UDK: 347.44 : 004 (498:439)
Review paper

Józsa Ede, PhD student
Faculty of Law, Institute of Private Law, University of Miskolc, Hungary
E-mail: jozsaede@gmail.com

AN EXAMINATION OF THE NATURE OF A SMART CONTRACTS AS A LEGAL TRANSACTION

ABSTRACT

Technological progress is not leaving the field of civil law, including private law, untouched, and its rapid development poses many challenges. Digitalisation, the driving force behind the fourth industrial revolution, is one of these current technological phenomena, which is likely to bring about major changes. The question to be answered is how, if at all, legislation can keep pace with these unprecedented situations brought about by technological change and cope with the changes brought about by technological innovation. The aim of the research is to identify the legal problems that have already arisen, to provide appropriate legal answers based on the doctrinal foundations, i.e. to formulate de lege lata, de lege ferenda proposals, and to carry out the research for the two countries (Hungary and Romania) along the lines of a legal comparison. To explore what further legal questions and challenges may arise from the progress of digitalisation, based on the institutions of civil law in the area of contract law, whether reassuring answers can be given to these questions or whether legal development is necessary. In this paper we will place the concept of smart contracts in the context of the current Romanian and Hungarian civil law. The study will examine the place of smart contracts in these legal systems, while providing an insight into the regulation of contracts in both countries. Furthermore, the study will also examine the nature of the smart contract as a legal transaction.

Keywords: *smart contracts, digitalisation, civil law, contract law.*

1. INTRODUCTION

The European digital decade in which we currently live constitute a significant part of the EU's digital policy, announced as Web 4.0. Technological advancements influence people's lifestyles, work, content creation and sharing, as well as the operation, innovation, and production of businesses, along with the position of consumers. This development brings both new opportunities and, undoubtedly, risks that need to be addressed. It is essential to examine how civil law, particularly the field of contract law, is affected by these developments and what challenges they pose. Digitalization impacts contract law in various ways

and areas. With the widespread use of technological tools, legal declarations and contract conclusions conducted via online and digital means have become increasingly common. In this context, the question arises as to whether legal declarations made electronically in different ways can be considered as being in written form and whether they can be classified under the traditional methods of legal declarations – namely, oral, written, or implied conduct. As a result of digitalization, there is an increase of contracts being performed by machines, robots and computers. For instance, robots serve customers in restaurants, oversee elderly individuals, or automate car washing, among other tasks. These scenarios generate multiple legal issues that require careful examination.

One of the primary objectives of my research is to explore how the recently emerging phenomenon, known as smart contracts – also referred to as intelligent contracts – fits within, or can be integrated into, the currently applicable rules of civil law. While the future of cryptocurrencies, which are also based on blockchain technology, largely depends on trust and the resilience of governments supporting traditional financial systems, no direct opposing interest seems to stand against blockchain technology itself – including smart contracts. However, despite this, a certain legislative hesitation can be observed worldwide concerning smart contracts. This factor makes the legal examination of smart contracts particularly timely.[1]

2. THE CONCEPT OF SMART CONTRACTS

As is customary, the present legal research cannot begin without defining key concepts. Since law is a language-dependent phenomenon, it is necessary to align everyday language with the legislative terminology created by lawmakers, as well as with the terminology used in legal scholarship. From the perspective of conceptual clarification, a key question arises regarding the first component of the term "smart contract": what makes a contract *smart?* To answer this, it is useful to start from the classical definition of a contract and examine how the attribute "smart" relates to this concept. I start from the premise that smart contracts are, in essence, digitally formatted contracts**.** Smart contracts are essentially programs stored on a blockchain, which - like cryptocurrencies, coins, and tokens – offer a futuristic vision in which high-security technologies replace traditional solutions.

[1] The financial sector is one of the largest adopters of smart contracts. Decentralized finance (DeFi) applications, for example, enable the automation of lending transactions, insurance contracts, and other financial operations without human intervention. For more: Schär, F., *Decentralized Finance: On Blockchain- and Smart Contract-Based Financial Systems*, Federal Reserve Bank of St. Louis Review, 2021, p. 153.

These alternative technologies – such as algorithms, artificial intelligence, and smart contracts – carry significant legal relevance, as they have the potential to fundamentally reshape existing legal institutions and impact all aspects of life.

One of the greatest advantages of smart contracts is that they are based on blockchain technology, which ensures decentralization, transparency, and immutability. Blockchain-based solutions enable contract execution without third-party intermediaries, leading to significant cost savings and increased efficiency.[2] The concept of smart contracts was first introduced by Nick Szabo, a Hungarian-born computer scientist and engineer, whose name is often associated with the invention of Bitcoin. According to his definition, a smart contract is *"a transactional protocol that executes contractual terms".*[3] Nick Szabo's vision,[4] basic contract forms can be embedded in computer software and hardware to automate the process of contract formation. Nick Szabo often cited vending machines as a typical example of smart contracts, arguing that they autonomously execute transactions by dispensing goods upon receiving payment.[5] However, this is a misconception: in this example, it is not the contract that is smart, but the machine that performs the contract's obligations on behalf of its operator. While the vending machine example does not fully illustrate the essence of smart contracts, it does highlight a related issue in digitalization – namely, the automation of contractual obligations through machines rather than human agents. Other authors[6] have provided different definitions of smart contracts, such as "self-executing autonomous computer protocols" or "agreements between two or more parties that are programmed to be enforced and executed through blockchain technology." A notable definition comes from Ágnes Juhász, who defines the technology as follows: *"In the simplest, most concise formulation, a smart contract is nothing more than a self-executing agreement".*[7] Although these definitions

[2] Tapscott, D., Tapscott, A., *Blockchain Revolution: How the Technology Behind Bitcoin and Other Cryptocurrencies is Changing the World*, Portfolio, New York 2016, p. 75.

