Acta Univ. Sapientiae, Legal Studies, **9**, 1 (2020) 63–82

DOI: 10.47745/AUSLEG.2020.9.1.04

The Applicability of Artificial Intelligence in Contractual Relationships

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Abstract. The appearance and the impacts of AI and digitalization on the different types of legal work as well as on different legal areas and in relation to certain legal institutions are examined and analysed nowadays by many research studies in many ways. In this study, we examine the impact digitalization and AI have on the law of obligations, particularly on the law of contract, and the challenges national legislators shall face in the near future. In the first part of the study, we deal with the formation of contracts by electronic means. After the short review of the related Hungarian regulation in force, recent EU legislation will be presented, which was generated by the expansion of both digital content and digital services. In the second part of the study, attention will be paid to a relatively new phenomenon, the so-called smart contract. In the course of our examination, we attempt to designate the framework of the notion of smart contract and to draft all those questions relating to smart contracts which shall be answered over time by legislation and by contract law.

Keywords: digitalization, digital transformation, conclusion of contract by electronic means, smart contract, intelligent contract

1. Introductory Thoughts

The fourth industrial revolution, the one we are witnessing, fundamentally changes our world and almost all areas of our life. The process called digital transformation impacts our work activity, and our private life does not remain intact either. In parallel with the 'smartening-up' process, almost all professions undergo changes to some extent, and thereby artificial intelligence (hereinafter referred to as: AI) appears and is integrated into the work of lawyers.

The appearance and the impacts of the AI and digitalization on the different types of legal work and on different legal areas as well as in relation to certain

legal institutions are examined and analysed nowadays by many research studies in many ways. The scope of the problems posed and the questions to be answered are extremely colourful and virtually infinite.

In this study, we will take a closer look at the effects of digitalization and AI. We will examine how these phenomena and impacts infiltrate the law of obligations and the law of contract, while attention will also be paid to future challenges.

The starting point of the first part of the study is the formation of contracts by electronic means, a kind of contract conclusion which was made possible by the appearance and the spreading of the Internet and which has already become widespread today. After the short review of the relevant Hungarian regulation in force, recent results of the EU legislation will be presented. This legislative reform was generated by both the spreading of the digital content and digital services and the demands which arose due to contracts relating to products containing or linked to digital content or digital services.

The smart contract constitutes the core element of the second half of the study. In some ways, this contract can be deemed as an improved version of the conclusion of a contract by electronic means. Nevertheless, as it will be later clearly visible, the content of the expression 'smart contract' is much wider since this contract has a special character not only in its conclusion but in its performance. In the course of our examination, we attempt to designate the framework of the notion of smart contract and to formulate all those questions relating to the smart contracts which shall be answered over time by legislation and by contract law regulation.

2. Formation of Contracts by Electronic Means – First Steps Towards the Modernization of Contract Law

Contract law is the most dynamic part of civil law. This characteristic shows itself not only in the operation but in the development of contract law, which has been adapting itself for centuries to the needs raised by everyday life. Due to this adaptation process, different types of contracts have evolved, and more specific and less classifiable contracts have appeared. Over time, the development process and the adaptation had an effect on the process of the conclusion of the contract and partially transformed it: modalities of contract conclusion extended, and the formation of contract by electronic means has become an everyday occurrence today.

However, it is important to mention that the application of this method by the contracting parties in the conclusion of their contract means only a technical change because the parties' intention, which is conveyed or which they wish to convey by the transaction, will not change, and the form of the conclusion of the contract does not affect the intention of the parties.

In 2000, rules on electronic commerce were adopted at the European Union level. As Directive 2000/31/EC[1] (hereinafter referred to as: e-Commerce Directive) indicated, the main aim of its adoption is to create a legal framework to ensure the free movement of information society services between Member States.[2]

According to the implementation duty prescribed by the e-Commerce Directive, the Hungarian legislator adopted Act No. CVII of 2001 on certain issues of electronic commerce services and information society services (hereinafter referred to as: e-Commerce Act), which, in accordance with EU rules, determines the requirements of starting and pursuing service activity relating to the information society. The e-Commerce Act contains special provisions on the conclusion of contracts by electronic means,[3] bearing in mind the aspects of consumer protection such as the interests of consumers during the online contract conclusion and the protection of consumer interests.

The e-Commerce Act prescribes for the service provider to make the general contracting terms and conditions appropriately available, i.e. in a way that allows the recipient of the service to store and retrieve them. The e-Commerce Act also specifies those elements and information which the service provider shall provide to the recipient of the service prior to the sending of an offer by the latter person. The provisions on the service provider's duty to provide information are basically imperative. Nevertheless, parties are allowed to derogate from these rules with their mutual consent if the contract is to be concluded between a service provider and a non-consumer recipient.[4] In this regard, it should be noted that the above mentioned provisions shall not apply to contracts concluded exclusively by the exchange of electronic mail or by equivalent individual communications, e.g. text message or online chat.[5] Moreover, the e-Commerce Act also contains provisions on the identification and correction of input errors. These rules are non-mandatory as well.

The rules of the conclusion of contract by electronic means are also regulated by the current Act No. V of 2013 on the Hungarian Civil Code (hereinafter referred to as: HCC). The HCC, in essence, follows and takes over the relating provisions of the e-Commerce Act[6] with minor modifications, while these rules remain in force. It is important to note that the provisions of the HCC, except the provision on the entry into force of a statement made electronically, relate exclusively to those contracts which are concluded online by 'click-wrapping'. These rules, in a way similar to the

1 Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market, OJ L 178, 17.7.2000, 1-16.

2 Directive 2000/31/EC, Recital (8).

3 e-Commerce Act, articles 5–6.

4 e-Commerce Act, Article 5, paragraph 3.

5 e-Commerce Act, Article 5, paragraph 4.

