

doc. dr. sc. Marko Perkušić*

THE LEGAL TREATMENT OF SMART CONTRACTS UNDER CROATIAN LAW

UDK: 347.4

336

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DOI: 10.31141/zrpf.2024.61.154.473

Izvorni znanstveni rad

Primljeno: 19.6.2024.

This paper analyzes smart contracts and the possibilities of applying legal regulation to them. Since smart contracts are not specifically regulated in the Republic of Croatia, the paper considers the possibility of applying European secondary law and Croatian civil law. In doing so, we consider the mode of operation of smart contracts, as well as the various systems by which they can function. Then we determine whether a smart contract is a contract at all and what are the legally relevant features of smart contracts that could help us classify smart contracts. Accordingly, we determine the differences between smart contracts based on the public (decentralized) blockchain and smart contracts based on the private (centralized) blockchain, as well as the differences between the so-called strong and weak smart contracts. From the legal aspect, we analyze the method of concluding smart contracts, their execution, terms of the contract and its interpretation, as well as the fulfillment of the contract itself. The mentioned aspects are considered and compared from the aspect of the applicable law, and special attention is paid to voidability of smart contracts and termination due to non-performance, as well as consumer protection.

Key words: *smart contract, decentralized smart contract, centralized smart contract, consumer protection, void contracts*

1. INTRODUCTION

Algorithms that facilitate transactions have existed for some time now. However, it has been blockchain technology that have made autonomous (smart) contracts possible. The emergence of blockchain technology has started a period of rapid innovation not only with regard to payment systems, but also in relation to a diverse set of industries and use-cases¹. In essence, decentralization through blockchain technology made it possible to create algorithms that can be used to fully automate

* Assistant professor at University Department of Forensic Science, University of Split, Ul. Rudera Boškovića 33, 21000, Split. Email: mperkusi@forenzika.unist.hr. ORCID: 0000-0002-5845-2961

¹ See Perkušić, M., Jozipović, Š., Piplica, D., The Need for Legal Regulation of Blockchain and Smart Contracts in the Shipping Industry, 2020., Transactions on maritime science, Vol. 09, No. 02, p. 365-368.

digital processes. When such blockchain based algorithms are used in order to substitute the lack of trust between two contracting parties of a legally binding transaction, they are considered smart contracts. While called smart contracts, these algorithms are first and foremost computer code² recorded and executed on the blockchain³. The blockchain serves as a platform for the smart contract and crypto-assets can be used as means of transactions of smart contracts⁴. Thus, the regulation of smart contracts is closely related to blockchain technology regulation by Croatian lawmakers and the European Union in its entirety.

Croatia as a member of the European Union has transferred certain legislative competences to the European Union. Some areas, especially those relating to the internal market, fall into the categories of shared competences between the EU and its member states⁵. Here EU law is applicable under the principles of subsidiarity and proportionality⁶. As the digital economy plays a key role in the development of the European market, regulatory reforms in this segment have increased in frequency in recent years. The European Union has made it a priority to create a comprehensive regulatory framework and has taken multiple actions in order to establish a stable foundation for blockchain based innovation. However, as innovation per definition results in changes to the *status quo*, regulation in this field has to be adapted regularly in order to keep track with new technologies. Thus, European law represents an essential and continuously evolving legal source in this field to all member states, including Croatia.

Simultaneously, European lawmakers have only limited authority over multiple other areas of law, of which some are highly relevant to smart contracts. In fact, core civil law is still largely within the jurisdiction of national legislators. Thus, individual characteristics of national law can have a strong impact on the treatment of certain aspects of smart contracts. The division between European and national influences for the purposes of this article can best be described in the following way: Regulatory efforts concerning issues like the use and storage of information⁷,

² Budimir, N., Blockchain tehnologija u osiguranju, Zbornik radova Veleučilišta u Šibeniku, Šibenik 2020., vol. 14, br. 1-2, p. 178.

³ Minović, M., Blockchain tehnologija: mogućnosti upotrebe izvan krypto valuta, 2017., conference paper, INFOTECH 2017, available under: https://www.researchgate.net/publication/318722738_BLOCKCHAIN_TEHNOLOGIJA_MOGUCNOSTI_UPOTREBE_IZVAN_KRIPTO_VALUTA, p. 3.

⁴ Cawrey, D., Lantz, L., Mastering Blockchain: Unlocking the Power of Cryptocurrencies, Smart Contracts, and Decentralized Applications, 2020., 1st Edition, O'Reilly, p. 66.

⁵ See: Marinac, A., Matijević, M. M., Mladenović, J., Division of Competences Between the European Union and the Member State, 2019., EU AND COMPARATIVE LAW ISSUES AND CHALLENGES SERIES – ISSUE 3, 79, p. 84.

⁶ Article 5(3) of the Treaty on European Union (TEU) and Protocol (No 2) on the application of the principles of subsidiarity and proportionality.

⁷ The Data Protection Law Enforcement Directive (EU) 2016/680 on the protection of natural persons regarding processing of personal data connected with criminal offences or the execution of criminal penalties, and on the free movement of such data; The General Data Protection Regulation (GDPR) Regulation (EU) 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data. This text includes the corrigendum published in the OJEU of 23 May 2018.

consumer protection⁸ or the regulation of financial instruments and services⁹ within the Union are mainly conducted on EU level, while fundamental questions of the nature and legal treatment of smart contracts are still heavily based on national law¹⁰.

In order to present how the legal system of the Republic of Croatia is classifying smart contracts, the following text gives an overview of relevant European law that shapes the framework for smart contract regulation as well as relevant national civil law concerning blockchain technologies and smart contracts. Based on this, the following text addresses questions concerning the creation of contracts, the execution of contracts and the termination of contracts in relation to smart contracts in Croatia. As will be presented below, at the core of this analysis is the question whether a smart contract by itself can be considered a legally binding contract, or if it only serves as means to execute an already established agreement¹¹.

2. GENERAL ASPECTS CONCERNING THE REGULATION OF BLOCK CHAIN BASED TECHNOLOGY AND THE USE OF DATA IN CROATIA AND THE EU

In order to determine the legal status of smart contracts in Croatia, it is essential to understand the evolution of blockchain technology regulation and the role which innovation in the area of crypto-assets played in the creation of smart contracts. While the concept of a smart contracts was already proposed in 1997, only after the creation of the Ethereum network in 2013 did blockchain based smart contracts became a reality¹². Thus, decentralized smart contracts were in essence linked to

⁸ See for example: Directive 98/6 / EC (OJ L 080, 18.3.1998) on consumer price statements; Directive 2002/65 / EC on distance trade in financial services for consumers and amending Council Directive 90/619 / EEC and Directives 97/7 / EC and 98/27 / EC (OJ L 271, 9.10.2002); Directive 2005/29 / EC on unfair business-to-consumer practices; Directive 2008/122 / EC on Consumer Protection concerning Long-Term Vacation Products (I L 33, 3.09.2009); Directive 2009/22 / EC on injunctions for the protection of interested consumers (OJ L 110, 1.5.2009); Directive 2011/83 / EU on consumer rights, as amended by Directive 93/13 / EEC and Directive 1999/44 / EC (OJ L 304, 22.11.2011).

⁹ See for example: Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive (OJ EU 2014 L 173/349); Directive 2014/17/EU on credit agreements for consumers relating to residential immovable property (OJ L 060 28.2.2014, p. 34).

¹⁰ See Perkušić, M., Jozipović, Š., Mamut, J., *Mogućnosti korištenja i pravnog uređenja tzv. pametnih ugovora u Republici Hrvatskoj*, Zagreb 2022., Chapter 18 in *Hrvatsko obvezno pravo u poredbenopravnom kontekstu: Petnaest godina Zakona o obveznim odnosima*, Ekonomski fakultet Sveučilišta u Zagrebu, ur.Tot, I., Slakoper, Z.

¹¹ See on this issue for example Werbach, K., & Cornell, N., *Contracts ex machina*, 2017., Duke Law Journal, 67, 313, 330, 338-343.