[3] Béla, Cs., *Smart Contracts*, Opuscula Civilia, National University of Public Service, Faculty of Public Governance and International Studies, Budapest 2019, p. 6.; available: https://antk.uni-nke.hu/document/akk-copy-uni-nke-hu/Opuscula_Civilia_2019_Csitei_Bela.pdf.

[4] Szabo, N., *"Smart Contracts,* Satoshi Nakamoto Institute, 1994, p. 1.; available: https://nakamotoinstitute.org/library/smart-contracts.

[5] Szabo, N., *"The Idea of Smart Contracts,* Satoshi Nakamoto Institute, 1997, p. 2.; Available: https://nakamotoinstitute.org/library/the-idea-of-smart-contracts/.

[6] *Kost: "*self-executing, autonomous computer protocols that facilitate, execute and enforce commercial agreements between two or more parties*"; Roger* Wattenhofer: *"*an agreement between two or more parties, encoded in such a way that the correct execution is guaranteed by the Blockchain*"*.

[7] Ágnes, J., *Online Contracting, Digital Content and Services, Smart Contracts – A New Era of Contract Law?,* Infocommunication and Law, 2020/2, (75.) e-special issue; available: https://infojog.hu/juhasz-agnes-online-szerzodeskotes-digitalis-tartalom-es-

emphasize different attributes, they all share a common characteristic: the self-executing nature[8] of smart contracts**.**

It is also reasonable to examine and use as a starting point the definition of the European Union's regulatory framework on blockchain and smart contracts,[9] issued in September 2019, as it provides a consensus-based definition**:** *"a smart contract is a computer code stored on a blockchain that is accessible to one or more parties (...) and is often self-executing".*[10] Taking into account these characteristics and definitions, in this research i associate the following definition to the concept of smart contract: *a smart contract is a code containing an if-then logical statement that executes autonomously when predefined conditions are met.*[11] While smart contracts present a revolutionary technological solution, they also raise several legal issues, such as validity, enforceability, and potential legal remedies. Currently, most legal systems do not have specific regulations governing smart contracts, meaning they must be interpreted according to traditional contract law principles.[12]

3. THE PLACE OF SMART CONTRACTS IN THE LEGAL SYSTEM

To examine the nature of smart contracts, it is essential to first analyze the concept of classical contracts, their evolution, role, and placement within the civil law system, as well as their stages of development. Understanding this latest form of

szolgaltatas-intelligens-szerzodessel-a-szerzodesi-jog-uj-korszaka-2020-2-75-e-kulonszam/.

[8] Basumallik, C., *"Smart Contracts: Types, Benefits, and Tools",* Spiceworks, 2023, p. 3.; available: https://www.spiceworks.com/tech/innovation/articles/what-are-smart-contracts/.

[9] European Union Blockchain Observatory and Forum, "Legal and regulatory framework of blockchains and smart contracts", 2019, p. 6.; available: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Publications/ELI_Principles_on_Blockchain_Technology__Smart_Contracts_and_Consumer_Protection_Council_Draft.pdf.

[10] „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., Ludovic, T., *Legal and Regulatory Framework of Blockchains and Smart Contracts. – A thematic report prepeared by the European Union Blockchain Observatory and Forum,* 27 th September 2019, p. 22.; https://www.eublockchainforum.eu/sites/default/files/reports/report_legal_v1.0.pdf.

[11] For example, a smart contract operation could be: *if a certain amount is received in a bank account, then 10% of it is automatically transferred to a second account for long-term savings.*

[12] Werbach, K., Cornell, N., *Contracts Ex Machina*, Duke Law Journal, Vol. 67, 2017, p. 344.

contract necessitates tracing back to the origins of contracts, referring to the rules of Roman law. Roman law provides the earliest structured approach to contracts, emphasizing key elements such as *voluntas* (intent), *consensus* (agreement), and *causa* (legal reason).[13] These foundational concepts have been carried through into modern civil law frameworks.

Notably, smart contracts, though executed in digital environments, often mirror classical forms in structure—requiring offer, acceptance, and performance—albeit mediated by code. The automated and decentralized nature of these contracts, however, challenges traditional legal interpretations, especially in areas like enforcement, consent, and modification.[14] Therefore, to fully understand the legal implications of smart contracts, one must contextualize them within the broader tradition of contract law, particularly its Roman and civil law roots.[15] This task means to analyse the classical concept of an obligation and contract in relation to smart contracts to determine their nature as legal acts. Moreover, scholars emphasize that the terminology and real-world limitations of smart contracts necessitate a cautious approach when equating them with traditional legal agreements.[16]

3.1. The classical concept of an obligation and contract

The appearance of abstract definitions is less characteristic of Roman law; however, attempts to define fundamental concepts, such as obligations, had already begun at that time. The term "obligation" derives from the Latin word "*obligatio*," which was defined in Roman law in relation to, and simultaneously with, property rights. The essence of an obligation does not lie "in making something our own or granting us a servitude, but in compelling another person to give something, do something, or assume responsibility for something on our behalf".[17] This definition serves as a starting point and excellently illustrates and embodies the distinction used to typify obligations – and, consequently, contracts – by emphasizing the provision of services as a defining characteristic in these areas of law. According to this definition, an obligation may entail three types of duties: the transfer of an object (*dare*), the performance of an act (*facere*), and the