6 In their co-authored study, Judit Barta and Mário Čertický observe that differences between the provisions of the e-Commerce Act and the HCC generate uncertainty in jurisprudence. See Barta–Čertický 2018. 307–331, 313.

provisions of the e-Commerce Act, shall not apply to contracts concluded exclusively by the exchange of electronic mail or by equivalent individual communications.[7]

The above-mentioned provisions of the HCC constitute part of the law of obligations, i.e. they have basically non-mandatory nature. Therefore, contractual parties, in accordance with Article 6:1, paragraph 3 of the HCC, are allowed to derogate with their mutual consent from these provisions. Nonetheless, derogation is excluded by the HCC in the case of consumer contract, i.e. when the contract is to be concluded between an undertaking and a consumer. If, contrary to the prohibition, contractual parties derogate from the relating provisions, their agreement shall be deemed as null and void.[8]

3. Towards the Creation of the Single Digital Market

In the late spring of 2015, the European Commission published a communication in which it launched the Digital Single Market Strategy for Europe[9] and envisaged the creation of the single digital market to achieve the preservation of the leading position of Europe in the digital economy. The digital market to be created means a market where the four fundamental freedoms prevail on the one hand and where both individuals and undertakings can conduct their online activity without barriers on the other.

In its three pillars strategy, the Commission worded a plan for a multi-annual period. At the same time, it drafted several measures which are to be carried out by the legislative bodies of the EU. In its communication, the Commission drew attention to the reasons why consumers and smaller undertakings demonstrate a timid attitude to cross-border electronic commerce. As the Commission worded, this attitude mostly stems from the complexity and unclear nature of the regulation on such transactions. Moreover, regulations are not fully harmonized, and therefore the legal provisions to be applied are often different. Although full harmonization has already been realized

7 In the legal practice, the question arose whether electronic mail without electronic signature (simple e-mail) shall be deemed as a written legal statement in the application of Article 6:7, paragraph 3 of the HCC. The relevant judicial practice is not uniform. There is a decision in which the court, regarding the given situation and its circumstances, deemed the simple e-mail as a written legal statement (Gfv. VII.30.417/2014/2). Nevertheless, according to the majority of the members of the New Civil Code Advisory Board, the court shall examine in all cases if the form of communication under the given circumstances complies with the conditions determined by Article 6:7, paragraph 3 of HCC. It means that a statement can only be deemed as written if the form allows for the content being properly recalled in and for the person who made the statement and the time when the statement was made being identified. About this question, see: Pomeisl–Pozsonyi 2020. 44–49; Barta 2019. 13–20, 17–19.

8 HCC, Article 6:85, paragraph 2.

9 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions – A Digital Single Market Strategy for Europe, COM (2015) 192 final. Brussels, 6.5.2015.

in certain areas (e.g. consumer protection rules of electronic commerce), in other areas only a minimum harmonization was prescribed by the EU directives. There were other segments of electronic commerce where the relevant European regulation was deficient or did not exist at all (e.g. in the case of digital content). Considering all these deficiencies, the Commission submitted a legislative proposal which is partly aimed at the adoption of new EU measures and at the revision of the already existing legal framework.[10]

After a multi-annual preparatory process, two new directives were adopted at the EU level in the spring of 2019.[11] In the future, these directives will form the regulatory framework of the contracts for the supply of digital content and digital services. The adoption of these legal measures is arguably one of the greatest regulatory achievements of the last two decades in the field of contract law and consumer protection in the EU.

In the case of consumer contracts, i.e. contracts between consumers and undertakings, the rules set forth for the formation of the contract by electronic means require particular attention. In the course of the adoption of the relevant rules, the EU legislator has considered this aspect from the very beginning. Nevertheless, the increasing number of online contracts concluded presented both the European and the national legislators with new challenges. Notwithstanding the fact that the number of online contracts is increasing, there is still some uncertainty on the consumer side, in particular in the case of cross-border purchases. Albeit this is due to several factors, consumers' uncertainty regarding their basic contractual rights and the lack of a clear regulatory framework of contracts for the supply of digital content and digital services have the greatest impact.

Directive 2019/770/EU contains common rules on certain requirements concerning contracts between traders and consumers for the supply of digital content or a digital service,[12] as Recital (11) of Directive 2019/770/EU declares that the main aim of the directive is the full harmonization of the rules on the conformity of digital content or a digital service with the contract, remedies in the event of a lack of such conformity or a failure to supply and the modalities for the exercise of those remedies, and the full harmonization of the rules on the modification of digital content or a digital service. Accordingly, the scope of the directive covers

10 For the detailed description of the proposal and the summary of the problems raised, see: Merdi 2017. 125–162; Romachuk–Racheva 2016. 95–106; Carvalho 2019. 194–201; Gellén 2017. 3–9.

11 Directive (EU) 2019/770 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the supply of digital content and digital services, OJ L 136, 22.5.2019, 1–27; Directive (EU) 2019/771 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the sale of goods, amending Regulation (EU) 2017/2394 and Directive 2009/22/EC, and repealing Directive 1999/44/EC, OJ L 136, 22.5.2019, 28–50.

12 The content of Directive 2019/770/EC is reviewed and analysed in detail by Karin Sein and Gerald Spindler in their co-authored studies. See: Sein–Spindler 2019a. 257–279; 2019b. 365–391.

all contracts for pecuniary interest[13] under which the trader supplies or undertakes to supply *digital content*, i.e. data which are produced and supplied in digital form,[14] or a digital service to the consumer. *Digital service* means a service that allows the consumer to create, process, store, or access data in digital form. Moreover, the notion covers all those services that allow the sharing of or any other interaction with data in digital form uploaded or created by the consumer or other users of that service.[15]

In addition to defining the basic expressions, Directive 2019/770/EU specifies the subjective and objective requirements for the conformity of a digital content or digital service. Furthermore, it contains provisions on the liability of the trader and on the burden of proof. Within the framework of the directive, all those remedies are determined which the consumer can claim against the trader for the failure to supply, i.e. in the event of non-performance or in case of a lack of conformity. Directive 2019/770/EU also sets forth the duties of both the consumer and the trader in case of the termination of the contract by the consumer and contains rules on the reimbursement of the price paid by the consumer.

