



The Applicability and Prospects of CISG on Smart Contracts

Yufei Zhang^(✉)

Department of International Economic Law, The City University of Macau, Macau, China
17261098@bjtu.edu.cn

Abstract. The trend in the era of digital globalization has led to innovative attempts in the field of international trade, for example, in the form of smart contracts. Smart contracts aim to digitally automate the execution of legal contracts and improve the ease of trade. However, its formation conditions, validity and risk control, are yet to be regulated by law. The United Nations Convention on Contracts for the International Sale of Goods (CISG), as a uniform substantive law regulating the commercial relations of States in international commercial activities, is valuable in responding to the emerging legal issues arising from the products of technological developments. This study discusses the specific criteria for the formation of smart contracts under the CISG Convention from the perspective of international law and in relation to the specific legal elements. Following this, it analyses the loopholes and challenges of smart contracts in practice from the perspective of contractual freedom and disintermediation, and proposes some improvements in preserving the immutability of the contract and reducing the risk of third party platforms. Finally, the prospects for the application of smart contracts as an aid in international commercial contracts are discussed.

Keywords: CISG · Smart Contract · Contractual Freedom · De-intermediation

1 Introduction

As an emerging product and core component of the Blockchain technology, smart contracts have emerged and been applied in commercial transactions. A smart contract is essentially a piece of on-chain code that aims to truly digitize legal contracts in the future, i.e. the automatic enforcement of contractual terms. It differs from traditional contracts presented in the form of procedural codes, which brings new opportunities and challenges to international trade in digital globalization. The United Nations Convention on Contracts for the International Sale of Goods (CISG), as a unified substantive law that is widely applicable to international commercial activities and regulates the commercial relations of States, is both principled and flexible. CISG's response to the question of the legal validity of smart contracts is of broad guidance. Meanwhile, the question of whether the existing CISG can regulate smart contracts is in debate. At present, UNCITRAL does not explicitly state in its text whether CISG can be used to regulate smart contracts. There is still room for debate about whether and when a smart contract is valid under CISG.

This article will discuss the validity of smart contracts, classified as contracts for the sale of goods at the contract formation stage in the CISG regulations. It will also provide suggestions for filling the gap in applying the CISG to smart contracts. It is important to note that the validity issues explained here are limited to “constitutive validity” only. This article does not consider factors affecting a contract’s validity, such as the contracting party’s capacity to act or not act, i.e., there is no other cause of invalidity by default. In other words, as long as a smart contract meets the CISG’s requirements for the constitution of a contract, then it should be considered binding.

2 Background of Smart Contracts

As a new contract model in blockchain systems, a smart contract is a piece of code stored on the Blockchain and is written in the contract account to agree on the terms and content of the contract. It can be triggered for execution when the parties implement a specific business operation. It is executed on each full node, and even if the data on a single node fails, it does not affect other nodes. This gives consistency in the execution of smart contracts and allows the decentralized nature to be used to ensure that business rules are correct. At the same time, it cannot modify the smart contract code to hedge against the risk of abusive modifications. Once the contract is set up and delivered to run, the operational terms are automatically enforced according to the code instructions. Finally, the third party will load the code of the smart contract into a platform such as “ChainVM”, which executes the code and eventually writes the result of the execution to the blockchain, which is executed and stored in all nodes [1]. Thus, the central point of forming a smart contract is the controlling act performed by the parties. Individual code has no legal effect. Therefore, the central legal issue is thus focused on the formation phase of the contract rather than the execution phase.

Smart contracts are not just a developing computer science technology. They are an emerging and pressing legal issue. The legal gap increases the uncertainty surrounding using smart contracts for trading purposes. This lack of clarity has led to an overestimation of the risks associated with using smart contracts, which is detrimental to the further development and application of the technology. Actually, in international trade, smart contracts can offer parties convenient tradings and more opportunities for cooperation, and the World Trade Organization has published a report on its opportunities and challenges [2]. Regarding to the existing law, as CISG still has the capacity to regulate smart contracts entered into by UK traders, the Law Commission for England and Wales also opened a public call for evidence on the topic of the existing law’s ability to adequately regulate smart contracts [3].

At the same time, questions arise: can smart contracts be adapted using CISG, and are the current provisions of CISG sufficient to accommodate the changes brought about by smart contracts?