[13] Zimmermann, R., *The Law of Obligations: Roman Foundations of the Civilian Tradition*, Oxford University Press, Oxford 1996, p. 578
[14] Werbach, K., *op.cit.,* p. 347.
[15] Beale, H., Fauvarque-Cosson, B., Ruggeri, S., *Contract Law: Ius Commune Casebooks for the Common Law of Europe*, Hart Publishing, Oxford 2010, p. 40.
[16] Mik, E., *Smart Contracts: Terminology, Technical Limitations and Real-World Complexity*, Law, Innovation and Technology, Vol. 9, No. 2, 2017, p. 278
[17] András, F., Gábor, H., *History and Institutions of Roman Law*, National Book Publishing House, Budapest 2019, p. 380.

assumption of liability (*praestare*).[18] Additionally, this tripartite classification is supplemented by an obligation of non-performance (*non-facere*), which is not found in the definition of *Paulus.*[19] It can be stated that *Julius Paulus*' tripartite classification, aside from the aforementioned supplement, not only facilitated the categorization of obligations but also fundamentally influenced legal development in this area through the creation of this definition.[20] This assertion is supported by the provisions of the current Hungarian Civil Code[21] regarding the definition of obligations, as well as by Romanian legal literature,[22] which also references this classification. Furthermore, from *Paulus'* definition, the structural characteristic of an obligation emerges, namely that it always involves two or more specifically identifiable and designated persons, between whom a legal relationship arises, requiring active or passive conduct. This legal relationship structure is termed a relative legal relationship, wherein the identity of the parties is known, in contrast to an *in rem* legal relationship, in which the entitled party enjoys protection against all other legal subjects.[23]

In absolute legal relationships, the obligors bear negative obligations – this tripartite following *Béni Grosschmid* is referred to, as a "compressed negative obligation".[24] Taking ownership as an example, this tripartite obligation consists of the following: 1) everyone must recognize and respect the status of the beneficiary of the absolute legal relationship; 2) all legal subjects must tolerate the exercise of the aforementioned right due to the lawful position of the entitled party; and 3) no one may interfere with the exercise of the right.[25] *Grosschmid's* terminology is accurate, as the fulfilment of this tripartite obligation is possible without any specific action.

In my view, smart contracts are relative legal relationships, as their formation identifies the contracting parties. Whether these identities become public, thanks

[18] Péter, K., *The place of smart contracts in the legal system,* Ministry of Justice programme to raise the level of legal education, Budaoest 2019, p.17; *obligationum substantia non in eo consistit, ut aliquod corpus nostrum aut servitutem nostram faciat, sed ut alium nobis obstringat ad dandum aliquid vel faciendum vel praestandum.*
[19] Julius Paulus was one of the famous jurists and lawyers of the late 2nd century and early 3rd century, the author of the above definition.
[20] Olteanu, A., *Roman Law and Its Reception in Modern Civil Codes*, Cluj University Press, Cluj-Napoca 2016, p. 115.
[21] Hungarian Civil Code 6:1. § [The obligation]: " (2) An obligation may pertain to the provision of an object, an activity, the abstention from an activity, or other conduct".
[22] Emőd, V., *Civil Law - General Theory of Obligations – V. edition*, C.H. Beck, Bukarest 2020, p. 6.
[23] This latter is called an absolute legal relationship. An example of this is ownership.
[24] Grosschmid, B., *Vázlat a magyar magánjog rendszeréből*, Franklin-Társulat, Budapest 1905, p. 210.
[25] Péter, K., *op. cit.,* p. 18.

to blockchain technology, is a separate question, as anonymity is an inherent characteristic of the technology. However, anonymity does not imply that the legal relationship assumes an absolute structure. Recent literature also affirms that blockchain-based contracts typically operate on predefined logic between known participants, reinforcing their relative legal nature.[26] These types of legal relationships also differ in terms of their duration: while property-based (absolute) legal relationships typically establish long-standing, enduring rights, obligational (relative) legal relationships have much shorter lifespans, sometimes requiring immediate execution – similar to smart contracts.[27]

Another relevant definition[28] of obligation was formulated by *Justinian's* codification: "An obligation is a legal bond by which we are necessarily bound to perform some service, according to the laws of our state".[29] This definition places the legal bond at the centre of an obligation, excluding other forms of obligations based on religion, decorum, or honour. Moreover, it emphasizes the presence of legal coercion as a driving force, appearing as a necessary consequence of legal relationships created by law. Consequently, if the obligor fails to fulfil their obligations voluntarily, the obligee may enforce their lawful rights derived from the obligational relationship with the help of the state's coercive power.[30] The last element of the definition – "according to the laws of our state" – highlights the requirement that obligations must possess legitimacy, meaning they must fit within the legal framework of a given state and be derivable from its legal norms.[31] In the case of smart contracts, the aforementioned requirement concerning legitimacy and derivability from a legal norm is questionable, as no explicit statutory provision – let alone a comprehensive normative system – exists that ensures state coercion in the event of a legal violation. In the absence of a more favorable solution, these legal relationships and the disputes arising from them are