According to Article 24 of Directive 2019/770/EU, Member States shall adopt and publish the measures necessary to comply with the directive. These measures shall apply from 1 January 2022.

As it was mentioned above, another legal norm was also adopted within the framework of the Digital Single Market Strategy for Europe. Directive 2019/771/EU lays down the common rules on certain requirements concerning sales contracts concluded between sellers and consumers. In the application of the directive, the term 'goods' should be understood broadly since it includes 'goods with digital elements', i.e. it covers all those digital content and digital services which are incorporated in or interconnected with such goods in such a way that the absence of that digital content or digital service would prevent the goods from performing their functions.

It is clear that the subject-matter of Directive 2019/770/EU and Directive 2019/771/EU coincides in certain cases, e.g. conformity of goods, digital content and digital services, applicable remedies in the event of a lack of such conformity, and the way of their exercising. Therefore, the directives' conceptual system is coherent, 'digital content' and 'digital service' are defined in the same way in both documents. Nevertheless, the scope of application of the directives is different: provisions of Directive 2019/771/EU shall basically not apply to contracts for the supply of digital content and digital services. However, provisions shall apply for a digital content or digital service incorporated in or interconnected with goods, which are provided with the goods.[16]

13 According to Article 3, paragraph 1 of Directive 2019/770/EU, the consumer pays or undertakes to pay a price for the digital content or digital service supplied or undertaken by the trader.

14 Directive 2019/770/EU, Article 2, point 1.

15 Directive 2019/770/EU, Article 2, point 2.

16 Directive 2019/777/EU, Article 3, point 3.

In addition to differences in the subject-matter of the directives, it is important to note that the texts of the directives expressly declare that the directives should complement each other.[17] Accordingly, Directive 2019/771/EU has a similar relationship with the provisions of Directive 2011/83/EU[18] since it is complementary to them.

In terms of content, Directive 2019/771/EU follows the regulatory structure of Directive 2019/770/EU. On the one hand, it determines the subjective and objective requirements for the conformity of goods. Furthermore, it provides for the liability of the seller and for the burden of proof as well as for the remedies which are available for the consumer. Finally, the directive contains provisions on the termination of the sales contract.

The deadlines for the implementation of the directives are the same, as is determined by Directive 2019/770/EU. However, Directive 1999/44/EC[19] on certain aspects of the sale of consumer goods and associated guarantees is repealed with effect from 2 January 2022, i.e. with the beginning of the application of the new rules.

The above introduced new European legal norms definitely have an impact on the future development of electronic commerce in the EU. Nevertheless, the restructuring of the regulation of electronic commerce, in particular of the rules on consumer protection regarding the supply of digital content and digital services, poses a major challenge for the national legislators as well. Beyond that, the implementation of the above mentioned directives appears as a concrete task in the legislation of the Member States; national legislators shall have regard to policy reasons and, along them, decide on how to integrate the rules prescribed by the European acts into their law in force, i.e. they shall decide whether to adopt a single act or to amend the existing legal rules.

4. Intelligent Contracts – The New Generation of Contractual Agreements?

4.1. Conceptual Framework. Main Characteristics and the Difficulties of Definition

During the examination of the different digital technologies' impact on the law of obligations, the appearance and interpretation of 'intelligent contracts', or 'smart

17 Directive 2019/770/EU, Recital (20) and Directive 2019/771/EU, Recital (13).

18 Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights, amending Council Directive 93/13/EEC and Directive 1999/44/EC of the European Parliament and of the Council and repealing Council Directive 85/577/EEC and Directive 97/7/EC of the European Parliament and of the Council, OJ L 304, 22.11.2011, 64–88.

19 Directive 1999/44/EC of the European Parliament and of the Council of 25 May 1999 on certain aspects of the sale of consumer goods and associated guarantees, OJ L 171, 7.7.1999, 12–16.

contracts', and their incorporation into the framework of classic contract law is one of the most frequently examined areas.

As it was mentioned before, the emergence of the conclusion of contract by electronic means brought merely technical changes in the method of the formation of the contract. Conversely, smart contracts mean not only a new kind of contract conclusion, but the application of this contract type based mostly, but not exclusively, on blockchain technology[20] also impacts the performance of the contract. Indeed, in the case of application of this technology, the fulfilment of conditions and terms determined in the contract leads automatically to the performance of the contract.

In relation to smart contracts, the expression 'blockchain' should be explained. Blockchain is a kind of so-called 'distributed ledger technology' (DLT), which, in order to distribute values and information, allows the establishment of a peer-to-peer (P2P) relationship between parties who are geographically absent or who do not trust each other. Blockchain is typically public, but, due to the different cryptographic processes it employs, it is able to provide a satisfactory proof of transactions without the need for the involvement of an intermediary.[21]

In the case of applications of the blockchain technology, the different asset movements, the conclusion and the fulfilment of contracts, the tracking of the phases of these operations, and the processing of different data take place entirely by computer encryption.[22]

Determining the conceptual framework of smart contracts is not an easy task since it does not have a generally accepted, universal definition.[23] At first sight, it can be surprising since the topic of smart contracts is one of the most frequented and most researched areas in the borderlands of computer science, digitalization trends, AI, and jurisprudence. The lack of a definition is due to several reasons.

a) Although the expression 'smart contract' has already been present for more than two decades in the public consciousness,[24] it appears as a relatively new

20 The operation of smart contracts is mostly, but not always, based on the blockchain technology. However, there are other platforms, e.g. the Hungarian-developed TrustChain, which ensure the online conclusion of contract but are not based on blockchain technology. About TrustChain, see: www.trustchain.com.