3 Determination of the Elements of a Contract Under CISG

On the basis of the above analysis, it can be seen that the question of whether smart contracts can be adapted under the CISG in international trade relates to the discussion

of its formation under the CISG. The discussion of offers and promises of contract formation in the CISG should start with Articles 14 and 18.

3.1 Elements of an Offer for the Formation of a Contract

3.1.1 Constitute an Offer

The primary requirement for forming a contract in Article 14 of CISG is that the offeror should expressly intend to enter into a contract. Unlike the natural language interpretation logic of traditional contracts, smart contracts are compiled in binary characters and carry the expression of meaning in a code language. Computer language has the objectivity of description and the preciseness of logic to reflect the legal meaning and logic [4]. In addition, as mentioned above, smart contracts have a specific language of implementation set out in advance. In international trade, smart contracts effectively reduce the potential risks of significant misunderstandings caused by misconceptions in the face of traders with different cultural backgrounds and legal systems. It can be concluded that smart contracts meet the requirements of this criterion and have a certain innovative value for the state of the offer that is expected to be reached.

3.1.2 One or More Specific Persons

The practical operation of smart contracts relies on two cryptographic infrastructures. It consists of a “public key” that identifies the address of the account and a “private key” that is the electronic signature of the participants. The blockchain system is first required to authenticate and authorize the offeror, who can then issue an offer in code to all platform users in the form of a contract that reflects their intention to enter into a contract. The authorization of the transaction is then triggered by the other participants with their private keys [5]. According to the UNCITRAL’s *Model Law on Electronic Commerce and the Guide* issued in 1996, data messages, including paperless messages automatically generated by a computer, should be considered as coming from the computer’s legal entity [6]. Although this is not explicitly stated in the CISG, it can be interpreted by analogy from the perspective of legislative intent that the legal entity of the offeror is capable of being traced at this point. Therefore, the smart contract satisfies the party formation element.

3.1.3 Sufficiently Definite

Sufficiently Definite here refers to specific information about the quality, price and quantity of the main objects of the contract. Firstly, the state of the object corresponding to the language of the code form of implementation is certain and known to the parties. There is little possibility of inadvertence or material misunderstanding. Secondly, platform tokens are used in platform transactions, and the actual value of the underlying object is measured against the immediate exchange rate of the token [7]. Exchange rates for larger amounts in international transactions require inter-bank charges, and there is also the risk of delays and ups and downs [8]. Digital tokens can reduce these risks and increase efficiency significantly. For example, smart contracts are currently used in the field of digital token financing, where the code indicates the commodity to be converted into

tokens, the price at which the tokens will be sold and the number of tokens represented. Smart contracts thus meet this requirement and are very helpful in practice.

3.1.4 Intention of the Offeror to Be Bound of Acceptance

To determine whether an offer is binding, the offeror can rely on the provisions of Article 8 of the CISG [9]. In determining the offeror's intention to be bound in case of acceptance, due consideration is to be given to all relevant circumstances of the case, including the negotiations, any practices which the parties have established between themselves, usages and any subsequent conduct of the parties. Considering the immediate and tamper-evident nature of smart contracts, there is no subsequent possibility of negotiating the offer. Secondly, smart contracts are self-executing, and the parties should be familiar with this rule [10]. It can be presumed to be a default binding offer. This is following the requirements of Article 14.

3.2 Elements of the Promise for the Formation of a Contract

Article 18 of the CISG sets out the elements for forming a promise, which is a declaration or act by the offeree to indicate its consent to an offer [11]. In some engagements, the offeree agrees without further notice by doing an act [12]. In the case of smart contracts, the parties can carry and realize this expression of intent with a private electronic signature. This leads to a certain degree of separation between the parties and their own consent, and the insecurity of personal information also affects the legal validity of the electronic signature.

There is some debate in the academic community about whether a smart contract can make a contractual commitment, with some arguing that an electronic signature in the form of a code lacks legal effect. This issue should be discussed from the following two aspects. From the legislative purpose of CISG, CISG is established to reduce the legal barriers to international trade of goods and promote the development of international trade. Its rules combine the common law and civil law systems, aiming to integrate the legal concepts of different countries and to encourage more countries to join the CISG and share the fruits brought by the development of global trade. From the point of view of principles of contractual interpretation, the Convention provides that the international nature of the Convention and the need to promote uniformity in its application, as well as the need to observe good faith in international trade, need to be taken into account [13]. According to Article 11, a contract of sale need not be concluded or evidenced in writing and is not subject to any other conditions. Thus, the Convention clearly focuses on the substance of the contract, which is the achievement of consent, rather than on the form of the contract. Therefore, smart contracts can satisfy the criterion of giving a promise. Combining the legislative purpose of the CISG and the legislative concept of Article 11 which focuses on the substance of the contract, it can be concluded that a digital signature in a smart contract should have the same legal effect as a traditional signature [14].

