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RETHINKING THE CONCEPT OF CONTRACTUAL FREEDOM IN THE ERA OF SMART CONTRACTS

ABSTRACT

This study examines how the proliferation of smart contracts in the digital environment reshapes the classical legal principle of freedom of contract. The analysis proceeds from the three foundational pillars of contractual autonomy embedded in the continental private law tradition: the freedom to conclude a contract, the freedom to choose one's contracting partner, and the freedom to determine the content of the contract. Of these three dimensions, smart contracts meaningfully preserve only the first, while substantive autonomy is significantly constrained by pre-coded contractual terms. On the basis of the "code as law" approach, contractual legal relationships are governed by technical structures that exclude classical negotiation and flexibility between the parties. Employing a legal-theoretical methodology, the study analyses the implications of this transformation and concludes that, although freedom of contract formally persists, it requires substantive reinterpretation within the framework of technological determinism.

Keywords: *freedom of contract, smart contract, blockchain technology, digital private law, technological determinism.*

1. INTRODUCTION

Freedom of contract, as one of the fundamental principles of classical liberalism¹, is firmly embedded in continental private law² thinking. According to this tradition, contract formation is based on the free decision of autonomous legal

¹ According to classical liberalism, the source of law is not the will of the state, but the natural legal order derived from individual freedoms. Consequently, the purpose of law is not the enforcement of state will, but the protection of individual liberty even against the state. Szabó, G., *The Human Rights Risks of Globalisation*, PhD Dissertation, University of Pécs, Pécs 2008, pp. 157–158.

² Continental private law denotes a codified system of private law based on Roman legal traditions, characteristic primarily of continental European countries. This continental model stands in sharp contrast to the Anglo-Saxon common law system, where legal development is based on judicial decisions and precedents.

subjects: the parties may, at their own discretion, choose their contracting partners and determine the content of the contract.

With the advance of digitalisation and the spread of smart contracts³, however, the normative content of this principle requires reconsideration. The smart contract – a blockchain-based⁴ construction capable of automatic execution – is not merely a technical innovation, but also signals a profound structural transformation of contractual mechanisms.

The central question of this study is whether freedom of contract, as a classical legal principle, can prevail in the digital environment of smart contracts. The hypothesis of the analysis is that freedom of contract formally continues to exist, yet becomes substantively constrained. While the parties may decide whether to enter into a contract, the contractual terms – such as price or the mode of performance – are typically predetermined; consequently, actual autonomy is reduced to a choice among predefined options.

The methodology of the study is grounded in legal-theoretical analysis, juxtaposing the conceptual foundations of classical freedom of contract⁵ with the theoretical frameworks of digital determinism⁶, with particular attention to those views according to which code assumes a normative function equivalent to that of law.

The aim of the study is to demonstrate that, with the proliferation of smart contracts, freedom of contract does not disappear, but its function and meaning are transformed: it can no longer be interpreted as classical autonomy, but is instead reduced to a technologically framed freedom of choice.

³ For the purposes of the present research, the concept of a smart contract is defined as code containing if-then logical instructions that executes itself automatically when the previously specified condition(s) are fulfilled.

⁴ Blockchain is a distributed data structure that records events occurring on a network in the form of a chain of timestamped data blocks.

⁵ Classical freedom of contract is based on the principle of maximum autonomy, according to which contracting parties are free to decide whether to conclude a contract, with whom, and with what content. State intervention is justified only in exceptional and well-founded cases. See further: Szalai, Á., *The Content of the Contract*, Pázmány Law Working Papers, 2013/11.

⁶ Digital determinism is a social-scientific and philosophical theory according to which the development of digital technology determines the structure, functioning, and future of society. According to this view, technology is not merely a tool, but an autonomous, decisive force shaping economic, political, and cultural processes.

2. THE CLASSICAL THEORETICAL FOUNDATIONS OF FREEDOM OF CONTRACT

The first issue to be examined with regard to the formation of a contract is the existence of contractual intent, the absence of which entails the sanction of invalidity. In the context of smart contracts, the process through which contractual intent is formed differs markedly from the classical manifestation of intent known from traditional contract formation, which typically appears in written form, often embodied in a signature. In the case of smart contracts, contract formation takes place on the basis of conditions embedded in computer code, usually determined by a third party. Consequently, in my view, the contractual intent of the parties is essentially directed towards the acceptance or rejection of the pre-programmed contractual terms.