[26] Savelyev, A., *Contract Law 2.0: "Smart" Contracts as the Beginning of the End of Classic Contract Law*, Information & Communications Technology Law, Vol. 26, No. 2, 2017, p. 120.
[27] Mik, E., *op. cit.*, 276.
[28] Justinian, *Institutes*, Book 3, Title 13, Section 2, translation by Birks & McLeod, Oxford University Press, Oxford 1987, p. 115
[29] „*Obligatio est iuris vinculum, quo necessitate adstringimur alicuius solvendae rei secundum nostrae civitatis iura".* Emperor Justinian I of Byzantium ordered the creation of the first codified collection of Roman law, known from the time of the glossators as *Corpus Iuris Civilis*. The first book of the codification, *Codex Iustinianus*, was enacted in 529, followed by the second book, *Digesta*, and the third book, *Institutiones seu Elementa*, in 533. The final book, *Codex Iustinianus repetitae praelectionis*, came into effect in 534. All of these were written in Latin with the aim of achieving the reunification of the Roman Empire through legal science and legislation, thereby restoring the golden age of Roman law.
[30] Stein, P., *Roman Law in European History*, Cambridge University Press, Cambridge 1999, p. 50.
[31] András, F., Gábor*, op. cit.,* p. 381.

regulated and remedied using traditional contractual provisions. The foundation for the modern definition of obligation was laid by the *Pandectists*,[32] who stated: "An obligation is a legal relationship in which one party (*creditor*) may demand a certain conduct from the other party (*debtor)*, and if the debtor fails to fulfill this obligation, the creditor is entitled to compel them to do so through in *personam action*".[33]

Roman law recognizes multiple approaches regarding obligations. In the archaic period, an obligation was understood as the creditor's limited power over the debtor. This notion of limited power over the debtor was present from the inception of obligations in Roman law, where *delicts*[34] appeared as acts that resulted in obligational legal consequences. In Roman law, the primary legal consequence of a criminal act was the right to lawful retribution, which over time was supplemented by the possibility of paying compensation (*compositio*). Initially, monetary compensation served as an alternative; over time, it became a mandatory requirement.[35] The delictual origin of obligations is supported by the etymological examination of the word "*obligatio*", which means "binding, shackling." Similarly, the termination of an obligation was denoted by the term "*liberatio*", meaning "release," while its fulfilment was described with the word "*solutio*", meaning "unbinding". Another theory associates the origin of obligations with the emergence of contracts (*contractus*). Nevertheless, in early contracts, the binding force ensuring performance was not the mere existence of an agreement but rather the religious foundations of the obligation, which were ensured through various formalities.

[32] The pandects (digests) have been part of Roman law since the time of Emperor Justinian I, specifically from the year 533. The word means 'all-encompassing,' which is paradoxical since thematically, it is mostly limited to private law. The selections of the pandects were used in the process of legal application and formed part of the *Corpus Iuris Civilis*. For more information, see: Elemér, P., *Pandectistics and Its Impact on the Science of Hungarian Private Law*, Acta Universitas Szegediensis De Attila József Nominatae, Acta Juridica et Politica, Tomus XXIII., Fascicultus 6, Szeged 1976.

[33] Péter, B., *Contracts*, Internet Encyclopaedia of Legal History (Legal History section, editor: László, K,); available: https://ijoten.hu/szocikk/jogtortenet-szerzodes.

[34] Delicts were considered crimes in Roman law. In the 19th century, a three-tier classification of punishable acts was established based on the severity of offenses, distinguishing crimes, misdemeanors, and infractions. By the late 19th century, this tripartite classification lost ground, and a new trend emerged, leading most European states to adopt a two-tier system. However, some countries still retain the three-tier classification, recognizing infractions, delicts, and crimes within their legal systems. The tripartite system remains in place in France, Belgium, Luxembourg, San Marino, and Greece. Pradel, J., *Comparative Criminal Law*, Ed. Dalloz, French 1995, p. 228.

[35] Kunkel, W., *An Introduction to Roman Legal and Constitutional History*, Oxford University Press, Oxford 1973, p. 145

3.2. Contracts in Hungarian and Romanian private law

It can be stated about the law of obligations in both Hungarian[36] and Romanian law that its provisions mostly contain dispositive rules. The principle of contractual freedom is recognized and guaranteed by the legal systems of both countries.[37] In my opinion, although Section 6:59 of the Hungarian Civil Code, which regulates contractual freedom, is more extensive, Article 1169 of the Romanian Civil Code captures the essence of the principle of contractual freedom more effectively, describing it concisely with appropriate precision. The mentioned article of the Romanian Civil Code essentially incorporates both paragraphs (1) and (2) of Section 6:59 of the Hungarian Civil Code into a single provision. Moreover, regarding deviations from the rights and obligations of the parties, Article 1169 of the Romanian Civil Code not only includes prohibitions imposed by law but also extends these restrictions to the boundaries set by public order and morality.[38] In the Hungarian Civil Code, a contract that violates good morals is also considered invalid; however, this provision is addressed separately by the legislator when regulating defects in the intended legal effect: "A contract that manifestly violates good morals is null and void."[39] As a consequence of the existence of contractual freedom as a fundamental principle of civil law, the contracts regulated in the Hungarian and Romanian Civil Codes are not listed in a closed enumeration. Contract types and their content are limited only by the imagination of the contracting parties, as long as they do not violate legal prohibitions or the expectations of public order and morality/good morals.[40] Modern civil law continues to incorporate numerous solutions known from Roman law, one example being the consensual nature of contract formation. According to this principle, in the absence of a contrary provision, the creation of a contract does not require the delivery of an object (real act); rather, the contract is formed