21 De Filippi–Wright 2019. 13–14.

22 The functioning of blockchain technology is not reviewed in detail within this study. For a detailed elaboration of the topic, see: Glavanits–Király 2018. 173–183; Szuchy 2020. 75–83; Csitei 2019.

23 De Caria 2019. 731–752. In spite of the fact that smart contracts do not have a generally accepted worldwide definition, there are countries where a regulation has been adopted which recognizes the application of blockchain technology and smart contract, and, at the same time, this designates to a certain extent the conceptual framework of these contracts. For instance, several states of the USA, e.g. Arizona, Delaware, Nevada, Ohio, Tennessee, and Wyoming, have rules on smart contract. See Catchlove 2017.

24 The expression was used at first by Nick Szabó. He defined smart contract as '[a] set of promises, including protocols within which the parties perform on the other promises. The protocols are usually implemented with programs on a computer network or in other forms of digital electro-

phenomenon in the present contractual practice inasmuch as it came to the forefront of the attention of legal professionals interested in computer science and programming only in the last few years due to the spread of bitcoin and blockchain technology. Additionally, it should be mentioned that the original meaning of the expression at the time of its first use (1998) by Nick Szabó is not identifiable with all those elements which the not strictly limited concept of smart contract covers.

b) In defining intelligent contract, the complexity of the technology upon which the functioning of this contract is based also causes difficulties since the conceptual delineation of smart contract is not possible without a detailed knowledge of blockchain technology. Creating the concept of intelligent contract requires at least a minimum knowledge and understanding of the information technology behind the contract. However, such a knowledge and perception are a quite serious challenge for average legal professionals, who have only user-level computer skills. It is an additional difficulty that the name 'smart contract' is basically created and used by IT specialists, therefore in the sense used by them, i.e. smart contracts as merely computer protocols have no real legal relevance.[25]

In short, due to all factors mentioned above, it is not possible to speak about the general and universal concept of smart contract. Nevertheless, several definition attempts appear in the quite rich and expanding literature relating to the topic. A typical feature of such definitions is that, instead of the conceptual delimitation of smart contracts, they identify and highlight the main characteristics of the construct itself. Nevertheless, the designation of the conceptual framework of intelligent contract is not an aim in itself. This kind of work is absolutely necessary to make remarks and to draw conclusions regarding the relationship existing between smart contracts and traditional contract law. Moreover, based on all these, it becomes possible to make recommendations and, in a given case, to designate the directions of the transformation of contract law, triggered by technological development. However, beyond the relatively precise designation of the conceptual framework and the creation of the logical closure, the definition method shall also be flexible. It means that the scope of the concept shall be 'moveable' in order to be able to adapt itself later to the relatively fast-changing technological environment, upon which the operation of intelligent contracts is based.

Thanks to the particularly high level of attention for the different issues of intelligent contracts and to the quantity of studies published recently, the number

nics, and thus these contracts are "smarter" than their paper-based ancestors. No use of artificial intelligence is implied.' See Szabó 1996.

25 This is the reason why the expression 'smart contract' appears in clarified form in the foreign, mostly English-language literature. 'Smart contract code' means the contract in the IT sense, while the expression 'smart legal contract' is used for the purpose of analysing the topic from a legal perspective. See Stark 2016.

of definition attempts is practically endless. Therefore, providing a complete picture of these various, sometimes more, sometimes less complex definitions seems hardly possible. Regarding this, some potential definitions of the smart contract will be presented in the following.[26]

If we designate the conceptual borders of the intelligent contract, we are given more options. From the technical point of view, an intelligent contract is a kind of computer protocol which, usually by the application of blockchain technology, executes itself automatically, without the contribution of any other actor or intermediary.[27] In addition, the transaction is automatically registered in a distributed database. With regard to this latter feature, these blockchain-based contracts are often called in the practice 'decentralised intelligent contracts'.[28] According to another approach, smart contracts are an agreement incorporated into digital form, which execute and enforce themselves;[29] it is an objective and infallible computer program which establishes, performs, and enforces the agreements.[30]

A further definition considers that smart contracts are computer programs of a new type, which are independent from a central operator and which are able to make the contract, in whole or in part, self-executing by transforming the contract terms to computer code.[31]

According to the simplest and briefest phrasing, a smart contract is a self-executing agreement.[32]

After reviewing the sometimes simpler, sometimes complicated wordings of intelligent contract definitions, it is clear that there is a common characteristic which is included in them: all of them contain the self-executing nature of the contract, which can be deemed as the key feature of smart contracts. Self-enforceability and a tamper-proof nature[33] can be identified as further essential features of the intelligent contract.

If a smart contract is approached from the point of view of traditional contract law, it should be noted that it cannot be deemed as a specific type of contract, just like the different groups and contract types existing and regulated by national laws. Instead, a smart contract can be perceived as an improved, 'upgraded',

26 In his previously referred work, De Caria collects several definition attempts of the smart contract. See De Caria 2019. 735 (Footnote 23).

27 De Filippi–Wright 2019. 33 (Footnote 21); Woebbeking 2019. 106–113, 107.

28 De Caria 2019. 733 (Footnote 23).

29 Werbach–Cornell 2017. 313–382, 320.

30 Mik 2017. 269–300, 270.

31 Rohr–Wright 2019. 463–524, 473 qtd. by Glavanits–Király 2018. 180 (Footnote 22).

32 Raskin 2017. 306–341, 306.

33 Tamper-proof enforcement means that the smart contract cannot be stopped or modified. This raises several problems, which are not to be discussed within the framework of this study. About the elaboration of this topic, see Mik 2017. 283–284 (Footnote 31); Clack–Bakshi–Braine 2016. 4.