Thus, the classical formation of a contract is based on the mutual agreement of the parties, which may, in certain cases, have to comply with specific formal requirements in order to be valid. By contrast, smart contracts are concluded on the basis of predetermined terms that the parties cannot modify – only accept or reject – so that personal negotiation and bargaining play no role.

It can generally be stated that the civil law provisions of most legal systems predominantly consist of dispositive rules. As an example, one may examine the principle of freedom of contract, which is recognised and guaranteed by both the Hungarian and Romanian legal systems⁷.

A consequence of the existence of freedom of contract as a fundamental principle of private law is that the contracts regulated within a given legal system do not constitute a closed list, since contracts, in terms of type and content, are limited only by the imagination of the parties, insofar as they do not conflict with statutory

⁷ Civil Code, Act V of 2013 (Hungary), Section 6:59 (Freedom of Contract):

"(1) The parties may freely conclude a contract and may freely choose the other contracting party. (2) The parties may freely determine the content of the contract. By concordant intention, they may deviate from the rules governing the rights and obligations of the parties, unless this Act prohibits such deviation."; Civil Code (Romania), Art. 1169: *"The parties may freely conclude any contract and determine its content, within the limits laid down by the law, public order, and public morals."* As regards the codified formulation of freedom of contract, Art. 1169 of the Romanian Civil Code captures the essence of the principle more succinctly and more precisely than Section 6:59 of the Hungarian Civil Code. While the Hungarian provision separates substantive and personal freedom, the Romanian rule presents them jointly within a single paragraph and additionally supplements them with limiting clauses of public order and public morals. The sanction of nullity for conflict with good morals is regulated as a separate provision in the Hungarian Civil Code, whereas the Romanian Civil Code addresses this in an integrated manner.

prohibitions or with the requirements of public order and public morals/good morals⁸.

The principle of freedom of contract is a cornerstone of civil law dogmatics, ensuring not only the autonomy of the parties but also constituting a foundational pillar of the legal structure of the market economy. Freedom of contract is based on consensus between individuals, brought about by their autonomous will; it is therefore also an expression of private autonomy. As demonstrated by both Hungarian and European legal development, this principle has manifested itself differently in various historical and economic contexts; nevertheless, the dogmatics of contract formation has consistently proceeded from this fundamental principle⁹.

Freedom of contract may also be understood as a fundamental-rights dimension of the market economy. According to classical private law thinking, this autonomy is grounded in agreement between the parties, which the state merely frames but does not shape. The development of Hungarian private law has likewise followed this logic: the contract is not merely a legal act, but a forum for the expression of individual free will¹⁰.

Freedom of contract is therefore a central principle of classical private law, closely linked to the philosophical and political foundations of bourgeois society. This principle acquired its normative weight during the emergence of modern codified private law, within the ideological framework of eighteenth- and nineteenth-century classical liberalism. The roots of this freedom can be traced to Enlightenment thinkers, in particular the theories of Locke¹¹ and Kant¹².

In Locke's conception of the state based on the social contract, emphasis is placed on the protection of individual self-determination and the right to property. From Kant's moral philosophy, contract formation may be derived as an expression of autonomous will: a contract is nothing other than the lawful union of two wills.

⁸ Civil Code, Act V of 2013 (Hungary), Section 6:59; Civil Code (Romania), Art. 1169.

⁹ Török, É., *Fundamental Issues of Contract Formation*, Debrecen 2013, pp. 14–29.

¹⁰ Török, É., *op. cit.*, pp. 14–29.

¹¹ John Locke (1632–1704): he is regarded as the father of English classical liberalism. Locke's political philosophy fundamentally determined the modern understanding of democracies and human rights. Locke emphasised the right to property and free action – these constitute the moral foundations of the private-law conception of freedom.

¹² Immanuel Kant (1724–1804): one of the greatest figures of modern ethical science and legal philosophy, and a central figure of German idealism. According to Kant, a contract is the coordination of legally mutually recognised wills – this is one form of the realisation of autonomy.

Within continental legal systems, the scholars of the Pandectist tradition¹³ – most notably Savigny¹⁴ – elevated freedom of contract to the level of dogmatics. According to Savigny, law is the legally regulated relationship of wills; consequently, the entire system of private law rests upon the principle of individual autonomy. Both the German Civil Code (BGB) and the French Code civil were founded on this philosophical basis, emphasising that the state merely provides the external framework for contract formation, while the determination of content depends on the autonomy of the parties.