[36] Barzó, T., *Szerződési szabadság és a diszpozitív szabályozás a magyar polgári jogban*, Miskolci Jogi Szemle, 2011/2, p. 89; Dănișor, D.C., *Libertatea contractuală în Codul civil român*, Revista Română de Drept Privat, 2011/3, p. 35

[37] This statement is supported by Section 6:59 of the Hungarian Civil Code: "(1) The parties are free to conclude contracts and freely choose the other contracting party. (2) The parties are free to determine the content of the contract. The provisions of contracts concerning the rights and obligations of the parties may be deviated from by mutual agreement unless such deviation is prohibited by this Act."; Similarly, Article 1169 of the Romanian Civil Code states: "The parties are free to conclude any contract and determine its content, within the limits set by law, public order, and morality."

[38] For more about contractual freedom in these countries see: Roș, V., *Drept civil. Teoria generală a obligațiilor*, Hamangiu, București 2018, p. 144 (Romania); Lenkovics, B., *A Polgári Törvénykönyv magyarázata*, HVG-ORAC, Budapest 2014, p. 427 (Hungary).

[39] Act V of 2013 on the Civil Code Section 6:96 [Contract Contrary to Good Morals].

[40] Veress, E., *Contractul în dreptul privat român și maghiar*, Studia Universitatis Babeș-Bolyai Iurisprudentia, 2015/2, p. 31.

through the mutual expression of intent by the parties[41]. This principle is in line with both Hungarian and Romanian civil law[42] as confirmed by the literature of these countries.[43]

Smart contracts offer a different solution, as the formal requirement necessary for their formation makes them an exception within the framework of the two civil codes. As seen, both Hungarian and Romanian law define contracts as fundamentally consensual in nature. In contrast, smart contracts require the existence of a pre-developed informatics code, meaning that the "legal transaction" must necessarily take a tangible form.[44]

4. THE NATURE OF A SMART CONTRACT AS A LEGAL TRANSACTION

Following the classical concept of contracts, I find it necessary to examine the nature of smart contracts as legal transactions. Since every contract qualifies as a legal transaction, the same classification forms applicable to legal transactions must also be applied in the case of smart contracts. Designated as a contract, a smart contract can constitute a bilateral legal transaction. Consequently, the formation of a smart contract requires the manifestation of intent by at least two persons. It is important not to confuse a unilateral contract with a unilateral legal transaction, as the former requires the intent of at least two persons, while the latter can produce legal effects solely through the declaration of intent by a single party,

[41] György, W., The General Rules of Contracts in the New Civil Code – Part II.; avalaible: https://ptk2013.hu/szakcikkek/wellmann-gyorgy-a-szerzodesek-altalanos-szabalyai-az-uj-ptk-ban-ii-resz/3611.
[42] Section 6:63 of the Hungarian Civil Code [Formation and Content of a Contract]: "(1) A contract is formed through the mutual and concordant expression of the parties' intent. (2) For the formation of a contract, the parties must agree on essential terms and on any terms that either party considers essential. Agreement on an issue deemed essential is a prerequisite for contract formation if a party explicitly expresses that, in the absence of such an agreement, they do not wish to conclude the contract"; Article 1182 of the Romanian Civil Code: "(1) The parties conclude a contract following negotiations or by unconditional acceptance of a contractual offer. (2) It is sufficient for the parties to agree on the essential elements of the contract, even if certain secondary elements are deferred for later negotiation or entrusted to a third party for determination. (3) Under the conditions specified in paragraph (2), if the parties fail to reach an agreement on secondary elements or if the designated third party does not make a determination, the court, at the request of either party, shall order the contract to be supplemented, taking into account the circumstances, the nature of the contract, and the intentions of the parties".
[43] Sárközy, T., *A szerződési jog új tendenciái*, HVG-ORAC, 2012, p. 113; Boroi, G., Anghelescu, L., *Curs de drept civil. Partea generală*, Hamangiu, 2019, p. 252
[44] More about this in the next section.

without the consent of another.[45] The distinction between a bilateral legal transaction (contract) and a unilateral contract lies in the fact that in the latter case, only one party holds a claim, while obligations are imposed solely on the other party. Therefore, a smart contract, as a bilateral legal transaction, may function either as a bilateral or unilateral contract, depending on the legal effects it generates.

Smart contracts may be onerous or gratuitous legal transactions. Every bilateral contract constitutes an onerous legal transaction, in which one party commits to providing a counter-performance in exchange for the performance of the other party. A unilateral contract may also be onerous, for instance, when a borrower agrees to pay interest.[46] A key characteristic of a gratuitous legal transaction is the absence of consideration, meaning that the beneficiary party does not reciprocate the benefits derived from the contract to the other party. From a formal perspective, a legal transaction may fall into one of the following categories: informal, form-bound, or real transaction. In my view, since smart contracts are legal transactions embedded in computer codes that operate based on predetermined conditions, their inherent digital nature can be equated with form-bound transactions, making them interpretable as one of its forms.

