Regulating smart contracts
and
the regulator's smart contracts

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Abstract:
Sooner or later, a technological innovation becomes a matter of law. Users of the innovation — those who benefit from it but also those harmed by it — demand regulations. Blockchains are quietly entering the legal world via corporate financing. Smart contracts, though still of limited use, should soon join them. They are so complex that their development depends on a secure legal framework. The nature of this new sort of contract must be legally qualified; and its uses, identified. Although most uses are private, we can imagine regulatory authorities using smart contracts…

Always the same dilemma when faced with a technological innovation: is it to be regulated?[1] A second question immediately follows: how to regulate it? An "institutional regulation" (by law or decree in comparison with self- or co-regulation) is often criticized. It is nearly always unstable and has gaps. Blockchains are advancing toward institutional regulation; and consequently, smart contracts will, we suppose, soon do so too, the aim being to ensure a harmonious development in the private sphere of law. But the public sphere could also benefit from this technolegal innovation. Smart contracts, a subject of regulations, could become a means of regulation.

Smart contracts as a subject of regulations

The development of technology in corporate financing has made it appropriate to adopt an institutional form of regulation. The bill of law that became the Macron Act foresaw authorizing the government (with parliament's approval) to adopt by executive order all measures necessary for adapting the body of law applicable to financial or transferable securities so that clearing and settlement could be done via shared electronic records.[2] This provision was left out of the act itself, because the rapporteur considered "dubious" the expansion of such an authorization.[3] Instead, a legal framework was provided for transactions on a blockchain of certain unlisted securities.

[1] This article has been translated from French by Noal Mellott (Omaha Beach, France). The translation into English has, with the editor's approval, completed a few bibliographical references.
[2] The Macron Act n°2015-990 of 6 August 2015 for economic growth, activity and equal opportunities. Texts of French law are available via: https://www.legifrance.gouv.fr/Droit-francais or http://eur-lex.europa.eu/n-lex/legis_fr/legifrance.joexpert_form_en..
[3] The "Sapin 2 Act" n° 2016-1691 of 9 December 2016 on *"transparency, the fight against corruption and the modernization of the economy*" allows for a regulatory framework to be set up about using blockchains for unlisted securities. See the article by Malo Carton & Pierre Jérémie in the current issue.

In effect, the executive order[4] of 28 April 2016 only foresaw the creation of "mininotes" (*minibons*) on the model of an old financial instrument, corporate notes. A decree[5] of 28 October 2016 regulates the conditions for the issue of these mininotes and their conveyance, which *"results from recording the transfer in an electronic register as mentioned in Article L223-12, which takes the place of a written contract for the application of articles 1321 and 1322 of the Civil Code. By default, under the exemption to the provisions of Article 1323 of this Code,[6] the transfer of the property of mininotes ensues from their being recorded under the purchaser's name in the register foreseen by Article L223-4."* The register mentioned under Article L223-12 is defined as a shared electronic register for authenticating operations under the conditions, in particular of security, set by decree. This indirect reference to blockchain technology has no effect as long as a decree is not issued.

Since MPs still had cause for concern, a written question was submitted: *"When the technology will have been sufficiently developed and litigation arises, the questions related to the liability of the parties involved, the obligations of the 'access-provider', the right to be forgotten or consumer protection will be asked in a legal vacuum."*[7] The author wanted to know the government's intentions for setting up a genuine legal framework for blockchain technology.

In response, Article 120 of Act n° 2016-1691 of 9 December 2016 on *"transparency and the fight against corruption"*[3] empowered the government to reform, by 9 December 2017, the body of law applicable to financial securities so as allow for the clearing and settlement via a shared electronic register (distributed ledger technology, DLT) of financial securities that are not subject to a central depository of securities and are not delivered via clearing and settlement procedures for financial securities. Although not the only method concerned,[8] blockchains are the principal target of the planned-for regulations. The government has held public hearings to gather the opinions of the parties concerned.

Let us draw a few lessons from all of this. For on thing, the French Civil Code, the principal body of law on relations between private parties, applies by default. When its provisions are incompatible with a technology, there has to be an exemption or dispensation. For another, associating stakeholders in the process of drafting regulatory texts tends to reinforce their willingness to accept the regulations — at least when their expectations are taken into account. Furthermore, the advice of experts should not be overlooked on such complicated technical topics.

The Internet is a space allowing for the free and equal expression of opinions, a space where the technology of blockchains and smart contracts is decentralized. This means that the parties concerned can react. This method can be duplicated when drafting regulations for smart contracts.