Classical doctrine distinguishes three dimensions of freedom of contract: (1) freedom to conclude a contract (*voluntas contrahendi*); (2) freedom to choose one's contracting partner (*libertas eligendi*); and (3) freedom to determine the content of the contract (*libertas determinandi*)¹⁵.

This tripartite structure represented the full realisation of private autonomy in the classical sense. At the same time, this principle was never entirely unlimited. From the first half of the twentieth century onwards, the recognition of economic inequalities and social embeddedness made it necessary to reinterpret freedom of contract. The school of social private law¹⁶ (e.g. Rudolf von Jhering¹⁷, Otto von

¹³ The Pandectists were representatives of nineteenth-century German legal scholarship who, on the basis of the dogmatic processing of Roman law, sought to create a theoretically coherent and systematised structure of private law. Their name refers to the *Pandectae*, that is, the Digest of Justinian, which was the principal source collection of classical Roman law. Their aim was to construct, on these historical foundations, a modern legal system built on logical principles.

¹⁴ Friedrich Carl von Savigny (1779–1861): one of the most influential German jurists of the nineteenth century, the founder of the Historical School of Law (*Historische Rechtsschule*), who reformed European private-law scholarship. His critique of French-style codification opened fundamentally new paths in continental legal development. According to Savigny, law is not an "artificial" creation that can be produced in an instant (e.g. by codification), but an organic process of development rooted in the spirit of the people.

¹⁵ Some authors apply a fourfold division of freedom of contract: (1) freedom to conclude a contract; (2) freedom to choose a contracting partner; (3) freedom of type; and (4) freedom to determine content. Béky, Á. E., *The Interpretation of Freedom of Contract in Modern Civil Law*, Debrecen, available at: <https://dea.lib.unideb.hu/server/api/core/bitstreams/a7787bc4-a990-4863-a2a9-d70bad5a31b4/content>, 25 February 2026.

¹⁶ Social private law is a legal conception that supplements the classical private law's equality-based, formally neutral contractual and property relations with social responsibility and inequality correction. The central aim of this approach is that private law – in particular contract and property law – should ensure not only market freedom, but also the protection of the weaker party.

¹⁷ Rudolf von Jhering (1818–1892): the father of "purpose in law" (*Zweckrecht*), one of the most influential figures of German legal scholarship. At first he followed the theoretical

Gierke¹⁸⁾ pointed out that inequalities can in fact distort the free manifestation of will. This line of thought was further deepened in the second half of the twentieth century, particularly under the influence of realist and critical legal theories¹⁹⁾. We thus arrive at the following conclusion: the "formal neutrality" of law does not guarantee actual autonomy if the economic or technological environment determines contractual positions.

Classical freedom of contract was therefore historically linked to a specific social and economic model – industrial capitalism and the principle of national sovereignty. The expansion of digital technologies begins to blur the boundaries of this model, once again raising the question: under what conditions can we today speak of meaningful contractual autonomy? This question becomes especially salient in the world of smart contracts, where contractual terms are no longer the result of free negotiation between the parties, but rather pre-coded, algorithmic structures.

3. THE OPERATION AND CHARACTERISTICS OF SMART CONTRACTS

In the present chapter, concepts are introduced whose definition is of key importance for understanding the operational mechanism of smart contracts. First, the discussion will begin with an outline of the notions arising in connection with blockchain technology.

Second, the definitions of smart contracts employed in the scholarly literature will be examined, and their conceptual scope will be delineated by formulating an autonomous definition.

3.1. Concepts related to Blockchain Technology

traditions of the Pandectists, then later took a critical turn and emphasised the social purpose and function of law.

¹⁸⁾ Otto von Gierke (1841–1921): a forerunner of "social private law", the developer of the community theory of legal persons. Proceeding from the heritage of the German Historical School, Gierke radically rethought the relationship between law and community.

¹⁹⁾ In the second half of the twentieth century, several realist and critical trends appeared in legal theory that rejected formalist, objectivist, or idealist approaches to law, and instead emphasised social, political, economic, psychological, and moral contexts. Such movements include, for example: American Legal Realism, Scandinavian Realism, Critical Legal Studies, Feminist Legal Theory, and Critical Race Theory.