The chapter of the Romanian Civil Code which regulates contract formation defines formal freedom as the primary rule of contract conclusion, which has an equivalent provision in the Hungarian civil Code as well.[47] According to this principle, the validity of a contract requires the "concordant" (Romanian Civil Code) or "mutual and consistent" (Hungarian civil Code) will of the parties. However, the Romanian Civil Code goes further by noting within the same statutory article that the consensual nature of contract formation is only applicable if "the law does not prescribe specific formal requirements." Thus, the Romanian Civil Code contains a legal condition that restricts formal freedom, namely the existence of a statutory provision requiring formality in the contract formation process. It can be concluded that this regulation is broader – or at least more extensive in content – than the corresponding provision in the Hungarian civil Code. But how does this relate to the nature and formation of smart contracts, and why is this distinction relevant? As observed, the Romanian Civil Code establishes the existence of a statutory requirement as the source of formality. Consequently, the interpretation of this provision implies that if the law does not impose a formality requirement for the validity of a particular contract, then such a contract

[45] Köteles, A., *A jogi ügyletek rendszertana a Polgári Törvénykönyvben*, ELTE Law Review, 2017/2, p. 66
[46] Gordley, J., *Foundations of Private Law*, Oxford University Press, 2006, p. 124
[47] Romanian Civil Code article 1178., Hungarian Civil Code 6:63. § [Creation and content of the contract].

may be concluded based on consensus. In other words, a contract is only formally bound if a positive legal norm explicitly mandates it.

The formation of smart contracts is inconceivable without some form of formal requirement. Three legally defined forms of formal requirements exist: 1) for evidentiary purposes (*ad probationem*); 2) for validity (*ad validitatem*); 3) for enforceability against third parties (*ad opposabilitatem*).[48] The question arises: which form of formal requirement applies to smart contracts? For such a contract to come into existence, a pre-developed computer code must exist, meaning that the "legal transaction" must always take a tangible form. However, while in the case of a real estate sale, the form requirement pertains to validity (i.e., the transaction can still take place without complying with the formality, but it will not be valid), in the case of smart contracts, formality itself is the precondition for the legal transaction's existence. Without it, not even an invalid legal transaction can come into being.[49] Referring back to the Romanian Civil Code's provision on the exception to consensual contract formation: for smart contracts to be form-bound for validity purposes (*ad validitatem*), a statutory provision should exist.[50] However, the formality of smart contracts does not stem from legislation but from their inherent nature as legal transactions embedded in computer code.

Smart contracts appear to be form-bound contracts but do not fit into any of the currently recognized statutory formal categories. *De lege ferenda,* I find it necessary to establish a new formal category linked to the existence of a contract.[51] It is apparent that the *ad validitatem* form requirement necessary for the valid conclusion of a contract does not fully address the issue surrounding the formation of smart contracts, as formality in their case is the prerequisite for the contract's existence. If the formal requirement is not met, we cannot speak of an invalid smart contract – since a smart contract cannot exist except in a form-bound manner. Consequently, the relevant legal provisions that could regulate the form-bound validity of smart contracts are inadequate, as they do not fully cover the conditions for the creation of this new type of contract. Therefore, legislation is necessary to regulate smart contracts appropriately.

[48] Pop, L., *Tratat de drept civil. Obligațiile*, Universul Juridic, 2015, p. 87
[49] Raskin, M., *The Law and Legality of Smart Contracts*, Georgetown Law Technology Review, 2017, p. 318
[50] The statement is also supported by Article 1179 (2) of the Romanian Civil Code.: "If the law prescribes a certain formal requirement for a contract, it must be complied with under the sanction of the applicable legal provisions".
[51] According to the author, the Latin name for this kind of formalism should be called *"ad existentiam"*.

Legal transactions can also be categorized as abstract or causal. An abstract legal transaction is one in which the purpose is not an essential element of the transaction. A causal legal transaction, such as a lease agreement, is one where the obligation is directly linked to a cause – for example, a tenant commits to paying rent because the landlord grants them the right to use the property. A classic example of an abstract legal transaction is a promissory note, in which the issuer undertakes to pay a specified amount by a certain deadline without indicating the underlying cause. In my view, smart contracts appear to function as abstract legal transactions. This is because they are executed based on pre-defined conditions rather than a pre-defined legal purpose. If we accept this premise and consider smart contracts as abstract legal transactions –meaning that the purpose of the payment is not essential – the question arises: can the contractual position be transferred, similar to a promissory note, or can claims arising from a smart contract be assigned? The issue of transferability is closely related to another classification: whether smart contracts fall under *inter vivos* (between living persons) or *mortis causa* (in case of death) legal transactions. *Inter vivos* transactions take effect during the lifetime of the parties. *Mortis causa* transactions, such as a will, produce legal effects only upon the death of the person creating them. Since the execution of a *mortis causa* transaction requires tracking the death of an individual, and no reliable digital database currently exists for this purpose, smart contracts cannot be classified as *mortis causa* transactions at present.

Smart contracts may be categorized as: 1) general civil law transactions; 2) business-to-business (B2B) transactions; or 3) consumer transactions. For instance, a consumer contract can be executed through a smart contract if a pre-loaded payment on Amazon automatically triggers a purchase as soon as the product becomes available. In an ideal scenario, such contracts would comply with distance contract regulations and special consumer protection rules. However, in practice, smart contracts are still in their early stages, and their interaction with special legal regulations remains uncertain. In my opinion, smart contracts can facilitate both property-transferring and non-property-transferring transactions. A property-transferring transaction (e.g., a sale contract) alters the ownership structure, meaning that the active party in the legal relationship changes. A non-property-transferring transaction (e.g., a lease contract) does not result in a change of ownership. This view is also reflected in the international literature.[52]

A future example of a property-transferring smart contract could be one integrated with a blockchain-based payment system. Consider an automated real estate