¹² Minović, M., *Blockchain tehnologija: mogućnosti upotrebe izvan kripto valuta*, 2017., conference paper, INFOTECH 2017, available under: https://www.researchgate.net/publication/318722738_BLOCKCHAIN_TEHNOLOGIJA_MOGUCNOSTI_UPOTREBE_IJZVAN_KRIPTO_VALUTA, p. 2.; N. Szabo, *The Idea of Smart Contracts*, http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart_contracts_idea.html, 1997.

blockchain based computer code and crypto-assets¹³. As a result, European regulation concerning such blockchain related code and assets indirectly also impacts smart contracts and it has to be analyzed before considering the legal status of smart contracts in particular.

The EU has made it a priority to modernize its laws in relation to crypto-assets and the digital economy¹⁴. European law concerning blockchain based technology comprises of multiple regulations and directives that are binding for all EU member states. One of the most important legal source already in force is the Anti-money laundering Directive of the EU, which defines certain crypto asset terms as well as rules to prevent the use of crypto assets for illegal purposes¹⁵. Furthermore, the directives concerning exchange of taxpayer information amongst tax authorities also contain rules that strongly affect entities active in cryptocurrency exchanges¹⁶. The most important legal source for crypto-asset regulation is the Markets in Crypto-assets Regulation¹⁷. This regulation establishes a comprehensive framework enabling the uptake of distributed ledger technology (DLT) and crypto-assets in the financial sector while simultaneously addressing the risks associated with these technologies. It also creates a mandatory legal source for national lawmakers.

Furthermore, data use and data protection significantly overlap with the application of smart contracts and especially oracle services. Therefore, the Regulation on harmonized rules on fair access to and use of data have a significant impact on smart contract regulation in Croatia and the EU¹⁸. Namely, the Regulation set standards for smart contracts that determine rules for the transfer and collection of data. It also defines smart contract as "a computer program used for the automated execution of an agreement or part thereof, using a sequence of electronic data records and

¹³ Perkušić, M., Jozipović, Š., Mamut, J., Mogućnosti korištenja i pravnog uređenja tzv. pametnih ugovora u Republici Hrvatskoj, Zagreb 2022., Chapter 18 in *Hrvatsko obvezno pravo u poredbenopravnom kontekstu: Petnaest godina Zakona o obveznim odnosima*, Ekonomski fakultet Sveučilišta u Zagrebu, ur.Tot, I., Slakoper, Ž., p. 666.

¹⁴ Communication from the commission to the European parliament, the council, the European economic and social committee and the committee of the regions on a Digital Finance Strategy for the EU, COM(2020)591, 24 Sept. 2020.

¹⁵ Anti-money laundering (AMLD V) - Directive 2018/843 of 30 May 2018 on anti-money laundering and countering the financing of terrorism. PE/72/2017/REV/1, OJ L 156, 19.6.2018, p. 43–74.

¹⁶ Directive 2011/16/EU of 15 Feb. 2011 on administrative cooperation in the field of taxation and repealing Directive 77/799/EEC, last amendment through: DAC6 – Council Directive (EU) 2018/822 of 25 May 2018 amending Directive 2011/16/EU as regards mandatory automatic exchange of information in the field of taxation in relation to reportable cross-border arrangements, ST/7160/2018/INIT, OJ L 139, 5 June 2018. In detail on this issue: Jozipović, Š., Perkušić, M., Gadžo, S. (2022): Tax Compliance in the Era of Cryptocurrencies and CBDCs: The End of the Right to Privacy or No Reason for Concern?, EC Tax review, 31, 1, p. 22.

¹⁷ REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Markets in Crypto-assets, and amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937, 31 May 2023, L 150/40.

¹⁸ REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on harmonised rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act), 13 December 2023, Series L, further in Article: Regulation on harmonised rules on fair access to and use of data.

ensuring their integrity and the accuracy of their chronological ordering”¹⁹. Under this regulation, the vendor of an application using smart contracts or, in the absence thereof, the person whose trade, business or profession involves the deployment of smart contracts for others in the context of an agreement to make data available must ensure the robustness, cybersecurity, data activation but also safe termination of a smart contract. Thus, data transfers through smart contracts have to include internal functions which can reset or instruct the contract to stop, thus removing full and immutable automation from smart contracts²⁰. The role of this rule serves as protective mechanism for individual rights or public interest in relation to the data being transferred, it however also establishes a level of third-party responsibility concerning the data transfer. The regulation furthermore clearly takes the position that the definition of a smart contract is technologically neutral, thus covering both blockchain based smart contracts, as well as those that are executed in another way, for example through centralized software of the smart contract vendor.

3. SMART CONTRACTS AND THEIR CLASSIFICATION IN CROATIA

Smart contracts are an important innovation in the field of “legal tech”. As smart contracts make traditional intermediaries obsolete, they have the potential to significantly decrease transaction costs²¹. Thus, it is expected that they will become increasingly more important in Croatia. While many different uses for smart contracts have been proposed in Croatian academic literature, their application is still limited to digitalized assets. One example discussed in Croatian literature concerns the concept of a smart marriage contract, based on an Austrian pilot project²². Under such a contract, crypto assets can be split between marital partners based on predetermined criteria (the digital prenuptial agreement). Furthermore, the application of smart contracts has especially been discussed as a cost reduction tool in the fin-tech space, for example for micro-insurance or peer-to-peer lending²³. Smart contracts can for example exist as loan contracts based on crypto-assets²⁴. As they already exist in a digital form, smart contracts can easily be designed to facilitate the necessary peer to peer transactions of crypto assets²⁵.

¹⁹ Art. 2 Par. 39 Regulation on harmonised rules on fair access to and use of data.

²⁰ See Article 36 of Regulation on harmonised rules on fair access to and use of data.

²¹ Minović, M., *Blockchain tehnologija: mogućnosti upotrebe izvan kripto valuta*, 2017., conference paper, INFOTECH 2017, available under: https://www.researchgate.net/publication/318722738_BLOCKCHAIN_TEHNOLOGIJA_MOGUCNOSTI_UPOTREBE_IJZVAN_KRIPTO_VALUTA, p. 3

²² See for details on the project the website of block42 available at: <https://www.block42.tech/>.

²³ Budimir, N., *Blockchain tehnologija u osiguranju*, Zbornik radova Veleučilišta u Šibeniku, Šibenik 2020., vol. 14, br. 1-2, p. 175 f.

²⁴ Schär, F., *Decentralized Finance: On Blockchain- and Smart Contract-Based Financial Markets*, 2021., Federal Reserve Bank of St. Louis Review, Second Quarter 2021, 103(2)), pp. 153-74, p. 164.

²⁵ Zetsche, D. A., Arner, D. W., Buckley, R. P., *Decentralized Finance*, Journal of Financial Regulation, 2020., Volume 6, Issue 2, 20 September 2020, 172–203, p. 181; Hönig, M., *ICO und Kryptowährungen Neue digitale Formen der Kapitalbeschaffung*, 2020., Springer Gabler, Wiesbaden, p. 117.

3.1. Public and private blockchains

In order to classify smart contracts within a legal framework, it is essential to differentiate between smart contracts contained on public and private blockchain networks²⁶. While public blockchains are comprised of open source code and open to the general public, private blockchains are established by a creator (organization or individual) for a specific purpose, and can only be accessed or altered by the creator of the blockchain.²⁷ This distinction is essential, as only public blockchains can truly be decentralized and thus the basis for an immutable transaction, while a transaction on a private blockchain still could be reversed, altered or stopped by the creator of the blockchain or a third party authorized to conduct such changes. Thus, smart contracts on fully decentralized public blockchains are considered to be permanent and immutable under most normal circumstances²⁸, while this cannot be said for smart contracts on private blockchains where the creator of the chain still controls the execution of smart contracts and acts either as an indirect intermediary or supervisor of transactions²⁹. This distinction is important as smart contracts that can be changed are so called weak smart contracts, while immutable smart contracts are so called strong smart contracts.³⁰ From a legal perspective, the fact that a third party in weak smart contracts can influence the outcome of a smart contract, creates an additional legal relationship between the contracting parties and this entity.