Blockchain is a distributed data structure that records events occurring on a network²⁰ in the form of a chain of timestamped data blocks²¹. It operates in a decentralised manner, meaning that the data are not maintained by a central authority; rather, the ledger²² is jointly maintained by the participating nodes²³ of the network through peer-to-peer connections²⁴. In addition to a list of transactions, each block contains the cryptographic hash value²⁵ of the previous block, thereby ensuring the retrospective immutability of the data chain.

Transactions carried out on a blockchain network are authenticated through asymmetric cryptography²⁶: each user possesses a public and a private (secret)

²⁰ Christidis, K.; Devetsikiotis, M., *Blockchains and Smart Contracts for the IoT*, Department of Electrical and Computer Engineering, North Carolina State University, Raleigh, NC, USA 2016, p. 2293.

²¹ A block is the basic unit of a blockchain, containing a collection of validated transactions and the hash of the previous block, thereby ensuring the continuity and immutability of the chain within a decentralised, cryptographically protected system. Yaga, D.; Mell, P.; Roby, N.; Scarfone, K., *Blockchain Technology Overview*, National Institute of Standards and Technology (NIST), 2018, DOI:10.6028/NIST.IR.8202.

²² A distributed ledger is a data structure whose purpose is to provide final, unambiguous, and immutable data storage, in such a way that the data are distributed across a network of computers (nodes). ISO 22739:2020 – *Blockchain and distributed ledger technologies — Vocabulary*; European Union Blockchain Observatory and Forum, *Legal and Regulatory Framework of Blockchains and Smart Contracts in the EU*, 2020.

²³ In the crypto world, nodes are devices that essentially enable the operation of the blockchain network. *What is a node?*, CoinCash, available at: <https://hu.coincash.eu/kripto-szotar/n/node>, 25 February 2026.

²⁴ The peer-to-peer (P2P) model in digital data exchange denotes a network structure in which the participating parties are directly connected to each other without a technical intermediary. This model enables users to conduct transactions without involving a financial institution. Nakamoto, S., *Bitcoin: A Peer-to-Peer Electronic Cash System*, 2008, p. 1; <https://bitcoin.org/bitcoin.pdf>, 25 February 2026.

²⁵ Cryptographic hashing is a one-way mathematical process that generates a fixed-length unique identifier (hash) from arbitrary data. The hash value guarantees data integrity: if any part of the data changes, the hash will be completely different. This property is particularly significant in contractual and evidentiary environments, where data immutability and traceability are fundamental requirements.

²⁶ Cryptography is a field encompassing the principles, tools, and methods used to transform data in order to conceal their semantic content, prevent unauthorised use, and exclude undetectable modification.

key²⁷, enabling the creation and verification of digital signatures. The nodes validate transactions on the basis of a predetermined consensus mechanism²⁸.

One of the best-known consensus mechanisms is Proof of Work (PoW²⁹), in which miners responsible for validating blocks "compete" by solving computational tasks; the winning node may create the new block and receives cryptocurrency as a reward. An alternative is Proof of Stake (PoS³⁰), which, instead of computational capacity, is based on the validator's stake or wealth.

Blockchain is not a single, uniform technology, but rather a configurable architecture adaptable to various purposes. Blockchains may be distinguished according to access: (1) public blockchains³¹ (e.g. Bitcoin, Ethereum), which are open to anyone wishing to participate; (2) private blockchains³², accessible only to designated participants; and (3) permissioned and permissionless systems, differentiated according to whether authorisation is required for participation or for conducting transactions.

²⁷ The security of blockchain networks is ensured by asymmetric cryptography, also known as public/private key cryptography, where each participant has a publicly accessible public key and a secret, exclusive private key. Using the public key, anyone may send a transaction or verify a digital signature, while the private key authorises the signing of transactions and the transfer of assets. Nakamoto, S., op. cit., p. 2; Mozilla Foundation, *How public key encryption works*, available at: <https://developer.mozilla.org/en-US/docs>, 25 February 2026.

²⁸ Nodes operating a blockchain must agree on which transactions are included and in what order they appear in the new block. In the absence of such agreement, different instances of the blockchain would evolve differently, leading to so-called forks; nodes would reflect different "world states", and the network would be unable to maintain a uniform, authentic chronology (i.e. a blockchain), unless the given fork is resolved. Greenspan, G., *Avoiding the Pointless Blockchain Project*, 2015, available at: <https://www.multichain.com/blog/2015/11/avoiding-pointless-blockchain-project/>, 25 February 2026.