4 Challenges and Suggestions

4.1 Challenges in Practice

The practical value of smart contracts has two sides, and while it offers many conveniences, it still has several problems.

The first challenge is the limitation on contractual flexibility. For example, at the contract formation stage, the immediate and immutable nature of the offer publication of a smart contract guarantees efficiency. However, the offeror does not enjoy the right to withdraw the offer under Articles 16 and 17 of the CISG. Unlike traditional contracts where a counter-offer can modify the contract's contents, the offeree can only choose to reissue a new offer and wait for the other party to respond. This means that in smart contracts, we cannot apply the provision in Article 19 CISG that a change in the offer constitutes a counter-offer. Silence is considered to reject the offer, except where the parties have supplemented their agreements. In smart contracts, we cannot apply silence as a promise under Article 18.3 CISG. The validity of late acceptance under Article 21 of the Convention is deemed to reject the offer under a smart contract. Smart contracts impose considerable restrictions on the parties' expression of intent and raise the standard of contract formation. Assumed, then, when parties enter into a smart contract for the sale of goods via the Internet, it is immediately accepted and automatically executed once it has been encoded and added to the blockchain. There is no possibility of negotiation or modification of the specifics and no time for the parties to consider it. This means that the content of the smart contract must be fully satisfied by both parties at once for the contract to be formed.

The second challenge is the paradox of incomplete de-intermediation. Traditional contract formation is mostly based on the parties' credibility and widespread acceptance. Smart contracts, on the other hand, break the transaction mechanism of the acquaintance society and create a platform of trust for unfamiliar parties. Smart contracts reduce the cost of contracting, but there are still loopholes. Firstly, the code level at this stage does not allow for full compliance with legal language. There is a need for improved technology and further compliance reviews. Secondly, there is the potential for code vulnerabilities to be hacked. The "DAO Incident", a costly incident on the Ether platform, involved hackers exploiting a vulnerability in the investment fund company DAO Smart Contract to transfer \$50 million to their private accounts [15]. Third-party platforms are responsible for both censorship and encryption, and the current state of technology makes it difficult to hedge these excessive risks.

4.2 Suggestions

Firstly, in terms of contractual flexibility, there seems to be an irreconcilable contradiction between the rigidity of smart contracts and the flexibility of CISG. CISG, as a uniform norm for international commercial activity, needs to accommodate the various changes that can occur in transactions. Smart contracts sacrifice flexibility for efficiency and low cost and eliminate the possibility of risk during service. This article argues that the two need not bridge this divide, and that if smart contracts are subject to arbitrary change as ordinary contracts are, this will undermine the advantage of parties choosing smart

contracts. By choosing a smart contract, the parties should be deemed to voluntarily waive the right to withdraw the offer, the right to rescind, the right to exercise the counter-offer by amending the contract, and the right to assert the validity of a promise issued after the deadline, as granted under CISG.

Secondly, the risks of disintermediation can be transferred. Platforms have a large pool of technical expertise and should focus on improving the level of encryption. There should also be an increase in the consistency of code technology and legal language to allow for the implementation of compliance tests. Risks at the contracting stage should belong to both parties. For example, platforms could allow parties to create new smart contracts through their code proposals, which are subsequently emailed to the other party's emails.

5 Conclusion

In the era of digital globalization, it is easy to foresee the future trend towards easier and more efficient transactions and contracts. We can fully apply the aims and specific elements of the CISG Convention to smart contracts. The foresight and inclusiveness of the CISG thus allow it to fully accommodate and actively face digital globalization and provide a regulatory basis for new models such as smart contracts. However, the limitations of smart contracts in terms of contractual freedom and disintermediation do not seem to make it a model that can be used independently to serve widespread international trade. At this stage, it is only recommended that partners with trading experience partially use it in trade. It will be extended in the future when the code technology is further improved.

Authors' Contributions. The author summarizes the possible applicability of smart contracts under the CISG specification. The author proposes an alternative to the conflict between smart contracts and CISG in contractual freedom and also innovatively propose a reallocation of responsibility for de-intermediation.

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