3.2. The role of smart contract vendors and oracles - data collection and data protection in consumer contracts and commercial contracts

A further issue concerns the treatment of data collected and data services in smart contracts. Especially in consumer-oriented sectors data collection would have to be accompanied by adequate protection mechanisms which could make it necessary to rely primarily on private blockchains. Simultaneously, however public authorities require data collection in order to prevent market manipulations

²⁶ Perkušić, M., Jozipović, Š., Mamut, J., Mogućnosti korištenja i pravnog uređenja tzv. pametnih ugovora u Republici Hrvatskoj, Zagreb 2022., Chapter 18 in *Hrvatsko obvezno pravo u poredbenopravnom kontekstu: Petnaest godina Zakona o obveznim odnosima*, Ekonomski fakultet Sveučilišta u Zagrebu, ur.Tot, I., Slakoper, Z., p. 685.

²⁷ Budimir, N., Blockchain tehnologija u osiguranju, Zbornik radova Veleučilišta u Šibeniku, Šibenik 2020., vol. 14, br. 1-2.

²⁸ Please note: new regulation on EU level could mandate oracle service providers to take a more active role in the execution of smart contracts, which would in fact shift those contracts from strong smart contracts to weak smart contracts.

²⁹ Budimir, N., Blockchain tehnologija u osiguranju, Zbornik radova Veleučilišta u Šibeniku, Šibenik 2020., vol. 14, br. 1-2., p. 173 f.

³⁰ See: Perkušić, M., Jozipović, Š., Mamut, J., Mogućnosti korištenja i pravnog uređenja tzv. pametnih ugovora u Republici Hrvatskoj, Zagreb 2022., Chapter 18 in *Hrvatsko obvezno pravo u poredbenopravnom kontekstu: Petnaest godina Zakona o obveznim odnosima*, Ekonomski fakultet Sveučilišta u Zagrebu, ur.Tot, I., Slakoper, Z., p. 310.; Raskin, M., The law and legality of smart contracts, 2016., p. 310. Available at: <https://www.ilsa.org/ILW/2018/CLE/Panel%20%2311%20-%20THE%20LAW%20AND%20LEGALITY%20OF%20SMART%20CONTRACTS%201%20Georgetown%20Law%20Technology%20Rev...pdf>.

and other illegal activities in highly regulated sectors, like the energy sectors³¹. Thus, it can be expected that many smart contracts, even though integrated into the blockchain, will not be fully autonomous and irreversible.

As stated above, smart contracts that fall under the Regulation on harmonized rules on fair access to and use of data must be reversible. Here it is important to note that vendors and smart contract providers have to integrate these features, but on the requirement of mutual consent of the contracting parties³². Thus, the smart contract is still under the control of the parties, even if safeguards are put in place when they are placed on public blockchains. Therefore, the above described distinction between public and private blockchains will likely become important in practice.

Another important aspect is the implementation of oracles that impact the outcome of smart contracts. Oracle are trusted sources of information that provide a smart contract with the necessary external input, for the contract to be executed³³. The traditional role of oracle services can best be described through the structure of some early pilot projects concerning smart contracts in the insurance sector based on public blockchains and irreversible transactions. One such example was the pilot program for fizzy, a blockchain based travel insurance³⁴. Travelers were automatically compensated for any delay reported by the airport. Such a system has however its own issues. Namely, when a report on late flights is simply incorrect, the payout might be triggered, even when this in fact should not be the case. This opens the question of the accountability of oracle service providers but also on the rights and obligations of the contracting parties to each other.

4. SMART CONTRACTS AS BINDING LEGAL CONTRACTS UNDER CROATIAN CONTRACT LAW

As already stated above, Croatian law does not have smart contract specific laws, but uses a combination of national and European law. Thus, the status of smart contracts has to be determined by an analysis of every relevant aspect of applicable private law. Therefore, the first step is to identify under which circumstances Croatian law would be applicable, how it classifies smart contracts and what legal consequences follow from this classification.

³¹ Bolanča, A., Pavlović, D., and Šijanović Pavlović, S, "Internet of Things" i „Blockchain“ kao alati razvoja fleksibilnog energetskog sektora., *Nafta i Plin* 38., 2018., br. 153, p. 114.

³² Nr. 104 of the preamble of xxxx

³³ Cawrey, D., Lantz, L., *Mastering Blockchain: Unlocking the Power of –Cryptocurrencies, Smart Contracts, and Decentralized Applications*, 2020., 1st Edition, O'Reilly, p. 385.

³⁴ See for example: <https://www.axa.com/en/magazine/axa-goes-blockchain-with-fizzy>

4.1. Applicable law

The first element is the status of smart contracts under international private law. As EU law governs most of international private law on contracts in Croatia, the rules of the Rome 1 regulation³⁵ would apply. While public blockchains usually exist on a globally decentralized network, smart contracts regulate the legal relationship between individuals. Therefore, the applicable law will depend on their personal status and location and not the location of the network. Under article 4 of the Rome 1 regulation, in the absence of an agreed upon jurisdiction, the law of the service provider or seller of goods would apply in most cases³⁶ and if it is not possible to determine a seller or service provider, then the law of the person performing the characteristic performance would apply³⁷. If even this person cannot be determined, the law of the most closely connected jurisdiction to the contract will be applicable³⁸. Based on this, we can draw two important conclusions in relation to Croatian law and smart contracts. First, the law of the seller or service provider within the smart contract would apply. Second the law of the creator of the smart contract and the provider of oracle services would apply in the respective legal relations between them and the contracting parties. As many smart contracts however are exchange contracts for different crypto assets, it would be difficult to determine which party is performing the service/transferring the goods because under Croatian law crypto assets are considered property, private means of payment or financial assets³⁹. While under Croatian law cryptocurrencies are not considered to be legal tender, for most transactions outside of categories like salary payments or large purchases (above 10 000 euro)⁴⁰, parties can choose to accept payment in various means of payments (electronic money, cryptocurrencies, etc.), depending on the agreement between the contracting parties⁴¹. Thus, if one party exchanges a stablecoin or a cryptocurrency in general for another type of crypto asset, this could still be considered to be

³⁵ REGULATION (EC) No 593/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 June 2008 on the law applicable to contractual obligations (Rome I).

³⁶ Art. 4 par. 1 b,c Rome I.

³⁷ Art. 4 par. 2 Rome I.

³⁸ Article 4 Para. 4 Rome I.

³⁹ Opinion of the Ministry of Finance of the Republic of Croatia Nr.:410-01/17-08/29 Reg. nr.:513-07-21-01/18-4 from 19.03.2018 available under: https://www.porezna-uprava.hr/HR_publicacije/Lists/mislenje33/Display.aspx?id=19590; Perkušić, M., *Pravo elektroničkog plaćanja*, Školska knjiga, Zagreb 2020., p. 274 – 340.

⁴⁰ The Law on Prevention of Money Laundering and Financing of Terrorism contains special payment rules. According to them a person performing a registered activity in the Republic of Croatia may not receive a payment or make a cash payment in the amount of HRK 75,000.00 or more, but the collection and payment must be made by payment or transfer to a payment transaction account opened with a credit institution. This limitation also applies in the case when the collection or payment is made in several obviously connected cash transactions in the value of HRK 75,000.00 and more. See Perkušić, M., *Pravo elektroničkog plaćanja*, Školska knjiga, Zagreb 2020., p. 188-192.

⁴¹ Therefore, in Republic of Croatia, kuna as a state currency is considered the only legal means of payment that a person is obliged to accept as a means of payment, while all other forms of payment are only options that people can agree to. See Perkušić, M., *Pravo elektroničkog plaćanja*, Školska knjiga, Zagreb 2020., p. 24.

intended as a sale for the purposes of international private law⁴². If even in this manner no conclusion could be made, a further indicator could be the fact that one party conducts a certain type of transaction for commercial purposes as this could be considered its commercial characteristic performance under Rome I para 2.

In contrast to the rules stated above, when consumer contracts are concerned, the Rome I regulation considers the law of the residence state of the consumer to be applicable⁴³. This is in line with a strong consumer protection in the EU in general. Thus, in cases where one commercial subject enters into a contract with a consumer concerning goods or services, including financial services, the jurisdiction of the consumer will be applicable⁴⁴. Furthermore, while all categories of contracts (consumer contracts, civil contracts, commercial contracts) the parties are free to choose a jurisdiction contractually, such a choice cannot be drafted in a way that prevents a consumer from a fair level of consumer protection⁴⁵.