²⁹ Proof of work is a process in which miners (those who solve complex cryptographic tasks and thereby validate transactions and create new blocks on the blockchain) receive a reward from the algorithm. German, P., *What Is Proof of Stake and Proof of Work?*, CryptoFalka, available at: <https://cryptofalka.hu/proof-of-work-proof-of-stake/>, 25 February 2026.

³⁰ Proof of stake emerged as an alternative to proof of work, as it requires significantly less computational capacity for block creation. In PoS systems, a node's chance of creating the next block is proportional to the balance held by that node. Buterin, V., *On Stake*, 2014, available at: <https://blog.ethereum.org/2014/07/05/stake/>, 31 May 2025.

³¹ *What Are the 4 Different Types of Blockchain Technology?*, TechTarget, available at: <https://www.techtarget.com/searchcio/feature/What-are-the-4-different-types-of-blockchain-technology>, 25 February 2026.

³² European Law Institute, *ELI Principles on Blockchain Technology, Smart Contracts and Consumer Protection*, European Union's Justice Programme, 2022, p. 25., available at: https://www.europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Publications/ELI_Principles_on_Blockchain_Technology_Smart_Contracts_and_Consumer_Protection.pdf, 25 February 2026.

A key feature of blockchain operation is the so-called trustless network. The execution of transactions between parties does not require an intermediary, as the functioning of the system is ensured by technical consensus among nodes rather than by an external authority. This distributed trust model may constitute one of the foundational pillars of the digital economy.

3.2. The concept of the Smart Contract

The concept of the smart contract was coined by the Hungarian computer scientist and engineer Nick Szabo. According to his definition, a smart contract is "*a transactional protocol that executes the terms of a contract*"³³.

In Szabo's vision, basic contractual forms can be embedded into computer software as well as hardware, and through these means contract formation can be automated. According to Szabo's proposal, contractual provisions – such as securities, undertakings, and similar arrangements – may be fixed through coding, and their embedding into hardware or software devices enables the autonomous enforcement of the agreement once the stipulated conditions are fulfilled³⁴. As a result, the need for trusted intermediaries may become unnecessary – the existence of trust between the contracting parties is replaced not by a third party, but by technology – and contractual disputes may be minimised.

According to Szabo's view, a typical example of smart contracts can be interpreted as a purchase from a vending machine, during which the system dispenses the product without human intervention. This approach, however, is debatable, since in this case it is not the contract itself that can be regarded as "smart", but rather the device that performs the obligation on behalf of the operator. Nevertheless, the example – although it does not fully reflect the substantive characteristics of smart contracts – illustratively demonstrates one effect of digitalisation, namely that a machine system performs contractual obligations in place of the legal subject.

³³ Csítei, B., *Smart Contracts*, Opuscula Civilia, 2019, p. 6, available at: https://antk.uni-nke.hu/document/akk-copy-uni-nke-hu/Opuscula_Civilia_2019_Csitei_Bela.pdf, 26 March 2025; Szabo, N., *Smart Contracts*, 1994, available at: <https://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart.contracts.html>, 25 February 2026.

³⁴ Szabo, N., *The Idea of Smart Contracts*, 1997, available at: <https://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabs.best.vwh.net/idea.html>, 25 February 2026.

Particular attention should be paid to the definition provided by Ágnes Juhász, who describes the technology as follows: "*In the simplest and most concise formulation, a smart contract is nothing other than a self-executing agreement*"³⁵.

The definitions offered by the aforementioned authors highlight the importance of different attributes; however, a common element is the self-executing nature of the contract.

It is reasonable to examine and use as a point of departure the definition contained in the document issued by the European Union in September 2019 establishing the legal regulatory framework for blockchain and smart contracts, according to which a smart contract is "*computer code that is stored on a blockchain and accessible by one or more parties (...) and is often self-executing*"³⁶.

Taking these characteristics and definitions into account, within the framework of the present study the concept of a smart contract is defined as code containing if-then logical instructions that executes itself automatically when the previously specified condition(s) are fulfilled³⁷.

