart contract."

¹⁰⁸ Werbach and Cornell 2017 *Duke LJ* 322.

¹⁰⁹ Erlank and Ramokanate 2016 *SA Merc LJ* 213-214.

and functions. Initial discourse on the topic suggests that smart contracts should operate independently without government or legislative oversight, which is not a viable option, as this would create a social and legal crisis. The developments in Europe (under the DDA) intend to set clear standards (or norms) upon which smart contracts may operate, and the South African legislature might consider such developments either by introducing new legislation or by updating the ECTA.

- (ii) People are involved in the coding of smart contracts, which means that there is a possibility for errors in the code. There should be a standard of conduct for programmers and suppliers to protect the contracting parties against such errors, which might be represented as a code of conduct for such programmers.
- (iii) The use of smart contracts must not in any way circumvent consumer protection measures.

Until the South African legislature intervenes, smart contracts enjoy only limited recognition in South Africa and, given the absence of clearly defined parameters for their use, they will presently operate with legal uncertainty. Such legal uncertainty may result in smart contracts being unenforceable in a South African context. This is particularly the case when considering that such smart contracting structures would have to comply with the provisions of the ECTA, and that the ECTA (in its current form) would not be sufficient to recognise smart contracts fully. We have, in this context, made the argument that one should not be fooled into thinking that section 20 of the ECTA is sufficient in regulating such contracting structures. This notwithstanding, there remain significant risks for contracting parties without proper legislative intervention, including that such contracts would not be legally recognised, thereby leaving contracting parties without any tangible legal recourse. Although the DDA is still in draft form and still provides the opportunity for the European legislature to introduce even more regulations, it could perhaps be a starting point for the navigation of the complexities of smart contracts. South Africa needs to seize this opportunity and introduce meaningful legislative change for emerging technologies,¹¹⁰ failing which it may run the risk of falling behind on the international commercial platform, which could impact on commercial activities in the country.

¹¹⁰ In addition to the DDA, internationally there are several draft legislative instruments that have considered emerging technologies related to artificial intelligence, such as, in Europe the *Artificial Intelligence Act* of 2021, 2021/0106(COD), in Canada the *Digital Charter Implementation Act* of 2022, Bill C-27, in the USA the *National Artificial Intelligence Initiative Act*, 2020, HR 6216 and *Algorithmic Accountability Act*, 2022 as well as in China the *New Generation of Artificial Intelligence Development Plan Act* 35 of 2017.

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List of Abbreviations

4IR	fourth industrial revolution
CPA	Consumer Protection Act 68 of 2008
DDA	Draft Data Act
DLT	distributed ledger technology
Duke LJ	Duke Law Journal

ECTA	Electronic Communications and Transactions Act 25 of 2002
EDI	electronic data interchange
ELI	European Law Institute
EU	European Union
GLTR	Georgetown Law Technology Review
Loy U Chi L J	Loyola University Chicago Law Journal
POPIA	Protection of Personal Information Act 4 of 2013
SALJ	South African Law Journal
SA Merc LJ	South African Mercantile Law Journal
NUJS Law Review	National University of Juridical Sciences (Kolkata) Law Review
TSAR	Tydskrif vir die Suid-Afrikaanse Reg
UK	United Kingdom
US / USA	United States of America