4.2. Automated execution of contracts

After determining the applicable law in general, in a second step the status of automated transactions has to be highlighted from a legal perspective. Algorithmically executed services can be a method of fulfilment of contract obligations. This has long been accepted under EU law. For example, the EU/PE Digital GmbH-case an online dating agency offered automated personality assessment and potential partner suggestions based on algorithm that assesses the preferences and traits of users⁴⁶. The European Court of Justice stated that generally automated fulfilment through an algorithm that matches individuals on the platform is legally not problematic and if agreed upon can be used to provide services in full or in part⁴⁷.

Besides the EU level, the role of automated contract execution particularly with regard to smart contracts has also been analyzed in Croatian legal literature and regulative practice. However, smart contracts still have not been the topic of Croatian case law. One example of an attempt to use binding smart contracts in Croatia was linked to the ICO process of a digital bank. The issuer of a token requested a statement from the Croatian agency for financial services (HANFA) on the legal status of the token, which was linked to a smart contract on the Ethereum network. The token should have been issued in order to collect funds for the creation of a digital banking institution.

⁴² Under Croatian civil law and financial law, depending on the facts of the case, the transaction could still be considered either a barter agreement or a sales contract, see: Perkušić, M., *Pravo elektroničkog plaćanja*, Školska knjiga, Zagreb 2020., p. 280.

⁴³ Art. 6 par. 1 Rome I.

⁴⁴ Art. 6 par. 1 Rome I.

⁴⁵ Art. 6 par. 2 Rome I.

⁴⁶ ECJ, 8.10.2020, C-641/19, ECLI:EU:C:2020:808, nr. 15 f.

⁴⁷ ECJ, 8.10.2020, C-641/19, ECLI:EU:C:2020:808, nr. 26 f.

While the token that should have been issued, would be exchangeable for cryptocurrency in the case that the bank was established, they were frozen through a smart contract, and thus not transferable until such a point in the future.⁴⁸ HANFA considered carefully the effect of smart contract function especially in relation to the exchangeability of such token on the market – a factor relevant for the classification of the token under financial law in Croatia and the EU. HANFA primarily classified such a limitation as a factual limitation that could be circumvented through the transfer of a private key to the respective wallet, rather than a legally binding agreement not to transfer the token⁴⁹. HANFA however did not object the function of the smart contract but classified the related project being an investment vehicle designed to avoid regulation⁵⁰. Thus, the technical function of a smart contract as means to fulfil a legally binding contract is legally not problematic, only the status of a smart contract as binding legal agreement has been called into question.

4.3. Smart contracts and contract formation

As it is clear that the execution of contractual obligations through smart contracts or computer code in general is not legally problematic under Croatian law, the next question to be asked is whether the smart contracts themselves can be considered to be a fully legally binding contract. A contract under Croatian law is formed as a result of the parties agreeing on the essential elements of a contract⁵¹. In order for this to happen one party has to take the initiative and make a contract offer. If a contract proposal contains all the essential elements of the contract, it will be considered an offer to conclude a contract.⁵² Thus, the offer itself is defined by the Croatian law on obligations⁵³ as a proposal for the formation of a contract made to a certain person, which contains all the essential elements of the contract.⁵⁴ In the event that the offeree accepts the offer of the offeror, the contract will be considered concluded from the moment when the offeror receives a statement or some other act

⁴⁸ Opinion of the Croatian agency for financial services (HANFA) regarding the issuance of digital assets based on Ethereum Blockchain, from 6.4.2020, avail-able under: <https://www.hanfa.hr/media/4602/misljenje-tokeni.pdf>, p. 1.

⁴⁹ Opinion of the Croatian agency for financial services (HANFA) regarding the issuance of digital assets based on Ethereum Blockchain, from 6.4.2020, avail-able under: <https://www.hanfa.hr/media/4602/misljenje-tokeni.pdf>, p. 3.

⁵⁰ Opinion of the Croatian agency for financial services (HANFA) regarding the issuance of digital assets based on Ethereum Blockchain, from 6.4.2020, available under: <https://www.hanfa.hr/media/4602/misljenje-tokeni.pdf>, p. 6.

⁵¹ Perkušić, M., Jozipović, Š., Mamut, J., Mogućnosti korištenja i pravnog uređenja tzv. pametnih ugovora u Republici Hrvatskoj, Zagreb 2022., Chapter 18 in *Hrvatsko obvezno pravo u poredbenopravnom kontekstu: Petnaest godina Zakona o obveznim odnosima*, Ekonomski fakultet Sveučilišta u Zagrebu, ur.Tot, I., Slakoper, Z., p. 671.

⁵² See Perkušić, A., *Osnove građanskog prava*, Split 2009., Sveučilište u Splitu, Pomorski fakultet u Splitu, p. 66.

⁵³ Croatian law on obligations (Zakon o obveznim odnosima NN 35/05, 41/08, 125/11, 78/15, 29/18, 126/21, further in the tekst CLO).

⁵⁴ Art. 253 par. 1 CLO.

of the offeree accepting the offer. The above is also derived from the CLO, which states that an offer is accepted when the offeror receives the offeree's statement that he accepts the offer, or when the offeree sends the thing or pays the price, and when he does some other action that, on the basis of the offer, practices established between the interested parties or customs can be considered as a declaration of acceptance.⁵⁵

Generally, in the Republic of Croatia, the principle of informality of contracts is applied, according to which the contract can be concluded in any form, except in cases where the law specifically requires a certain form for individual contracts.⁵⁶ Contract formation is the result of the acceptance of an offer based on the identifiable will of the contracting parties. Additional elements of the contracting process like the notarial authentication or digital signatures serve only as proof of the identity of the parties or proof of the content of contract terms. Therefore, parties can enter into a contract in digital form, including by entering into a smart contract in any way that proves their intent. Exemptions for this rule would apply to contracts with legal form requirements, amongst others to contracts concerning the sale⁵⁷ or lease⁵⁸ of real estate, sales contracts that allow for a payment in instalments⁵⁹, construction contracts⁶⁰ or licensing agreements⁶¹ for which specific rules apply. Based on these considerations, below in section 7 we will discuss when actually a smart contract can be considered a legally binding contract.

5. DIGITAL SIGNATURES AND OTHER METHODS TO CONCLUDE CONTRACTS IN A VIRTUAL ENVIRONMENT

The Republic of Croatia has in recent years invested intensely into the digitalization of public services and the creation of a comprehensive e-citizen system. Thus, it is today possible to digitally conclude binding legal agreements with public authorities – so called administrative contracts. An administrative contract is a formal contract concluded between a public legal body and third parties in cases where the formation of such a contract is prescribed by law. It regulates the execution of rights and obligations established in the decision that resolved the administrative matter.⁶² Such a contract must be in line with compulsory regulations and public interest. If it has a legal effect on the rights of third parties, it is legally

⁵⁵ Art. 262 par. 1 - 2 CLO.

⁵⁶ Art. 286 par. 1 CLO.

⁵⁷ Art. 377 CLO.

⁵⁸ Art. 552 CLO.

⁵⁹ Art. 465 CLO.

⁶⁰ Art. 620 par. 2 CLO.

⁶¹ Art. 700 CLO

⁶² Art. 150 par. 1 and 4 Law on General Administrative Procedure (Zakon o općem upravnom postupku, NN 47/09, 110/21, further in the tekst LGAP).

valid only with the written consent of those persons.⁶³ For these contracts digital certificates are used, which are issued by multiple digital service providers like FINA⁶⁴.

One area where such certificates and administrative contracts play an important role is public procurement. Public procurement is carried out by a public or sectoral contracting authority, or another entity in cases determined by the Law on Public Procurement⁶⁵.⁶⁶ Public procurement itself is defined by the Public Procurement Act as procurement through a contract for the public procurement of goods, works or services procured by one or more clients from economic entities chosen by these clients, regardless of whether the goods, works or services are intended for public purposes.⁶⁷ The principles on which public procurement is based are: - the principle of freedom of movement of goods, - the principle of freedom of business establishment, and - the principle of freedom to provide services, and the principles that derive from it, such as: - the principle of market competition, - the principle of equal treatment, - the principle of prohibition of discrimination, - the principle of mutual recognition, - the principle of proportionality and - the principle of transparency.⁶⁸ The digitalization of these processes allows for a more efficient fulfilment of the mentioned principles.