A smart contract is a script written onto a blockchain that is executed automatically, has a unique address, and is activated by sending a transaction. The execution of the contract takes place simultaneously and deterministically on every node of the network, which guarantees uniform network consensus. Architecturally, the system operates as a distributed virtual machine in which each node runs the same program on the basis of identical inputs.

The contract code is public and auditable, and interactions with it are recorded on the blockchain in the form of digitally signed messages, thereby ensuring full cryptographic traceability.

³⁵ Juhász, Á., *Online Contracting, Digital Content and Services, Smart Contracts – A New Era of Contract Law?*, Infocommunication and Law, 2020/2, (75.) e-special issue, available at: <https://infojog.hu/juhasz-agnes-online-szerzodeskotes-digitalis-tartalom-es-szolgalatas-intelligens-szerzodesdel-a-szerzodesi-jog-uj-korszaka-2020-2-75-e-kulonszam/>, 25 February 2026.

³⁶ "*In the blockchain context, it generally means computer code that is stored on a blockchain and that can be accessed by one or more parties. These programs are often self-executing and make use of blockchain properties like tamper-resistance, decentralised processing, and the like.*" Lyons, T.; Courcelas, L.; Timsit, K., *Legal and Regulatory Framework of Blockchains and Smart Contracts – A Thematic Report Prepared by the European Union Blockchain Observatory and Forum*, 27 September 2019, p. 22.

³⁷ For example, an operation executed by a smart contract may be the following: if a certain amount is credited to a bank account, then 10% of that amount is transferred to a second bank account for long-term savings purposes.

3.3. The operational mechanism of Smart Contracts – a practical example

In the following, a practical example³⁸ is presented in order to illustrate the operational mechanism of a smart contract.

Let us consider a blockchain network in which Alice, Bob, and Carol participate, and in which digital assets of type X and Y are traded. Bob deploys a smart contract on the network containing the following functions: (a) a "deposit" function that allows him to place units of X into the contract; (b) a "trade" function that returns 1 unit of X (from the assets previously deposited into the contract) in exchange for every 5 units of Y; and (c) a "withdraw" function that allows Bob to retrieve the entire asset balance held by the contract.

In our example, the "deposit" and "withdraw" functions are written in such a way that only Bob (via his private key) can activate them. This is Bob's design choice made at the time of programming, and within the framework of this example it is reasonable; however, in theory, these functions could also be written so that any network user may activate them.

Next, Bob initiates a transaction to the smart contract's address, activates the "deposit" function, and transfers 3 units of X into the contract. This transaction is recorded on the blockchain. Subsequently, Alice – who possesses 12 units of Y – sends a transaction to the "trade" function, transferring 10 units of Y to the contract and, in return, receiving 2 units of X. This transaction is likewise recorded on the blockchain. Finally, Bob sends a signed transaction to the "withdraw" function: the contract verifies the signature in order to ensure that the withdrawal is indeed initiated by the owner of the contract. Thereafter, it transfers the entire asset balance held by the contract to Bob (1 unit of X and 10 units of Y).

The example clearly demonstrates that the parties' freedom of decision is heavily based on data-driven logic. Individual will does not appear in the classical sense (free negotiation, shaping of contractual content), but is limited to the activation of a pre-programmed behavioural system. Freedom of contract therefore formally persists – one may decide whether to interact with the contract – but substantively it is deterministically defined, meaning that the sphere of autonomous decision-making is narrowed.

³⁸ Christidis, K.; Devetsikiotis, M., *op. cit.*, p. 2296.

This confirms the central hypothesis of the study: classical freedom of contract operates in a diminished form in the environment of smart contracts, as machine code and condition-driven logic take the place of individual autonomy.

4. NEW CHALLENGES TO FREEDOM OF CONTRACT IN THE AGE OF SMART CONTRACTS

The transformation of freedom of contract in the context of smart contracts requires a twofold analysis: one which situates these mechanisms within the tradition of standardised contracting, and another that captures the qualitatively new constraints arising from their technological architecture.

4.1. Smart Contracts and Standard Form Contracts: Continuity or Rupture?

At this point, it is necessary to nuance the above thesis by situating smart contracts within the broader evolution of contractual practice. The limitation of contractual autonomy observed in smart contracts is not entirely without precedent in classical private law systems. In particular, standard form contracts and adhesion contracts have long represented situations in which one party's ability to negotiate contractual terms is significantly restricted³⁹.