The close relation between smart contracts and blockchains compels recognition, but it should not distract us from seeing that the uses of algorithms, even without DLT, is already placing at our service digital technology's rapidity, simplicity and security. Software already sends notifications to the parties to a transaction to inform them that their obligations are to be executed and to remind them of the purpose and date. The contracts made using such software fall under the usual conditions about the validity of contracts (Civil Code Article 1128). Statute law has been adapted to make it easier to use digital technology: a contract may be concluded via electronic means (Civil Code articles 1125ff.). No other regulations are needed for using such software, which may propose forms for contracts and procedures for enforcing special conditions regarding a contract's validity. Dematerializing a contract makes it possible to use an electronic medium to draft certified

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[4] *Journal Officiel de la République Française* (JORF) n°0101 of 29 April 2016: https://www.legifrance.gouv.fr/eli/jo/2016/4/29
These mininotes are barely at the stage of experimentation, according to *Les Échos*, p.26, 30 May 2017.

[5] JORF n°0254 of 30 October 2016.

[6] Article 1323 of the Civil Code states: *"Between these parties, the transfer of receivables takes place on the date of the instrument. It is opposable to third parties at that date. In case of contention, proof of the date of transfer is the responsibility of the transferee, who may bring proof by all means. However the transfer of an instrument receivable in the future takes place only at the date of when the debt is incurred, both between the parties and vis-à-vis third parties."*

[7] Written question n°96014 of 24 May 2016.

[8] http://www.tresor.economie.gouv.fr/File/434688

documents, the equivalent of notarial acts. However smart contracts require much more technological input.

The phrase "smart contract" refers to more sophisticated arrangements for the automatic extinction of agreed-upon obligations once the conditions set for execution have been fulfilled — when all the conditions and limits that were programmed at the origin into the contract are met. None of the parties may oppose this execution. This eliminates the costs and delays stemming from a trusted third party's interventions. This technology facilitates the conclusion of contracts between parties who do not know each other, guarantees that each party will execute engagements, and makes a reliable record of the transaction on a register — a sort of bookkeeping ledger that, it is claimed, cannot be falsified.

Qualifying these contracts to be "intelligent" or "smart" is ambiguous. A smart contract is not intelligent, not even if there is a layer of artificial intelligence in the computer program used for the contract. Its "intelligence" is the capacity to automatically execute the engagements foreseen in the contract. Since we are considering the institutional regulation of these contracts, it is worthwhile to look more closely at this description of them as being smart/intelligent.

Two possibilities arise if we assume that a smart contract is a contract in the sense of Article 1101 of the Civil Code, namely: an agreement between two or more persons for creating, modifying, conveying or extinguishing obligations.

One possibility is to bring smart contracts into the Civil Code. In this case, considerable means must be marshaled to convert this body of legislation into computer code so that smart contracts provide to the contracting parties the benefits of all the Civil Code's provisions and safeguards. Nonetheless, this conversion would leave points of incompatibility. For instance, it is impossible to modify a blockchain. Consequently, if the contract or provisions in it are voided, it is impossible to return to the *status quo ante* by deeming certain clauses to be unwritten or unfair, or by enforcing a court order that grants a grace period. At this point, the blockchain and contract law become incompatible. Of course, the immediate execution of a monetary obligation could be foreseen in compensation for the impossibility of canceling or suspending a recorded obligation. However, such a provision, though properly executed by a piece of computer code, would have no legal grounds. Since the rules set by contract law cannot be followed, it would be necessary to suspend to exempt smart contracts from certain rules of law.

If an act of law exempts smart contracts from the prescriptions of the Civil Code, this law will, we suppose, be formulated in computer code, not just in natural language. Such an exemption could be complete, making smart contracts fully autonomous from a legal viewpoint. This would, however, give rise to two problems. First of all, how to create the confidence necessary for these contracts to develop? Secondly, could smart contracts be used for all contracts and with all parties? The exemption could be adapted with a requirement to certify electronic signatures by a trusted third party (even though a blockchain is based on the absence of such a party) or the possibility to relinquish in advance the right to undertake litigation (since a smart contract is concluded between persons who, given the anonymity that characterizes a blockchain, do not know each other), etc.