Digital signatures and certificates are less prevalent in private contracts. European law however defines the validity and legal treatment of electronic signatures. Under EU law, an electronic signature shall not be denied legal effect and admissibility as evidence in legal proceedings solely on the grounds that it is in an electronic form or that it does not meet the requirements for qualified electronic signatures⁶⁹. Furthermore, a qualified electronic signature shall have the equivalent legal effect of a handwritten signature⁷⁰. A qualified electronic signature is an advanced electronic signature that is created by a qualified electronic signature creation device, and which is based on a qualified certificate for electronic signatures, which are also strictly regulated by EU law⁷¹.

Thus, formal contracts that rely only on a written signature to be valid, would be valid even with a qualified digital signature, while contracts that require additional

⁶³ Art. 150 par. 2 and 3 LGAP.

⁶⁴ See <https://www.fina.hr/finadigicert>, accessed May 5, 2023.

⁶⁵ Law on Public Procurement (Zakon o javnoj nabavi, NN 120/16, further in the tekst LPP).

⁶⁶ Art. 1 par. 1 LPP.

⁶⁷ Art. 1 par. 2 LPP.

⁶⁸ Art. 4 par. 1 LPP.

⁶⁹ Art. 25 Par. 1 REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC.

⁷⁰ Art. 25 Par. 2 REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC.

⁷¹ Art. 3 nr. 12 REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC.

elements, like the involvement of a notary would not. As there are no form requirements for most contracts and digital signatures thus serve primarily as means to establish proof of the identity/intent to contract of the contracting parties but does not represent a constitutive factor of the contract itself, informal contracts would be also valid if signed with an ordinary digital signature. Therefore contracts are in general even valid without specific authentication through a digital signature or other means. Furthermore, some sectors require advanced authentication mechanisms. Financial institutions like banks have strong legal obligations to protect their clients personal security credentials which are necessary to access services like mobile or internet banking⁷². Here however a framework contract has already been signed before the clients start using mobile- or internet banking services⁷³. Thus an authentication is less frequently used for the framework contracts and much more as security mechanism to accept orders within the framework contract.

6. CONTRACT TERMS AND DIFFERENCE BETWEEN SMART CONTRACT CODE AND TEXTUAL EXPLANATION

The vast majority of individuals and representatives of legal entities neither have the technical understanding, nor the ability to read and understand the computer code of a smart contract⁷⁴. What the parties actually agree upon is the expected effects of the smart contract which will usually be explained in separate documents accompanying the smart contract. Therefore, smart contracts are first and foremost means to ensure an automated execution of a contract, rather than the contract itself.⁷⁵ Under most circumstances, the contracting parties therefore agree on the contract terms (descriptions, explanations, separate agreements) and not the functions of the computer code. However, there exist exceptions from this rule which are closely related to the differentiation between strong and weak smart contracts. Namely, such a viewpoint can only be valid for weak smart contracts as well as for strong smart contracts between known subjects, while strong smart contracts between anonymous parties follow a different logic.

For example, a smart contract – computer code can be poorly designed so that the outcome does not reflect the explanation of how the contract should work. If both parties are anonymous, the result of the contract is final. As both parties agreed to irreversibility and anonymity, their agreement in fact is equal to the function of the smart contract itself. Even if they do not know that bug exists or what it does, each party willingly accepts the contract in the form that it exists. They in fact

⁷² Art. 40 par. 1 nr. 1 Croatian Payment Act (Zakon o platnom prometu, NN 66/18 from 28.07.2018.).

⁷³ See Perkušić, M., *Pravo elektroničkog plaćanja*, Školska knjiga, Zagreb 2020., p. 118-165.

⁷⁴ Perkušić, M., Jozipović, Š., Mamut, J., *Mogućnosti korištenja i pravnog uređenja tzv. pametnih ugovora u Republici Hrvatskoj*, Zagreb 2022., Chapter 18 in *Hrvatsko obvezno pravo u poredbenopravnom kontekstu: Petnaest godina Zakona o obveznim odnosima*, Ekonomski fakultet Sveučilišta u Zagrebu, ur.Tot, I., Slakoper, Z., p. 672.

⁷⁵ Ibid.

agree on the smart contract in the same manner someone signs a contract without reading it. This of course does not mean that such a contract will in every case be valid. Croatian contract law allows for multiple legal remedies for cases like this, as will be addressed below in section 8. Furthermore, as stated above, due to EU legislation even many strong smart contracts could lose their immutability, the number of smart contracts that in fact are legally binding contracts could shrink significantly in the future. However, it highlights that a uniform approach to smart contracts is not appropriate.

7. CONTRACT INTERPRETATION IN SMART CONTRACTS

It is often difficult for the average person to understand the exact meaning of contract terms, especially with relation to complex contract. The level of complexity however increases significantly when a contract is written in the form of computer code. Under Croatian law the interpretation of the contract is aimed at determining the intention of the parties at the moment of entering into the contract. According to the CLO, in the Republic of Croatia, the provisions of the contract are applied as they read, and when interpreting disputed provisions, one should not stick to the literal meaning of certain expressions, but should investigate the common intention of the contracting parties and understand the provision in such a way that it corresponds to the principles of mandatory law established by the CLO.⁷⁶ In the case when the contract was concluded according to pre-printed content, or when the contract was otherwise prepared and proposed by one contracting party, unclear provisions will be interpreted in favor of the other party.⁷⁷ In the case of an unclear provision in a contract with no consideration, it should be interpreted in a sense that is less burdensome for the debtor, and in a consideration contract in a sense that achieves a fair relationship of mutual actions.⁷⁸ The parties can furthermore agree that a contract will be interpreted by a third party in the case of a dispute.⁷⁹

For smart contracts this means that in the majority of cases the functioning of the smart contract can be an indicator at what parties actually wanted, especially if it is accompanied by additional explanations, FAQs etc. However, when the smart contract is the actual contract between two parties, there is little room for interpretation concerning the content. If one party believed that the smart contract functions in a different way, this might be a delusion on the side of that party, which can be a reason for voidability of a contract but not a means of interpretation of the contract.

⁷⁶ Art. 319 CLO.

⁷⁷ Art. 320 par. 1 CLO.

⁷⁸ Art. 320 par. 2 CLO.

⁷⁹ Art. 321 CLO.

8. VOID CONTRACTS, VOIDABLE CONTRACTS AND TERMINATION DUE TO NON-FULFILMENT

There are multiple issues with smart contracts. As presented above, it is essential to distinguish between smart contracts based on a public and on a private blockchain. For smart contracts the originator of the private blockchain serves as intermediary for the transaction and thus is usually liable for the quality of the smart contract related services. For smart contracts on a fully decentralized blockchain, this is however not the case. Here the finality of transactions, especially between mutually anonymous (pseudonymous) contracting parties, represents a significant problem in practice. As long as the mentioned EU legislation on oracle services is not implemented, this will continue to be the case.

Thus, in order to understand the legal consequences of voidness, voidability and termination of contract, it is especially important to have in mind whether there is only a bilateral legal relationship (strong smart contracts) or if the parties also have a legal relationship to an intermediary (weak smart contracts). Croatian law distinguishes between non-fulfilment/breach of a valid contract which gives the affected party a right to termination (*raskid ugovora*) and the legal reasons for a void (*ništetan ugovor*) or voidable (*pobojan ugovor*) contracts. In the following case, both weak and strong contracts will be analyzed within all of the mentioned categories.

8.1. Void contracts – the absence of essential elements

Null and void contracts “lack the essential preconditions required by law for their validity at the time of formation, and in principle (unless the aim of the violated rule indicates some other legal consequence or unless the law prescribes otherwise), do not derive legal effects”.⁸⁰ The court will monitor the nullity of the contract ex officio, and any interested person (if the person has a legal interest) can invoke the nullity, as well as the state attorney who also has the right to request a nullity.⁸¹ As reasons for the nullity of contracts, the Croatian scientific literature points out: a) Contracts that are contrary to the Constitution of the Republic of Croatia, coercive regulations and the morals of society; b) Legal incapacity of the person; c) Usurious Contracts; d) Impossible, impermissible, indefinite or indeterminate action; e) Defects of intention as a cause of nullity of the contract (misunderstanding, use of force, apparent or fictitious or simulated contract, and joke as a non-serious statement); f) Violation of the rules on the form of the contract; g) Inadmissible initiative for concluding a contract; h) Nullity of the provisions of the general conditions of the contract, and; i) Inadmissible or impossible condition.⁸² A legal transaction will be null and void

⁸⁰ Perkušić, A., *Osnove građanskog prava*, Split 2009., Sveučilište u Splitu, Pomorski fakultet u Splitu, p. 87.