AI-supported version of the *formation of contract by electronic means*. Smart contracts are independent from any particular type of contract, and therefore they ensure that contracting parties conclude and perform their contract online, fully virtually, without meeting, and using the guarantees granted by the blockchain technology.

Smart contracts are practically 'type-independent' as they, in theory, can appear in any form of contract. Nevertheless, it should be added that there are and will always be contracts which would not be appropriate for conclusion as smart contracts or for the transformation of which into smart contracts no need would arise.

Regarding the appearance, a smart contract always contains the contract terms in translated form, i.e. as computer code. In some cases, smart contracts appear exclusively in encoded and encrypted form. In other cases, smart contracts are the encoded version of a traditional contractual document. However, there are also other cases, where intelligent contracts combine the two forms and appear as a hybrid which contains the elements of the traditional contract together with the computer code.[34] Regardless of the form of smart contracts, their most important characteristics are their irrevocability (finality) and automation.[35]

When contractual partners conclude an intelligent contract, both the performance and the enforcement of the contract are ensured by an immutable computer code by using (most often) blockchain technology.[36] Such a contractual construct allows for parties to rely exclusively on the blockchain technology instead of establishing and strengthening mutual trust. In such a case, parties leave the performance of contractual obligations to be fulfilled via blockchain technology, irrespective of whether changes occurred after the conclusion of the contract either in the external circumstances or in the parties' attitude to the contract or to each other or in their intention, motivation, or goals to be reached by the conclusion of the contract.

4.2. The Place of Intelligent Contracts in Traditional Contract Law

Before finding the right place for intelligent contracts within the system of traditional contract law, two fundamental questions must be answered. First, it should be discussed if these contracts are truly intelligent, or 'smart'. It is evident that these attributes are not to be taken in a literal sense.[37] Nevertheless, it is also important to see that a smart contract goes much further than some kind of digitalized contract. The name of the legal institution is also misleading: it suggests that the use of artificial intelligence is essential in the operation of the contract, while

34 Cieplak–Leefatt 2017. 417–427, 418.
35 Szczerbowski 2017. 333–338, 333; Raskin 2017. 306 (Footnote 33).
36 Savelyev 2017. 116–134.
37 Müller–Seiler 2019. 317–328, 318; De Caria 2019. 736 (Footnote 23).

this is not the case.[38] In general, a given contract shall be deemed as intelligent if it is able to communicate with another computer protocol.[39] Smart contracts based on blockchain technology fulfil this criterion.

Secondly, it is also a question if clauses existing in encoded form as computer protocols can be subjected to a classic contract law approach and deemed as forming a contract which includes the consent of the contracting parties, or not.

The answers to the questions asked above are quite diverse. There is a sense, for instance, in which the expression 'intelligent contract' is a mere habit since these constructs are neither intelligent nor are they contracts.[40]

In their study, Werbach and Cornell do not dispute that intelligent contracts can be considered contracts in the proper meaning of the term,[41] but, at the same time, they draw attention to the fact that the legal enforceability of the agreement is an important question which must be examined in order to assess the legal nature of smart contracts. According to Werbach and Cornell, with the application of smart contracts, contracting partners probably intend to avoid the legal enforcement of the contract since the automation of performance precludes or, at least, minimizes the possibility of breach of contract by either of the parties.[42] For this reason, they conclude that intelligent contracts still cannot be deemed as contracts in the traditional sense, but they are more like a 'gentlemen's agreement', which is informal and typically has no legal binding force, wherefore they cannot be enforced by way of a judicial proceeding.

The arguments put forward by Werbach and Cornell definitely reflect the approach of Anglo-Saxon contract law. Nevertheless, we presumably come to a different conclusion if we intend to examine the legal nature of smart contracts on the basis of continental contract law. In this latter approach, legal enforceability is an essential element of the contract.[43] In lack of enforceability, the given legal relationship is a so-called 'natural obligation' which the debtor may perform, but the performance of which cannot be required or enforced by the creditor. In this case, if smart contracts are considered as contracts in the legal sense, it shall also be assumed that legal enforceability relates to them. However, it is important to note that in the case of smart contracts the non-applicability of a judicial proceeding, i.e. the lack of legal enforceability, is due to the fact that the automated performance of the contract theoretically precludes any problems of enforcement or the emergence of a dispute.

38 De Caria 2019. 737 (Footnote 23). It is important to note that opposing views also exist in the relating legal literature. Most of them emphasize that the use of AI is one of the essential elements of the concept of intelligent contract. See O'Shields 2017. 177–194; Scholz 2017. 128–169.

39 Carron–Botteron 2019. 101–143, 109.

40 Grimmelmann 2019. 1–22.

41 Werbach–Cornell 2017. 339.

42 Ibid.

43 Vékás 2016. 21.

At present, the question of legal enforceability of smart contract remains unanswered since it requires further discussion. Nonetheless, in the course of elaborating an answer to this question, it will be crucial how the smart contracts appear: is there a traditional contract or not prior to their conclusion, before the contractual parties' intention becomes recorded only in encoded form?