In the case of standard terms, contractual content is typically pre-formulated by one party, while the other party is limited to a binary choice: acceptance or rejection⁴⁰. From this perspective, the reduction of autonomy to a "take-it-or-leave-it" decision is not a novel phenomenon introduced by digital technologies, but rather an already existing structural feature of modern mass contracting.

However, the structural logic underlying these two models differs in a fundamental respect. In classical adhesion contracts, the "take-it-or-leave-it" mechanism reflects an asymmetry between the parties: the stronger party unilaterally determines the contractual content, while the weaker party is left with no real

³⁹ Waraich, R. S.; Fayaz, M.; Zahid, H., *Consent Theory and Adhesion Contract: A Critical Analysis of Contemporary Global Business Practices*, 2022, p. 2., available at: https://www.researchgate.net/publication/365964837_Consent_Theory_and_Adhesion_Contract_A_Critical_Analysis_of_Contemporary_Global_Business_Practices, 25 February 2026.

⁴⁰ Ben-Shahar, O., *Boilerplate and the Foundations of Contract Law*, Cambridge University Press, 2007, p. 7., available at: https://assets.cambridge.org/97805216/76380/frontmatter/9780521676380_frontmatter.pdf, 25 February 2026.

possibility of influencing its terms⁴¹. The restriction of contractual autonomy is therefore not symmetrical, but is instead rooted in unequal bargaining power and economic dominance.

By contrast, in the environment of smart contracts, this asymmetry is, in principle, absent. Neither contracting party typically determines the contractual terms in the course of the contractual relationship; rather, both parties are equally subjected to a pre-existing coded structure. The "take-it-or-leave-it" logic thus applies to all participants in a uniform manner: each party must accept or reject the conditions embedded in the code, without the possibility of unilateral modification. In this sense, the limitation of contractual autonomy is no longer the consequence of a hierarchical relationship between the parties, but is instead inherent in the technological framework itself.

A further distinction may be observed with regard to the origin of contractual content. In the case of standard form contracts, the stronger party actively shapes the contract by drafting pre-formulated terms tailored to its own interests. In contrast, smart contracts are typically developed independently of the concrete contractual relationship, often by programmers or platform operators, and are subsequently used by parties who merely interact with the existing code. As a result, neither party exercises direct control over the content of the contract at the moment of contracting.

Admittedly, exceptional situations may arise in which one of the contracting parties also assumes the role of programmer and thereby determines the contractual logic. In such cases, a structural asymmetry comparable to that of adhesion contracts may reappear. Nevertheless, this should be regarded as a special configuration rather than the general model of smart contracting, which is characterised by the use of pre-existing, externally developed code.

Despite these differences, a certain continuity between the two phenomena may still be identified. Both standard form contracts and smart contracts reduce the scope of negotiation and confine the parties' autonomy to a decision of acceptance or rejection. Yet, in smart contracts, this limitation is not merely economic or practical, but is embedded at the level of technical architecture. The contractual terms are not only pre-formulated, but are also encoded in such a way that their

⁴¹ Looney, J. W., *Adhesion Contracts, Bad Faith and Economically Faulty Contracts*, Drake Journal of Agricultural Law, pp. 177-195., available at: <https://aglawjournal.wp.drake.edu/wp-content/uploads/sites/66/2016/09/agVol04No1-Looney.pdf>, 25 February 2026.

execution is automatic and, in principle, resistant to modification or reinterpretation.

Accordingly, smart contracts may be understood not merely as a continuation of standard form contracting, but as its intensified and formalised manifestation. The restriction of contractual freedom shifts from the socio-economic sphere to the technological one: whereas classical adhesion contracts limit the formation of contractual will in an asymmetrical manner, smart contracts impose a structurally symmetrical and technologically enforced constraint that extends to both the formation and the execution of the contract.

This distinction is of fundamental importance for the assessment of freedom of contract in the digital environment. While both models reduce the scope of negotiation, only smart contracts eliminate, to a significant extent, the interpretative and corrective functions traditionally exercised by legal institutions. Consequently, smart contracts do not simply reproduce existing limitations of contractual autonomy, but transform them into a structurally embedded feature of the contractual mechanism itself.

The above comparative analysis demonstrates that, although smart contracts share certain structural similarities with classical standard form contracting, the nature of the constraints they impose differs in both origin and intensity. Building on this distinction, it becomes necessary to examine more closely how these technologically embedded limitations reshape the concept of contractual autonomy.