⁸¹ Ibid.

⁸² Ibid., p. 89.-93.

in terms of the content of the contract and its essential elements in the case if the object of the legal transaction, its specificity and comprehensibility, as well as its possibilities and admissibility are not clear from the provisions of the contract.⁸³

Smart contracts thus can be void regardless of whether they are strong or weak. For weak smart contracts, the smart contract usually serves only as means of executing the contract. If the contract has become void, the contracting parties have the right to request the restitution of the situation before the contract was executed based on unjust enrichment⁸⁴. As with weak smart contracts there is a third party involved that provided access to the smart contract, it would also be the duty of that party to reverse the contract if possible⁸⁵. Strong smart contracts don't have this element of third-party control and thus one contracting party has only a claim against the other contracting party. This claim exists regardless of whether the parties are known or anonymous. However, from a practical standpoint it will be much more difficult to enforce the restitution between anonymous parties. As the contract itself is void, oracle service providers that do not have any authority over the smart contract would usually not be liable as they are involved in contract fulfilment and not contract formation.

8.2. Voidable contract – fraud and delusion

Voidable contracts, also called relatively null and void contracts, produce legal effects same as valid contracts (from the moment of their formation), but they can be challenged by the interested contracting party due to certain deficiencies that are of a milder nature.⁸⁶ The most common reasons for voidability of contracts in Croatian law are: a) limited legal capacity of the contractor; b) defects of will such as threat, delusion and fraud; c) annulment of the will due to defects of the testator's will or due to shortcomings in the form of the will; d) refuting the debtor's legal actions; e) excessive damage, and; f) the legal consequences of the violation of preemption right.⁸⁷ Of the above reasons for the voidability of contracts, in the context of smart contracts we must specifically point out delusion and fraud because we think they could often arise as a problem when using smart contracts. Delusion is defined in the Croatian academic literature in various ways, but it could be summarized in a way that delusion is a discrepancy between the will and its manifestation,⁸⁸ while a legally relevant delusion would exist if that discrepancy caused a certain manifestation that

⁸³ Gavella, N., *Privatno pravo*, Zagreb 2019., Narodne novine, p. 316.

⁸⁴ Art. 1111 par. 1 CLO.

⁸⁵ Art. 1118 CLO.

⁸⁶ See Perkušić, A., *Osnove građanskog prava*, Split 2009., Sveučilište u Splitu, Pomorski fakultet u Splitu, p. 93, Momčinović, H., *Nevaljanost ugovora – Ništetni i pobojni ugovori prema Zakonu o obveznim odnosima*, Zagreb 2006., Zbornik radova Aktualnosti hrvatskog zakonodavstva i pravne prakse, Organizator, p. 117.

⁸⁷ See Perkušić, A., *Osnove građanskog prava*, Split 2009., Sveučilište u Splitu, Pomorski fakultet u Splitu, p. 93-98.

⁸⁸ Vidaković Mukić, M., *Opći pravni riječnik*, Zagreb 2015., p. 1533.

does not correspond to the party's true will.⁸⁹ In Croatian law, the voidability of a contract is caused only by a significant delusion. The CLO determines that the delusion is significant if it fulfills two requirements. First, it relates to the object of the contract, the essential characteristics of the object of the contract, the person with whom the contract is concluded if it is concluded with respect to that person, and if significant circumstances are considered decisive. Second, in such cases the party who is in delusion would not otherwise have concluded such a contract.⁹⁰ Fraud is described in CLO as a case where one party causes a delusion in the other party or maintains it in a delusion in order to lead it to enter into a contract. Here the other party may request the annulment of the contract even when the delusion is not significant.⁹¹

For weak smart contracts, the action of one party to declare the contract void, would remove the legal basis for the execution of the contract and cause the same responsibility of the other contracting party and the intermediary to restate the state before the contract was conducted. If the delusion was caused or upheld by the other party, that party would be liable for fraud. If this is not the case, the party in delusion would be liable for damages⁹². If the delusion was caused by third parties, these third parties could be liable for damages under a recourse claim. Oracle service providers that only provided data to the contract will usually not be liable in these cases, as the data is used in the contract execution and usually not as constitutive element of contract formation.

For strong smart contracts the situation is slightly more nuanced. Especially as the contract is written in computer code, it is far more likely that delusions will be a common appearance. If one party has a delusion about the content of the contract, and the delusion is relevant under the above mentioned criteria, this would make the legally binding agreement voidable. If the agreement would become void, the smart contract itself would transform from the actual binding agreement to a means of execution like with weak smart contracts. Similar to weak smart contracts, it is important if a significant delusion was caused or upheld by the other contracting party in which case this would be considered fraud. If neither is the case, the contracting party that had the delusion about the content of the contract still can void the contract but would be liable for damages. However, the actual enforcement of such would be difficult with strong anonymous smart contracts. Thus, recourse claims against the providers of smart contracts that did not disclose all effects of the contract, could play an important role in this segment.

⁸⁹ See Perkušić, A., *Osnove građanskog prava*, Split 2009., Sveučilište u Splitu, Pomorski fakultet u Splitu, p. 95.

⁹⁰ Art. 280. par. 1. CLO. In the case of a contract with no consideration, a significant delusion is also considered in the case of delusion about the incentive that was decisive for the undertaking of the obligation (Art. 281. CLO).

⁹¹ Art. 284 par. 1 CLO.

⁹² Art 280 par. 3 CLO.

8.3. Contract termination due to non-fulfilment

In bilaterally binding contracts, when one party fails to fulfill its obligation, the other party may, unless otherwise specified, demand fulfillment of the obligation or, under the assumptions provided by the Law, terminate the contract by unilateral declaration, when the termination of the contract does not happen already *ex lege*⁹³. In any case the other party has the right to compensation for damages⁹⁴. The contract cannot be terminated due to non-fulfillment of an insignificant part of the obligation.⁹⁵ The CLO specifically regulates the cases when fulfillment within a deadline is an essential part of the contract and the cases when fulfillment within a deadline is not an essential part of the contract. Thus, the Law points out that in the event that the fulfillment of the obligation within a certain period is an essential component of the contract, and the debtor does not fulfill the obligation within that period, the contract is terminated by law.⁹⁶ The creditor can still keep the contract in force if, after the expiration of the deadline, he notifies the debtor without delay that he demands fulfillment of the contract, and if the creditor did demand fulfillment after the deadline and did not receive it within a reasonable time, he can declare that he is terminating the contract.⁹⁷ The aforementioned rules apply both in cases where the contracting parties have foreseen that the contract will be considered terminated if it is not fulfilled within a certain period, as well as in cases where the fulfillment of the contract within a certain period is an essential component of the contract due to the very nature of the contract.⁹⁸ In the event that the fulfillment of the obligation within a certain timeframe is not essential, the debtor reserves the right to fulfill his obligation even after the deadline.⁹⁹ Therefore, if the creditor wants to terminate the contract, he must leave the debtor an appropriate subsequent deadline for fulfillment. If even then the debtor does not fulfill the obligation within that subsequent deadline, the same consequences occur as in the case when the deadline is an essential component of the contract.¹⁰⁰

As smart contracts are executed automatically, a reason for the termination of a contract under Croatian law will usually be that the smart contract did not execute a transaction in the way the parties actually agreed upon. The majority of smart contracts only serve as means of execution of a legally binding contract. Thus, it can happen that a smart contract deviates from the actual legally binding contract and lead to non-fulfilment of an obligation as a result. The same thing applies in the case that an oracle provides incorrect information as long as the

⁹³ Art. 360 CLO.

⁹⁴ Art. 360 CLO.

⁹⁵ Art. 367 CLO.

⁹⁶ Art. 361 par. 1 CLO.

⁹⁷ Art. 361 par. 2 and 3 CLO.

⁹⁸ Art. 361 par. 4 CLO.