When comparing smart contracts with traditional contracts, the difference between the two legal institutions is apparent.[44] From the legal viewpoint, a less relevant difference is the appearance of the contract, as contractual terms do not appear in paper format but in the form of computer code in the case of smart contracts. Actually, this seemingly almost irrelevant feature is of paramount importance since this element ensures the self-executing, automatic performance of the contract. Regarding the performance of the contract, this characteristic is relevant from a legal point of view, which reflects a completely different approach compared to the logic of traditional contract law. Classic contract law mainly aims at treating the losses and injuries suffered by the parties in relation to their contracts. Conversely, in the case of the application of smart contracts, contractual parties, by the automation of performance, preclude the possibility of a breach of contract by either of them, overshadowing the above mentioned function of traditional contract law.[45] According to this characteristic of smart contracts, Raskin brings an illustrative example in his related work, when he compares the contractual parties to Ulysses, who had himself tied to the mast of the ship so as to be able to resist the deadly seduction of the Sirens.[46] Although the different factors impacting the existence and performance of contracts do not mean mortal danger to the contractual parties nor to the contract, the parallelism drawn by Raskin can be correct. Contractual parties, indeed, commit themselves *ex ante* to comply with the terms stipulated in their contracts and, at the same time, to avoiding the occurrence and the legal consequences of the breach of contract by either of them. Considering the aspect of contractual law, the course of contractual phases[47] is incomplete in the case of intelligent contracts since the phase of breach of contract is left out due to the exclusion of future breaches of contract. In other words, the 'life-cycle' of a smart contract is shorter since it comes to an end by the performance of the contract, which is automatic due to the action of the computer code.

Relating to the application of smart contracts, full automation constitutes the main problem. Nevertheless, the amendment of contract is no less problematic since it is, in theory, also precluded.[48] Smart contracts are less flexible than agreements fixed on paper. After the conclusion and the encoding of the contract,

44 In their co-authored work, Stefan Grundmann and Philipp Hacker review and analyse the differences between smart contracts and traditional contracts. See Grundmann–Hacker 2017. 255–297.

45 Werbach–Cornell 2017. 318.

46 Homer: Odyssey, Book XII: 39–52; Raskin 2017. 309.

47 Vékás 2016. 77–79.

48 Clack–Bakshi–Braine 2016. 4.

parties have no opportunity to make any amendment in their contract. The contract runs to completion, to the programmed 'expiration date' without external intervention, regardless of any external circumstance, and without reacting to any such circumstance.[49]

The amendment of the contract is only possible if the parties include the potential future amendments (e.g. indexation clause, payment deferment, moratorium, etc.) into their agreement at the time of the conclusion of the contract. Therefore, these clauses are to be also encoded and automatically executed if the prescribed conditions are fulfilled. Nevertheless, since parties are not able to anticipate and cover every situation, there will always be such external circumstances arising after the conclusion of the contract which would impact the existing contract but which cannot be treated at all because of the intelligent nature of the contract.

From the programming aspect, it is practically impossible to insert such a 'sensitive' command into the contract which is able to handle unforeseeable changes in circumstances occurring after the conclusion of the contracts since the potential consequences of these changes are very diverse, and therefore these potential outputs cannot be fully programmed.[50]

As it was mentioned before, there are also cases where smart contracts are linked to the contract in the traditional sense. Broadly speaking, two different methods are conceivable. In the first case, a contract is concluded in the traditional way, but this legally binding agreement will be later transformed into computer codes by the use of the technology built into the smart contract. This action allows the application of blockchain technology, and the performance of the contract will be automated. In this case, the smart contract can have two roles. It is possible that it only provides support for the performance of the contract by the blockchain technology, i.e. it makes the payment transparent and safer. However, it is also possible that the contract transformed to computer code is fully performed by the intelligent contract.[51]

In the above-mentioned cases, the existence and operation of a smart contract is necessarily preceded by the conclusion of a traditional contract. Therefore, in these cases, *smart contracts are nothing but the dematerialization of the traditional contract*.

Nevertheless, there are cases where smart contracts do not appear as the computerized manifestation of the traditional contract, but the contractual parties conclude their contract from the beginning in coded form, without defining their contractual intention, rights, and duties in understandable terms, in legal language. In these cases, the relationship between the contractual parties is exclusively regulated by the smart contract, i.e. both offer and its acceptance take

49 Mik 2017. 281.

50 For the in-depth elaboration of the question, see Carron–Botteron 2019. 120–121.

51 Carron–Botteron 2019. 111–112.

place in encoded form via the blockchain, which records and stores the agreement of the parties.[52] From that moment, smart contracts are not a mere computer code but a real and binding contract ('smart legal contract'), which establishes rights and duties for the contracting parties. In this regard, intelligent contracts are the platform facilitating the conclusion of the contract. However, the mere fact that the contract is concluded exclusively in this form, via the Internet, raises the question of the appropriate protection of the offeree, who typically does not have IT expertise, only user-level computer skills.

Closely linked to this latter topic, it should also be examined how a 'non-expert', i.e. a person having only average computer knowledge, can effectively participate in the negotiations prior to the conclusion of the contract and in the preparation of the draft agreement and its assessment. Actually, in lack of technological knowledge, parties must rely on a third party, who transforms (encodes) the traditional contract into an intelligent contract. This third party may be a human programmer. This moment calls for a special type of confidence from the parties. This case is similar to the situation where, because of the use of legal terminology, a client has problems with the understanding of the language of the contract, and therefore he requires the explanation of these terms by a lawyer. As it was said, the situation is similar but not the same as in the case of a smart contract, where the client having no programming knowledge is practically in complete darkness concerning the content of the contract, even if the given smart contract was encoded in the simplest programming language. Precisely for this reason, it is common in practice for contractual parties to ask the programmer to state that the smart contract appearing in encoded form and made by him/her complies with the expressed intention of the contracting parties and that it contains the terms and conditions envisaged by them.

The involvement of a third person, the IT expert, in the process of contract conclusion – which is required because of the lack of technological expertise by the parties – is not only a question of confidence, but it raises further questions relating to liability. There may be situations in which the non-performance of the contract is due to a programming error. A situation can also arise where the intelligent contract does not fully cover, does not express faithfully the parties' intention because the contractual parties did not use sufficient precision when informing the IT expert who was preparing the smart contract.[53] How should a situation be assessed where a smart contract made by a programmer is to be used by the parties for an unlawful purpose?[54] All three situations give birth to liability questions which cannot be answered yet since the regulation of smart contracts is controversial, and it generates quite a lot of problems at this time.