[52] Clack, C.D., Bakshi, V., Braine, L., *Smart Contract Templates: Foundations, Design Landscape and Research Directions*, arXiv:1608.00771, 2016.

transaction: a smart contract linked to a land registry database ensures that the purchase price remains frozen in the buyer's account; the transaction only completes once the land registry confirms the ownership transfer; upon confirmation, the purchase price is immediately released to the seller. On the other hand, a non-property-transferring smart contract could be seen in the electric scooter rental system: a digital code unlocks the scooter upon payment; the system automatically disables the scooter's power supply when the rental period ends. The same examples explain why a smart contract can be either an immediate or a continuing legal transaction. Based on the above examples, smart contracts qualify as named legal transactions. However, their complexity depends on the sophistication of the underlying computer code, which is ultimately determined by the expertise of the software developer. Currently, smart contracts are mainly used for simple transactions, as more complex transactions require increasingly sophisticated programming. The evolution of smart contract technology will depend on the ability of developers to create increasingly sophisticated code to handle complex legal relationships.

5. CONCLUSION

As digitalization continues to reshape legal frameworks, contract law must evolve to address the implications of emerging technologies. The rise of smart contracts, automation, and electronic legal declarations challenges traditional legal concepts, necessitating clear regulatory responses. While blockchain technology offers transformative potential, legislative hesitation highlights the need for further legal adaptation. Ensuring that digital advancements align with existing civil law principles will be crucial for fostering legal certainty in the digital era. Smart contracts represent a significant shift in contractual agreements, merging legal principles with technological automation. While their self-executing nature offers efficiency and security, conceptual and regulatory challenges persist. Clarifying their legal status and ensuring alignment with existing frameworks will be crucial for their broader adoption. As blockchain technology evolves, so too must the legal interpretations that govern these digital agreements, ensuring both innovation and legal certainty in an increasingly automated world.

The concept of obligations has evolved significantly from its Roman law origins to modern legal frameworks. The definitions provided by legal scholars such as Julius Paulus and Justinian emphasize the binding nature of obligations and their role in structuring legal relationships. Smart contracts, as a contemporary form of contractual obligation, align with the characteristics of relative legal relationships, as they establish defined parties and require specific actions or performances. However, the enforceability of smart contracts within traditional legal systems

remains an open question due to the lack of explicit statutory regulations and state-backed coercive mechanisms. As legal frameworks continue to adapt to technological advancements, the integration of smart contracts into existing legal structures will necessitate further clarification regarding their legitimacy, enforcement, and applicability in the broader legal system.

The principle of contractual freedom is a cornerstone of both Hungarian and Romanian civil law, primarily governed by dispositive rules. While the Hungarian Civil Code provides a more detailed regulation, the Romanian Civil Code encapsulates the essence of contractual freedom with greater conciseness, incorporating restrictions based on public order and morality. Both legal systems uphold the consensual nature of contract formation, a legacy of Roman law, which allows contracts to be formed through mutual intent rather than formal requirements. However, smart contracts challenge this traditional framework, as they necessitate a pre-developed informatics code, making them a formalized exception within these civil codes. Their integration into the existing legal system raises questions about adaptability, enforcement, and alignment with established principles of contract law.

Smart contracts challenge traditional legal transaction classifications by introducing a digital, self-executing mechanism that operates outside existing statutory frameworks. As bilateral legal transactions, they require mutual intent but may function as unilateral or onerous agreements depending on their terms. Their digital nature inherently imposes a form requirement, yet they do not fit into current formal categories such as *ad probationem* or *ad validitatem,* necessitating new legislative recognition. Moreover, their abstract nature separates them from causal transactions, while their *inter vivos* application excludes them from *mortis causa* legal acts. They can facilitate both property-transferring and non-property-transferring transactions, demonstrating their adaptability in both commercial and consumer contexts. As smart contracts evolve, legal systems must address their unique characteristics to ensure enforceability and legal certainty.

REFERENCES

BOOKS AND ARTICLES

1. Ágnes, J., *Online Contracting, Digital Content and Services, Smart Contracts – A New Era of Contract Law?,* Infocommunication and Law, 2020/2, (75.) e-special issue.