⁹⁹ Art. 362 par. 1 CLO.

¹⁰⁰ Art. 362 par. 2 and 3 CLO.

wording of the legally binding contract does not provide otherwise¹⁰¹. In both cases the party that did not receive fulfillment has the right to request fulfilment beyond the smart contract from the other party, and if the other party does not comply, to terminate the contract. Furthermore, if there is a contract for the participation or use of a private blockchain, that party could also have a contractual claim against the person in control of the blockchain to ensure fulfilment. However, even if there is no contract in place, after the termination of the contract, all transactions would have to be reversed, and the person in control of the blockchain could be required under the rules for unjust enrichment¹⁰² to do so if still possible. If the issue lies with incorrect information from oracles, the important issue would be whether there are any contractual relationships between the oracle and the contracting parties. Only if the oracle provided the information voluntarily based on a legally binding agreement with one of the parties, contractual damages could be claimed. If, however, there is no contract in place, a simple mistake of the oracle would not be considered sufficient for a claim, as the parties entering voluntarily into the smart contract and thus accepted this risk. If the oracle however provided knowingly and willingly false information, this would go beyond the accepted risk by the parties and therefore could be considered the key cause for the damages and basis for a claim for restitution.

As stated above, with strong smart contracts, the rules concerning voidability and delusion would apply if the issue lies with the content of the smart contract itself (unexpected feature, bug etc.). If the issue lies with the oracle services, the rules for non-fulfilment and termination described above for weak smart contracts, would apply.

8.4. Consumer protection

As mentioned before, consumer protection plays an integral role in the EU. As smart contracts find increasing use in the general population and large digital service providers start using them, consumer protection in relation to smart contracts will continue to gain in importance. Especially, general terms and conditions of business operations are an important factor. They are secondary, i.e. supplementary components of the contract, and form a special type of the so-called form contracts (adhesionally concluded contracts). They can be defined as “a set of provisions (articles, contractual clauses) for which their drafter intends to be part of the content of the contract that he intends to conclude with others, so before or at the time of concluding a particular contract, he suggests that it be part of the content of their

¹⁰¹ The contract can be formulated either in a way that the information received from the oracle is final even if wrong, as long as it was provided in good faith or that the correct information is final. If this is not clearly regulated, the correct information should be considered the relevant factor.

¹⁰² Art. 1111 par. 1 CLO.

contract”.¹⁰³ When consumer contracts contain terms and conditions, they are highly regulated under EU law.

A consumer contract is a contract concluded between a consumer and any natural or legal person acting within the scope of their trade, business, craft or professional activity, including a person acting in the name or on behalf of that person.¹⁰⁴ In addition to the CLO, which primarily deals with consumer contracts from the aspect of liability for material defects, consumer contracts in the Republic of Croatia are also regulated by the Consumer Protection Act which is based on EU law.¹⁰⁵ No one can waive or limit the consumers rights that are based on the CPA or other laws that protect consumers rights. Contractual provisions that would be less favorable for the consumer than those prescribed by the said laws would be null and void.¹⁰⁶ In practice, it could occur that a smart contract contains protocols that execute elements of a legal agreement or its general terms and conditions that are not in line with EU law. As this would be a direct violation of EU law, it is the obligation of the trader to ensure reversibility or compensation, regardless of the content of the smart contract.

A second issue concerns the right of a consumer to be informed. Before the consumer enters into a contract or is bound by an offer, the trader must provide clear and comprehensible information about himself as a trader, the main features of the contract and the rights the consumer has.¹⁰⁷ Thus, when conducting a contract with a consumer, the trader has an obligation to inform him in detail about all elements of the contract, including the content of the smart contract.

Beyond the obligation to inform a consumer, EU law furthermore limits how products can be advertised to consumers. Misleading information (misleading advertising) is regulated by the Law on Unauthorized Advertising¹⁰⁸, which is also based on EU law. The said Law defines misleading advertising as any advertising that in any way, including its presentation, misleads or is likely to mislead the persons to whom it is addressed or to whom it reaches, and is therefore likely to affect their economic behavior, i.e. that it hurts or is likely to hurt competitors because of it.¹⁰⁹ Thus, even marketing material or sales presentations that affect the decision of a consumer, can cause a contract to be voidable and make it necessary to ensure the reversal of a smart contract or the compensation of a consumer.

¹⁰³ Gavella, N., *Privatno pravo*, Zagreb 2019., Narodne novine, p. 278 and 279.

¹⁰⁴ Art. 399a par. 2 CLO.

¹⁰⁵ Consumer Protection Act (Zakon o zaštiti potrošača NN 19/22, Further in the text CPA).

¹⁰⁶ Art. 45 par. 1 and 2 CPA.

¹⁰⁷ The stated does not apply to everyday transactions between merchants and consumers that are completed at the time of their formation. Art. 46 CPA.

¹⁰⁸ Law on Unauthorized Advertising (Zakon o nedopuštenom oglašavanju, NN 43/09, further in the paper LUA).

¹⁰⁹ Art. 3 par. 2 LUA.

9. CONCLUDING REMARKS

The regulation of smart contracts in Croatia is based on European secondary law and Croatian domestic civil law. There is no single rule that determines if smart contracts are contracts or means to execute contracts. However, Croatian contract law theory strongly suggests that the answer to this question is found in the intent of the parties and the structure of transactions. In essence, smart contracts are nothing more than a digital representation of a self-executing code contained within the blockchain. Thus, the question becomes, if this computer code represents a contract, and any explanation concerning the contract terms, only a type of “Terms of service”, or if the explanation itself is the actual contract and the code only a means to execute the contract. Croatian law does not define that most contracts, except strictly formal contracts, have to be drafted in any specific way or in any specific language. Thus, programing code is not *ex ante* excluded from being a valid written contract. In fact, the key element for contract formation is a meeting of the minds on the essential contract terms. As a result, centralized smart contracts will usually only serve as means of executing a contract to which the parties actually agreed. However, this principle should not apply to all decentralized smart contracts. Namely so called strong (decentralized and immutable) smart contracts if conducted anonymously (pseudonymously) strongly imply the intention of the parties for the smart contract to be final, thus jointly accepting that the smart contract with all its flaws represents their actual agreement.

This distinction has consequences both with regard to the validity of contracts, as well as concerning contract fulfilment and reasons for termination. In regard to void contracts, the result is generally the same. If a smart contract represents the actual legally binding agreement between two parties, and if the contract is declared void or terminated, the smart contracts effects remain in practice, but the parties have the obligation to reverse the transaction as there is no legal basis for the transaction. The same is true when the smart contract is separate from the legally binding agreement. However, with strong anonymous smart contracts it will be much more difficult to enforce the reversal of a transaction in practice.

A big difference between smart contracts which are simultaneously legally binding agreements and those that serve only as tool for contract execution exists in the sphere of voidable contracts. A contract is voidable if one party misunderstood important elements of the contract. Normally, when a smart contract deviates from a written agreement or explanation of the contract, this would fall under non-fulfilment and the rules for contract termination would be applicable. However, when the smart contract itself is the binding agreement between the parties, and the contract has an unexpected effect due to a party misunderstanding the functioning of the smart contract, this would be a delusion. If the delusion was caused fraudulently by one contracting party, the other party would have the right to void the contract and claim damages. If the delusion was not caused maliciously, the contracting party would still have the right to void the contract but would be liable for damages to

the other party and have a potential recourse claim against third parties that caused the delusion.