52 Carron–Botteron 2019. 113; Jaccard 2018. 22.

53 For the explanation of this topic, see Hoffmann 2019. 168–175.

54 Savelyev 2017. 20–21.

5. Closing Remarks

According to American futurist Martin Ford, we are not at the beginning of the development of information technology, and in a short time we will reach a steep section of the exponential curve, which represents technological progress. The events accelerate, and the future can arrive long before we can prepare for it. Digitalization and the fourth industrial revolution open up new perspectives which we could not have imagined before. New constructs appear, which make us uncertain and raise a number of questions.

Ford's thoughts can be especially true if we compare the particularly rapid tempo of technological development to the circumstantial and quite slow process by which legislation is developed and which would be (unrealistically) expected to react to technological advances by creating a regulatory framework.

However, regulation does not exist in itself but always has its own purpose. Therefore, legislators are under the duty to react to the regulatory demands which arise due to technological development and to modernize the existing legal framework to the extent necessary.

The achievements of the modern age affect all areas of the law. Due to the spreading of the Internet, almost all segments of life have changed. These changed situations call for the amendment of existing rules or for the adoption of new provisions.

At the beginning of the 2000s, a process started in the field of private law, particularly that of contract law, which resulted in the gradual development of the rules of electronic commerce. Accordingly, provisions on contracts concluded by electronic means also appeared, including special consumer protection rules.

Nevertheless, the development process did not stop at this point. The spreading of digital tools forced the legislators to face up to new challenges. It soon became clear that contracts using these tools need more detailed rules. Directive 2019/770/EU and Directive 2019/771/EU, which were shortly reviewed above, can be understood as an answer to the above mentioned regulatory demands since these legal norms contain express rules on the digital content and digital services and the supply of digital services.

The expansion of contracts for the supply of digital content or digital services is a major challenge for national legislators, particularly in the case of cross-border online contracts. Similarly, it is also a difficult situation for legislators when the demands for amending an already existing regulation or for creating new rules have not arisen in the specific subject-matter of contracts but due to a new method of contract conclusion.

Concluding a contract by electronic means is an ordinary procedure today. Nevertheless, the conclusion of a contract via the Internet enters another dimension, when electronic means join cryptography, another achievement of technological

development. In these cases, it is possible that a given contract exists only in the form of computer code.

In some ways, intelligent contracts mark a new phase, practically the end of the development of contract conclusion by electronic means. Nonetheless, due to the involvement of a new element, i.e. cryptography, these contracts are completely different from any other previously known form of usual solutions of contract conclusion.

The use of intelligent contracts starts from the idea that the transformation of traditional agreements into computer codes and their storing in blockchain make the contracts tamper-proof and self-executing, or self-enforcing. Application of smart contracts brings numerous benefits. By the exclusion of human routine tasks and intermediaries, the process of contract conclusion becomes less risky and more cost-effective at the same time. On the other hand, due to the use of artificial language, these contracts are always univocal, while traditional contracts carry several uncertainties because of the use of human language.[55]

Though the widespread use of intelligent contracts offers several opportunities, their real application, due to their nature, is limited in several ways. Moreover, the application of this contracting method is also restricted by the regulatory environment in force.[56]

There can be no question that the appearance of blockchain technology and intelligent contracts based on this technology revolutionize contractual practice. Nevertheless, the expansion of their application requires the revision of the existing regulatory framework and the rules of contract law. In some countries, for instance, in certain states of the USA, the development of a legal regulation on intelligent contracts has already started, or the relating provisions have already been adopted. On the contrary, the legal status of smart contracts is still uncertain in the jurisprudence, which makes it more difficult for the national legislators to create their own rules on smart contracts. Though the appropriate application of the legal provisions in force can be a solution, it is unsatisfactory since smart contracts constantly bring about new questions in practice.

During the examination of intelligent contracts, the question whether the law, particularly contract law, shall react to such a construct, which is so far from the thinking of lawyers and other professionals having legal knowledge, is often asked.

There is no doubt that law shall reckon with the massive expansion of intelligent contracts and that it shall answer in the future the difficult questions raised by them. One of these questions is if smart contracts can eventually replace traditional contracts, i.e. if smart contracts can appear as real alternatives of traditional contracts over time.

55 That conclusion is contradicted by James Grimmelmann. See Grimmelmann 2019. 20–21.
56 Szuchy 2020. 82.

It may be too soon to answer such questions, even if we know that the future is happening now. However, one thing is certain: the emergence of intelligent contracts and their online conclusion in encoded form opens a new era of contract law.

References

BARTA, J. 2019. Az elektronikus úton történő szerződéskötés és a Ptk. In: *Studia in honorem Lajos Vékás*. Budapest. 13–20.

BARTA, J.–ČERTICKÝ, M. 2018. Az elektronikus szerződéskötés általában és a biztosítási, különösen a gépjármű-felelősségbiztosítási szerződés elektronikus úton történő megkötése. *Publicationes Universitatis Miskolcinensis, Sectio Juridica et Politica* 2: 307–331.

CARRON, B.–BOTTERON, V. 2019. How Smart Can a Contract Be? In: *Blockchains, Smart Contracts, Decentralised Autonomous Organisations and the Law*. Cheltenham–Northampton. 101–143.

CARVALHO, J. M. 2019. Sale of Goods and Supply of Digital Content and Digital Services – Overview of Directives 2019/770 and 2019/771. *Journal of European Consumer and Market Law* 5: 194–201.

CATCHLOVE, P. 2017. *Smart Contracts: A New Era of Contracts Use*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3090226 (downloaded on: 17 March 2020).