4.2. The Transformation of Contractual Autonomy under Smart Contracts

The three principal dimensions of classical freedom of contract – freedom to conclude a contract, freedom to choose one's contracting partner, and freedom to determine contractual content – are cast in a new light in the environment of smart contracts. Although, formally, the parties may still decide whether they wish to enter into a contract, the freedom to shape the content of the contract is essentially eliminated.

A smart contract operates on the basis of predetermined, coded conditions. The contractual declaration – unlike the classical declaration of intent – is not aimed at

the individual formulation of terms, but rather at their acceptance or rejection⁴². Consequently, autonomous decision-making is in fact reduced to a binary choice: to accept or to reject the algorithmic construction.

Within this digital contractual space, autonomy does not emerge as the result of free negotiation between the parties, but rather as the product of prior structuring through programming decisions. The technological environment – characterised by deterministic operation, full transparency, and traceability – displaces the traditional arenas of legal interpretation and contractual flexibility.

According to the principle of "code as law"⁴³, the regulatory function of law is, in part, performed by the programming itself. The smart contract is therefore not merely a legal act, but a technical structure whose execution does not require judicial involvement or legal interpretation. This represents a significant departure from the established system of continental private law, which is based on interpretation and on the balancing of the parties' interests.

The concept of digital determinism refers to the fact that contract execution proceeds according to predefined outcomes and leaves no room for context-sensitive decision-making. While this model enhances legal certainty and reduces the possibility of abuse, it simultaneously restricts precisely that sphere of individual decision-making which forms the foundation of freedom of contract in its classical sense.

Freedom of contract therefore does not disappear, but its meaning is transformed: from a classical legal principle it becomes a technologically determined entitlement, in which the parties' freedom extends only to initiating interaction. The possibility of negotiating and shaping the terms – constituting the core of private autonomy – is lost as a result of algorithmic contractual logic.

5. CONCLUSIONS

The aim of this study was to explore whether freedom of contract, as a classical legal principle, can prevail within the technological environment of smart contracts. The analysis has demonstrated that, in the continental private law

⁴² It is already a further question what type of conditions can be incorporated into smart contracts.

⁴³ De Filippi, P.; Hassan, S., *Blockchain Technology as a Regulatory Technology: From "Code Is Law" to "Law Is Code"*, available at: <https://arxiv.org/pdf/1801.02507>, 25 February 2026.

tradition, freedom of contract rests upon three pillars: freedom to conclude a contract, freedom to choose one's contracting partner, and freedom to determine the content of the contract. Of these three dimensions, smart contracts essentially leave only the first intact.

At the same time, the transformation identified in this study must be understood in a nuanced manner. On the one hand, smart contracts exhibit structural similarities with standard form and adhesion contracts, in which the parties' autonomy is likewise reduced to the acceptance or rejection of pre-formulated terms. On the other hand, however, smart contracts introduce a qualitatively new dimension of constraint, as the limitation of contractual freedom is no longer merely the result of economic or bargaining asymmetries, but is embedded in the technological architecture of the contractual mechanism itself.

The operation of smart contracts – pre-coded logic, automated execution, and a deterministic input–output relationship – creates a digital environment in which the role of the contracting parties is transformed: technical activation replaces autonomous decision-making. The parties do not negotiate or shape terms; rather, they accept them. Contractual intent is thus limited to affirming acceptance or rejecting entry.

At the same time, freedom of contract does not disappear, but its function becomes formalised: private autonomy is no longer expressed in the free determination of content, but merely in the binary decision to participate. According to the "code as law" approach, certain contractual norms are technologically determined, thereby narrowing the jurisprudential space for interpretation, balancing, and individual discretion.

In support of the study's hypothesis, it can be concluded that freedom of contract operates in a diminished form in the world of smart contracts. This limitation is not necessarily negative, since deterministic contracts may enhance legal certainty and reduce the possibility of abuse; nevertheless, from a legal-theoretical perspective, it is beyond doubt that the substantive sphere of individual autonomy is curtailed.

This insight may encourage future digital private law to reinterpret freedom of contract on new foundations, taking into account both the continuity with earlier forms of limited autonomy and the novel constraints arising from technological determinism, while preserving the requirements of fairness and balance between the parties.

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