However, another possibility can be imagined, namely to consider that a smart contract is not a contract. *"A smart contract can be compared to a sheet of paper that has a legal value if it satisfies all the criteria required for being a contract; but only the legal corpus grants it this value. The interesting aspect of a blockchain (and of code in general) is the possibility of implementing conditions that are automatically applied. However these conditions are limited by the technical system, which must absolutely not be confused with the legal system. The two can be connected to each other, but this is not the case by default."*[9] Keeping the contract (a legal instrument) separate from the smart contract (a coding technique for executing preset conditions) seems to be in line with currently observed practices for using blockchains in contractual operations. The parties to a

[9] P. DE FILIPPI, "Il faut davantage enseigner la technologie aux juristes", interview available at: http://equationdelaconfiance.fr/rencontre/primavera-de-filippi-il-faut-davantage-enseigner-la-technologie-aux-juristes0

transaction need but validly conclude a contract outside a blockchain, but in this contract, they will agree on using a smart contract to execute provisions in the contract. The guiding principles of contract law (the freedom to contract, consensual agreement, the lawfulness of conventions, rules of evidence and proof) form a clear, rather flexible legal framework. Current practices are drawing on these principles.

So, how to institutionally regulate smart contracts based on blockchains? What laws and regulations are needed? Formally, regulations established by law or decree (in comparison with self- or co-regulation) could be included under a third subsection in the section of the Civil Code devoted to the effects of a contract on the concerned parties (articles 1193-1198). Following the provisions on the binding force of contracts and conveyance, the Civil Code could contain measures allowing parties to the contract to encode their obligations for the purpose of seeing to the contract's proper execution. Provisions could also be added about the consequences on the blockchain in case a contract were to be voided or in case certain clauses were to be declared abusive (in particular, the clause specifying the use of a smart contract). Among the most important provisions for this subsection would be to delimit the scope of application for using smart contracts.

In my opinion, smart contracts should be allowed only for contracts that, agreed upon by parties of equivalent economic power, create obligations related to conditions that are simple to execute and subject to few conditions. The use of smart contracts would thus be facilitated for contracts between professionals and for relations between private persons. Blockchains should not be allowed for acquisitions of real estate or bank loans. Start-uppers who want to "disrupt" these businesses will be disappointed; but the current system has broad, solid social grounds, something that smart contracts in the current state of their technological development cannot replace.

Another approach would be to establish a list of the contracts that would be allowed to incorporate a smart contract; but this might infringe on the freedom to contract.

Yet another approach would be to postulate the separation between, on the one hand, the contract as a legal instrument in compliance (its nature, form or purpose) with the applicable body of law and, on the other hand, the smart contract as a conventional modality for executing the contract. In this case, the attention of the parties to a smart contract would have to be drawn to the strict execution of the obligations formulated therein. It would be reasonable for lawmakers to require that precise information be given when a contract is signed that contains a clause for using a smart contract. Given a blockchain's inherent properties and the impossibility of neutralizing the execution of the obligations recorded therein, or even of modifying them, the Civil Code should impose the payment of compensation (whether or not foreseen in the smart contract) for the tort resulting from the execution of obligations that are nullified or deemed unwritten. Measures with respect to liability should also be foreseen: the liability of the software makers in case the blockchain were to prove unable to perform the actions promised (liability for fault and perhaps for gross negligence), the liability of users (in particular if a user were to corrupt the blockchain such that the other parties were deprived of the automatic execution of the contract). The possibility should be considered that it would not be possible to make accusations of this sort owing to the decentralized, anonymous system formed by a blockchain.

Smart contracts as a regulatory tool

To control market concentration, competition authorities may subordinate the authorization of a transaction to eventual remedies entailing structural (*e.g.*, the transfer of assets) or behavioral (*e.g.*, voiding of a noncompete clause) engagements. Whereas it is rather easy to check whether the first have been performed, controlling the proper execution of behavioral engagements is much less easy.[10] The French Competition Authority is currently making plans for an independent proxy wtih the role of monitoring and reporting. When informed of breaches, the Authority may suspend or retract an authorization, enjoin firms with penalties to keep their engagements and eventually impose monetary sanctions. It is obligatory to keep each engagement, and the financial sanctions are severe enough to dissuade firms from proposing engagements without sincerely having the intention to keep them. A blockchain established by regulatory authorities could be used to efficiently automate the execution of engagements and, maybe too, of sanctions in case of violation. To do this, the technology probably needs to be improved.

Regulations can evolve along with technology or follow it; but in no case can they take the lead.

[10] E. CHEVRIER, "Du suivi des engagements dans les concentrations", 2p., *Dalloz Actualité*, 22 September 2011. Available via: https://www.dalloz-actualite.fr/essentiel/du-suivi-des-engagements-dans-concentrations#.WkuNLHkiH1c