CIEPLAK, J.–LEEFATT, S. 2017. Smart Contracts: A Smart Way to Automate Performance. *Georgetown Law Technology Review* 2: 417–427.

CLACK, C. D.–BAKSHI, V. A.–BRAINE, L. 2016. *Smart Contract Templates: Foundations, Design Landscape and Research Directions*. http://www.resnovae.org.uk/fccsuclacuk/images/article/sct2016.pdf (downloaded on: 19 March 2020).

CSITEI B. 2019. Okos szerződések. *Opuscula Civilia*. https://antk.uni-nke.hu/document/akk-copy-uni-nke-hu/Opuscula_Civilia_2019_Csitei_Bela.pdf (downloaded on: 18 March 2020).

DE CARIA, R. 2019. The Legal Meaning of Smart Contracts. *European Review of Private Law* 6: 731–752.

DE FILIPPI, P.–WRIGHT, A. 2019. *Blockchain and the Law: The Rule of Code*. Cambridge (Massachusetts, USA).

GELLÉN, K. 2017. Az egységes digitális piaci stratégia törekvései az áruk távértékesítése és a digitális tartalomszolgáltatások körében. *Gazdaság és Jog* 4: 3–9.

GLAVANITS, J.–KIRÁLY P. B. 2018. A blockchain-technológia alkalmazásának jogi előkérdései: a fogalmi keretek pontosításának szükségessége. *Jog – Állam – Politika* 3: 173–183.

GRIMMELMANN, J. 2019. All Smart Contracts Are Ambiguous. *Journal of Law & Innovation* 1: 1–22.

GRUNDMANN, S.–HACKER, P. 2017. Digital Technology as a Challenge to European Contract Law – From the Existing to the Future Architecture. *European Review of Contract Law* 3: 255–297.

HOFFMANN, T. 2019. Smart Contracts and Void Declarations of Intent. In: *Advanced Information Systems Engineering Workshops. CAiSE 2019. Lecture Notes in Business Information Processing*. Cham. 168–175.

JACCARD, G. O. B. 2018. *Smart Contracts and the Role of Law*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3099885 (downloaded on: 3 February 2020).

MERDI, T. P. 2017. The Proposed New Digital Single Market Contact Law Directives: A New Start for Digital European Contract Law? In: *EU Internet Law – Regulation and Enforcement*. Cham. 125–162.

MIK, E. 2017. Smart Contracts: Terminology, Technical Limitations and Real World Complexity. *Law, Innovation and Technology* 2: 269–300.

MÜLLER, L.–SEILER, R. 2019. Smart Contracts aus Sicht des Vertragsrechts. Funktionsweise, Anwendungsfälle und Leistungsstörungen. *Aktuelle Juristische Praxis* 3: 317–328.

O'SHIELDS, R. 2017. Smart Contracts: Legal Agreements for the Blockchain. *North Carolina Banking Institute* 3: 177–194.

POMEISL, A. J.–POZSONYI, N. 2020. Az írásbeliség problematikája a modern digitális technológiák fényében. In: *Innovatív magánjogi megoldások a társadalmi-gazdasági haladás szolgálatában*. Miskolc. 44–49.

RASKIN, M. 2017. The Law and Legality of Smart Contracts. *Georgetown Law Technology Review* 2: 306–341.

ROHR, J.–WRIGHT, A. 2019. Blockchain-Based Token Sales, Initial Coin Offerings, and the Democratization of Public Capital Markets. *Hastings Law Journal* 70: 463–524.

ROMACHUK, S. V.–RACHEVA, S. S. 2016. Legal Perspectives and Obstacles for Unified Digital Contract Rules of Online Sales in the European Union within the Digital Single Market Strategy Context. *InterEuLawEast – Journal for International and European Law, Economics and Market Integrations* 1: 95–106.

SAVELYEV, A. 2017. Contract Law 2.0: 'Smart' Contracts as the Beginning of the End of Classic Contract Law. *Information & Communications Technology Law* 2: 116–134.

SCHOLZ, L. H. 2017. Algorithmic Contracts. *Stanford Technology Law Review* 20: 128–169.

SEIN, K.–SPINDLER, G. 2019a. The New Directive on Contracts for the Supply of Digital Content and Digital Services – Scope of Application and Trader's Obligation to Supply – Part 1. *European Review of Contract Law* 3: 257–279.

2019b. The New Directive on Contracts for Supply of Digital Content and Digital Services – Conformity Criteria, Remedies and Modifications – Part 2. *European Review of Contract Law* 4: 365–391.

STARK, J. 2016. *Making Sense of Blockchain Smart Contracts*. https://www.coindesk.com/making-sense-smart-contracts (downloaded on: 2 March 2020).

SZABO, N. 1996. *Smart Contracts: Building Blocks for Digital Markets*. http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart_contracts_2.html (downloaded on: 6 January 2020).

SZCZERBOWSKI, J. J. 2017. Place of Smart Contracts in Civil Law. A Few Comments on Form and Interpretation. In: *Proceedings of the 12th Annual International Scientific Conference: New Trends 2017 – New Trends in Economics, Management, Marketing and Public Administration*. Znojmo. 333–338.

SZUCHY R. 2020. A blockchain technológia alkalmazása a kötelmi jogban. In: *Innovatív magánjogi megoldások a társadalmi-gazdasági haladás szolgálatában*. Miskolc. 75–83.

VÉKÁS, L. 2016. *Szerződési jog. Általános rész*. Budapest.

WERBACH, K.–CORNELL, N. 2017. Contracts Ex Machina. *Duke Law Journal* 67: 313–382.

WOEBBEKING, M. K. 2019. The Impact of Smart Contracts on Traditional Concepts of Contracts Law. *Journal of Intellectual Property, Information Technology and E-Commerce Law* 1: 106–113.