BIBLIOGRAPHY

Books and articles

1. Bolanča, A., Pavlović, D., and Šijanović Pavlović, S, "Internet of Things" i „Blockchain“ kao alati razvoja fleksigurnog energetskog sektora., *Nafta i Plin* 38., 2018., br. 153
2. Budimir, N., Blockchain tehnologija u osiguranju, *Zbornik radova Veleučilišta u Šibeniku*, Šibenik 2020., vol. 14, br. 1-2
3. Cawrey, D., Lantz, L., *Mastering Blockchain: Unlocking the Power of – Cryptocurrencies, Smart Contracts, and Decentralized Applications*, 2020., 1st Edition, O'Reilly
4. Gavella, N., *Privatno pravo*, Zagreb 2019., Narodne novine
5. Hönig, M., *ICO und Kryptowährungen Neue digitale Formen der Kapitalbeschaffung*, 2020., Springer Gabler, Wiesbaden
6. Jozipović, Š., Perkušić, M., Gadžo, S, Tax Compliance in the Era of Cryptocurrencies and CBDCs: The End of the Right to Privacy or No Reason for Concern?, 2022., *EC Tax review*, 31, 1
7. Marinac, A., Matijević, M. M., Mladenović, J., Division of Competences Between the European Union and the Member State, 2019., *EU AND COMPARATIVE LAW ISSUES AND CHALLENGES SERIES – ISSUE 3*, 79
8. Minović, M., Blockchain tehnologija: mogućnosti upotrebe izvan kripto valuta, 2017., conference paper, INFOTECH 2017, available under: https://www.researchgate.net/publication/318722738_BLOCKCHAIN_TEHNOLOGIJA_MOGUCNOSTI_UPOTREBE_IZVAN_KRIPTO_VALUTA
9. Momčinović, H., Nevaljanost ugovora – Ništetni i pobjni ugovori prema Zakonu o obveznim odnosima, Zagreb 2006., *Zbornik radova Aktualnosti hrvatskog zakonodavstva i pravne prakse*, Organizator
10. N.Szabo, The Idea of Smart Contracts, 1997., available under: http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart_contracts_idea.html
11. Perkušić, A., *Osnove građanskog prava*, Split 2009., Sveučilište u Splitu, Pomorski fakultet u Splitu
12. Perkušić, M., *Pravo elektroničkog plaćanja*, Zagreb 2020., Školska knjiga
13. Perkušić, M., Jozipović, Š., Mamut, J., Mogućnosti korištenja i pravnog uređenja tzv. pametnih ugovora u Republici Hrvatskoj, Zagreb 2022., Chapter 18 in *Hrvatsko obvezno pravo u poredbenopravnom kontekstu: Petnaest godina Zakona o obveznim odnosima*, Ekonomski fakultet Sveučilišta u Zagrebu, ur.Tot, I., Slakoper, Z.

14. Perkušić, M., Jozipović, Š., Piplica, D., The Need for Legal Regulation of Blockchain and Smart Contracts in the Shipping Industry, 2020., Transactions on maritime science, Vol. 09, No. 02
15. Raskin, M., The law and legality of smart contracts, 2016., p. 310. Available at: <https://www.ilsa.org/ILW/2018/CLE/Panel%20%2311%20-%20THE%20LAW%20AND%20LEGALITY%20OF%20SMART%20CONTRACTS%201%20Georgetown%20Law%20Technology%20Rev...pdf>.
16. Schär, F., Decentralized Finance: On Blockchain- and Smart Contract-Based Financial Markets, 2021., Federal Reserve Bank of St. Louis Review, Second Quarter 2021, 103(2)
17. Vidaković Mukić, M., Opći pravni riječnik, Zagreb 2015.
18. Werbach, K., & Cornell, N., Contracts ex machina, 2017., Duke Law Journal
19. Zetsche, D. A., Arner, D. W., Buckley, R. P., Decentralized Finance, Journal of Financial Regulation, 2020., Volume 6, Issue 2, 20 September 2020, 172–203

Legal acts

1. Anti-money laundering (AMLD V) - Directive 2018/843 of 30 May 2018 on anti-money laundering and countering the financing of terrorism. PE/72/2017/REV/1, OJ L 156, 19.6.2018
2. Croatian law on obligations (Zakon o obveznim odnosima NN 35/05, 41/08, 125/11, 78/15, 29/18, 126/21)
3. Croatian Payment Act (Zakon o platnom prometu, NN 66/18 from 28.07.2018.)
4. Directive 2002/65 / EC on distance trade in financial services for consumers and amending Council Directive 90/619 / EEC and Directives 97/7 / EC and 98/27 / EC (OJ OJ L 271, 9.10.2002)
5. Directive 2005/29 / EC on unfair business-to-consumer practices
6. Directive 2008/122 / EC on Consumer Protection concerning Long-Term Vacation Products (I L 33, 3.09.2009)
7. Directive 2009/22 / EC on injunctions for the protection of interested consumers (OJ L 110, 1.5.2009)
8. Directive 2011/16/EU of 15 Feb. 2011 on administrative cooperation in the field of taxation and repealing Directive 77/799/EEC, last amendment through: DAC6 – Council Directive (EU) 2018/822 of 25 May 2018 amending Directive 2011/16/EU as regards mandatory automatic exchange of information in the field of taxation in relation to reportable cross-border arrangements, ST/7160/2018/INIT, OJ L 139, 5 June 2018
9. Directive 2011/83 / EU on consumer rights, as amended by Directive 93/13 / EEC and Directive 1999/44 / EC (OJ L 304, 22.11.2011)
10. Directive 2014/17/EU on credit agreements for consumers relating to residential immovable property (OJ L 060 28.2.2014)
11. Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive (OJ EU 2014 L 173/349)

12. Directive 98/6 / EC (OJ L 080, 18.3.1998) on consumer price statements
13. Law on General Administrative Procedure (Zakon o općem upravnom postupku, NN 47/09, 110/21)
14. Law on Public Procurement (Zakon o javnoj nabavi, NN 120/16)
15. REGULATION (EC) No 593/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 June 2008 on the law applicable to contractual obligations (Rome I)
16. REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Markets in Crypto-assets, and amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937, 31 May 2023, L 150/40
17. REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on harmonised rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act), 13 December 2023, Series L
18. REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC
19. The Data Protection Law Enforcement Directive (EU) 2016/680 on the protection of natural persons regarding processing of personal data connected with criminal offences or the execution of criminal penalties, and on the free movement of such data
20. The General Data Protection Regulation (GDPR) Regulation (EU) 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data
21. Treaty on European Union (TEU) and Protocol (No 2) on the application of the principles of subsidiarity and proportionality

Other

1. Communication from the commission to the European parliament, the council, the European economic and social committee and the committee of the regions on a Digital Finance Strategy for the EU, COM(2020)591, 24 Sept. 2020.
2. <https://www.axa.com/en/magazine/axa-goes-blockchain-with-fizzy>
3. <https://www.fina.hr/finadigicert>, accessed May 5, 2023.
4. Opinion of the Croatian agency for financial services (HANFA) regarding the issuance of digital assets based on Ethereum Blockchain, from 6.4.2020, available under: <https://www.hanfa.hr/media/4602/misljenje-tokeni.pdf>
5. Opinion of the Ministry of Finance of the Republic of Croatia Nr.:410-01/17-08/29 Reg. nr.:513-07-21-01/18-4 from 19.03.2018 available under: https://www.porezna-uprava.hr/HR_publikacije/Lists/mislenje33/Display.aspx?id=19590

PRAVNI TRETMAN PAMETNIH UGOVORA PREMA HRVATSKOM PRAVU

U ovom radu analiziraju se pametni ugovori i mogućnosti primjene pravne regulacije na iste. Naime, budući da pametni ugovori nisu detaljno regulirani određenim zakonom u Republici Hrvatskoj, u radu se razmatra mogućnost primjene europskog sekundarnog prava i hrvatskog građanskog prava. Pri tom se prije svega razmatra način rada pametnih ugovora, kao i različiti sustavi pomoću kojih mogu funkcionirati, te se zatim utvrđuje može li se pametni ugovor uopće smatrati ugovorom i koje su pravno relevantne značajke pametnih ugovora uz pomoć kojih bi mogli klasificirati pametne ugovore. Shodno tome, utvrđuju se razlike između pametnih ugovora temeljenih na javnom (decentraliziranom) blockchainu i pametnih ugovora temeljenih na privatnom (centraliziranom) blockchainu, te razlike između tzv. jakih i slabih pametnih ugovora. Zatim se analizira način sklapanja pametnih ugovora, njihovog izvršenja, uvjeta ugovora i tumačenja, kao i prestanka samog ugovora. Navedeni aspekti razmatraju se i uspoređuju sa strane mjerodavnog prava, te se posebna pozornost stavlja na nišetnosti, poboynosti i raskid zbog neispunjenja pametnih ugovora, kao i na zaštitu potrošača.

Ključne riječi: *pametni ugovor, decentralizirani pametni ugovor, centralizirani pametni ugovor, zaštita potrošača, nišetni ugovori*