2. András, F., Gábor, H., *History and Institutions of Roman Law*, National Book Publishing House, Budapest 2019, p. 380.
3. Barzó, T., *Szerződési szabadság és a diszpozitív szabályozás a magyar polgári jogban*, Miskolci Jogi Szemle, 2011/2.
4. Basumallik, C., *"Smart Contracts: Types, Benefits, and Tools",* Spiceworks, 2023, p. 3.
5. Beale, H., Fauvarque-Cosson, B., Ruggeri, S., *Contract Law: Ius Commune Casebooks for the Common Law of Europe*, Hart Publishing, Oxford 2010.
6. Béla, Cs., *Smart Contracts*, Opuscula Civilia, National University of Public Service, Faculty of Public Governance and International Studies, Budapest 2019, p. 6.
7. Boroi, G., Anghelescu, L., *Curs de drept civil. Partea generală*, Hamangiu, 2019.
8. Clack, C.D., Bakshi, V., Braine, L.**,** *Smart Contract Templates: Foundations, Design Landscape and Research Directions*, arXiv:1608.00771, 2016.
9. Dănișor, D.C., *Libertatea contractuală în Codul civil român*, Revista Română de Drept Privat, 2011/3.
10. Elemér, P., *Pandectistics and Its Impact on the Science of Hungarian Private Law*, Acta Universitas Szegediensis De Attila József Nominatae, Acta Juridica et Politica, Tomus XXIII., Fascicultus 6, Szeged 1976.
11. Emőd, V., *Civil Law - General Theory of Obligations – V. edition*, C.H. Beck, Bukarest 2020, p. 6.
12. European Union Blockchain Observatory and Forum, "Legal and regulatory framework of blockchains and smart contracts", 2019, p. 6. available: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Publications/ELI_Principles_on_Blockchain_Technology__Smart_Contracts_and_Consumer_Protection_Council_Draft.pdf.
13. Gordley, J., *Foundations of Private Law*, Oxford University Press, 2006.
14. Grosschmid, B., *Vázlat a magyar magánjog rendszeréből*, Franklin-Társulat, Budapest 1905.
15. György, W., The General Rules of Contracts in the New Civil Code – Part II.
16. Justinian, *Institutes*, Book 3, Title 13, Section 2, translation by Birks & McLeod, Oxford University Press, Oxford 1987.
17. Köteles, A., *A jogi ügyletek rendszertana a Polgári Törvénykönyvben*, ELTE Law Review, 2017/2.
18. Kunkel, W., *An Introduction to Roman Legal and Constitutional History*, Oxford University Press, Oxford 1973.
19. Lenkovics, B., *A Polgári Törvénykönyv magyarázata*, HVG-ORAC, Budapest 2014.

20. Lyons, T., Ludovic, T., *Legal and Regulatory Framework of Blockchains and Smart Contracts. – A thematic report prepeared by the European Union Blockchain Observatory and Forum,* 27 th September 2019, p. 22.
21. Mik, E., *Smart Contracts: Terminology, Technical Limitations and Real-World Complexity*, Law, Innovation and Technology, Vol. 9, No. 2, 2017.
22. Olteanu, A., *Roman Law and Its Reception in Modern Civil Codes*, Cluj University Press, Cluj-Napoca 2016.
23. Péter, B., *Contracts*, Internet Encyclopaedia of Legal History (Legal History section, editor: László, K,).
24. Péter, K., *The place of smart contracts in the legal system,* Ministry of Justice programme to raise the level of legal education, Budaoest 2019, p.17.
25. Pop, L., *Tratat de drept civil. Obligațiile*, Universul Juridic, 2015.
26. Pradel, J., *Comparative Criminal Law*, Ed. Dalloz, French 1995, p. 228.
27. Raskin, M., *The Law and Legality of Smart Contracts*, Georgetown Law Technology Review, 2017.
28. Roș, V., *Drept civil. Teoria generală a obligațiilor*, Hamangiu, București 2018.
29. Sárközy, T., *A szerződési jog új tendenciái*, HVG-ORAC, 2012, p. 113.
30. Savelyev, A., *Contract Law 2.0: "Smart" Contracts as the Beginning of the End of Classic Contract Law*, Information & Communications Technology Law, Vol. 26, No. 2, 2017.
31. Schär, F., *Decentralized Finance: On Blockchain- and Smart Contract-Based Financial Systems*, Federal Reserve Bank of St. Louis Review, 2021.
32. Stein, P., *Roman Law in European History*, Cambridge University Press, Cambridge 1999.
33. Szabo, N., "Smart Contracts", Satoshi Nakamoto Institute, 1994.
34. Szabo, N., "The Idea of Smart Contracts", Satoshi Nakamoto Institute, 1997.
35. Tapscott, D., Tapscott, A., *Blockchain Revolution: How the Technology Behind Bitcoin and Other Cryptocurrencies is Changing the World*, Portfolio, New York 2016.
36. Veress, E., *Contractul în dreptul privat român și maghiar*, Studia Universitatis Babeș-Bolyai Iurisprudentia, 2015/2.
37. Werbach, K., Cornell, N., *Contracts Ex Machina*, Duke Law Journal, Vol. 67, 2017, p. 344.
38. Zimmermann, R., *The Law of Obligations: Roman Foundations of the Civilian Tradition*, Oxford University Press, Oxford 1996.

LEGAL ACTS

1. Hungarian Civil Code - Act V of 2013 on the Civil Code
2. Romanian Civil Code - Law No. 287/2009 on the Civil Code

NETWORK RESOURCES

1. chromeextension://efaidnbmnnnibpcajpcglclefindmkaj/https://europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Publications/ELI_Principles_on_Blockchain_Technology__Smart_Contracts_and_Consumer_Protection_Council_Draft.pdf
2. https://antk.uni-nke.hu/document/akk-copy-uni-nke-hu/Opuscula_Civilia_2019_Csitei_Bela.pdf
3. https://ijoten.hu/szocikk/jogtortenet-szerzodes
4. https://infojog.hu/juhasz-agnes-online-szerzodeskotes-digitalis-tartalom-es-szolgaltatas-intelligens-szerzodessel-a-szerzodesi-jog-uj-korszaka-2020-2-75-e-kulonszam/
5. https://nakamotoinstitute.org/library/smart-contracts
6. https://nakamotoinstitute.org/library/the-idea-of-smart-contracts/
7. https://ptk2013.hu/szakcikkek/wellmann-gyorgy-a-szerzodesek-altalanos-szabalyai-az-uj-ptk-ban-ii-resz/3611
8. https://www.eublockchainforum.eu/sites/default/files/reports/report_legal_v1.0.pdf
9. https://www.spiceworks.com/tech/innovation/articles/what-are-smart-contracts/