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Smart contracts and imperfect obligations:

Certainty for unlicensed gambling

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ABSTRACT

Gambling is an activity which the governments want to deter from and discourage citizens from partaking in. Regardless, participating in unlicensed gambling is a present phenomenon, which raises issues in variety of ways, such as in the apsect of legal certainty. One possibilty for tackling these problems of unregulated gamblings are smart contracts: blockchain-based self-executing computer programs. Using smart contracts in unlicensed gambling can increase transparency and security, as the entire process can be automated. Furthermore, they have the potential to enable the creation of decentralized, peer-to-peer platforms for gambling that do not require an intermediary to funtion. However, although smart contracts are an appealing technology, there are legal issues that need to be addressed. Besides, the lack of legal framework obstruct them from reaching their full potential. This paper thus explores the usage of the smart contracts in the participation in unlicensed gambling. This research uses the terms "unlicensed gambling" and "illegal gambling" synonymously and is conducted by qualitative method. Considering the fast development of smart contract-related technologies, the material used in this research has been limited to last six years.

Keywords: Smart contract, blockchain, imperfect obligations, unlicensed gambling, legal certainty

INTRODUCTION

Within the last few years, the term "smart contracts" has been emerging more and more. This technology is built on a blockchain technology and its core function lies within self-execution: once the certain criteria and requirements set in the chain have been fulfilled, the contract will automatically perform the wanted result.[1] In addition to self-execution, smart contracts are viewed as a reliable instrument as once the criteria set in one "block" of the blockchain has been established, they no longer cannot be altered, deleted, or moved, making them tamper-resistant.[2] Nevertheless, smart contracts work only as well as the code that's embedded in them, and bugs and malicious coding can cause unwanted results. Furthermore, a variety of legal issue arise in the lack of regulation and understanding of this instrument.

Imperfect obligations, in turn, are obligations based on an activity that is technically legal but the outcome of which cannot be enforced judicially even if one party fails to perform, as governments wish to deter from such activity.[3] Imperfect obligations, therefore, do not bind the parties together legally. In other words, imperfect obligations raise a variety of issues as they do not have similar legal implications for failure to perform than perfect obligations, i.e., obligations derived from the law. Thus, they lack legal certainty. That being said, there are a few different versions of what can be understood as imperfect obligations, varying from ethical or moral to legal issues. However, this research will concentrate on the last one, leaving out the ethical and moral obligations aspects out. To specify, the research will concentrate on unlicensed, and therefore illegal, gambling as an imperfect obligation.

Within the European Union (EU), the Member States have the power to regulate their own gambling laws, as there is no sector-specific EU legislation in that field.[4] Generally, Member States

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[1] Raskin, M. (2016). The law and legality of smart contracts. *Geo. L. Tech. Rev.*, *1*, 305.
[2] Mohanta, B. K., Panda, S. S., & Jena, D. (2018, July). An overview of smart contract and use cases in blockchain technology. In *2018 9th international conference on computing, communication, and networking technologies (ICCCNT)* (pp. 1-4). IEEE.
[3] „*Imperfect VS erfect obligation*". Lawyers & Jurists. Retrieved from:
https://www.lawyersnjurists.com/article/imperfect-vs-perfect-obligation/ on 1.4.2023
[4] European Commission. „Online gambling in the EU". Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs. Retrieved from https://single-market-economy.ec.europa.eu/sectors/online-gambling_en on 1.4.2023

allow certain types of gambling as long as the provider holds a license. Unfortunately, though, as the Member States have autonomy to establish their own regulations, they also get to define the requirements regarding licensing, which inevitably has led to different criteria and different takes by different states.[5] This, in turn, has raised an issue of Member States not recognizing the gambling licenses issued by another Member States. Ultimately, this set-up could lead to participating in unlicensed, and thus illegal, gambling activity outside of their home State, thus possibly discharging the State from enforcing the outcome.

Considering the cost-efficiency and the lack of need of intermediaries, smart contracts seem to be very appealing instruments to be used in a different type of business transactions, since the outcome is foreseeable and there's potentially less to dispute than in classical contracts.[6] Such a characteristic, therefore, also raises an idea regarding the applicability of smart contracts to activity that isn't directly regulated by law – namely imperfect obligations and of illegal gambling. Regardless, the utilization of smart contracts is not without legal problems such as issues with security, functionality, and legal enforcement, to name a few.

This research aims to examine whether smart contracts could be utilized in the unlicensed gambling, and whether they could, therefore, work as an instrument for enhancing the legal certainty in the activity. The hypothesis of this research is, hence, "via utilization of smart contracts, the enforcement of the outcome arising from unlicensed gambling activity can be executed without third parties. The smart contracts could in this sphere diminish vagueness concerning the fulfillment of the outcome, and, thus enhance legal certainty within the transaction." This research does not take jurisdiction into deeper consideration.

The first chapter of this research will concentrate on smart contracts in general, how they evolved and they function and, therefore, it also examines the important components required for the decentralized smart contracts to function. The first chapter chapter also includes a deeper look into one felicitous example regaring smart contracts and online betting – the decentralized oracle Augur. The last section of the first chapter will cover and examine the current regulatory sphere surrounding smart contract technology in the Union, and aims to shed light as to how they can be regarded in the current contract regulations. The second chapter, in turn, will have a look into

[5] Littler, A., & Jarvinen-Tassopoulos, J. (2018). Online gambling, regulation, and risks: A comparison of gambling policies in Finland and the Netherlands. *JL & Soc. Pol'y*, *30*, 100.
[6] Zheng, Z., Xie, S., Dai, H. N., Chen, W., Chen, X., Weng, J., & Imran, M. (2020). An overview on smart contracts: Challenges, advances and platforms. *Future Generation Computer Systems*, *105*, 475-491.

imperfect obligations, namely unlicensed illegal gambling in the realm of the EU and Estonian regulations, and evaluates what their place and implications in the justice system are. Lastly, before the conclusion, the third chapter will review the challenges of the utilization of smart contracts for illegal gambling and the possiblities for harnessing it within the legal scope examined in the research. The last chapter will, thus, put together and apply the information of the previous chapter, and analyses the realization of the hypotheses.

1. Smart contracts

The term "smart contract" has been around since 1994 when it was first introduced as an imaginary concept for a computer protocol which automatically executes the terms of a contract.[7] Although the concept was merely a hopeful idea nearly 30 years ago, the development of technological infrastucture, specifically the development of blockchain technology, in the past few years has been able to bring this concept into reality.[8] Advantages such as cost-efficiency and the lack of need for an outside intermediary only further increases the appeal and enthusiasm to develop this instrument even further.[9]

Today, the definition of smart contracts somewhat follows the original thought, although there isn't one unambiguous definition. Most commonly, though, smart contract are understood as self-executing legal contracts, functioning at least to some extent on a software that do not need a trusted third-party to complete.[10] More specifially, smart contracts are code scripts running on a blockchain, i.e. a distubuted ledger, and hence, smart contracts are created by transferring the desired terms and into an automatizised computer programme.[11]

Although there is no consensun on the definition, the European Commission has in its proposal for regulation on harmonised rules on fair access to and use of data (Data Act) provided a definition for smart contracts, stating them to mean "a computer program stored in an electronic ledger system wherein the outcome of the execution of the program is recorded on the electronic ledger".[12]

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[7] Giancaspro, M. (2017). Is a 'smart contract' really a smart idea? Insights from a legal perspective. *Computer law & security review*, *33*(6), 825-83
[8] Ibid
[9] Ibid
[10] Ibid
[11] Zou , W., Lo, D., Kochhar, P., Dinh Le, X., Xia, X., Feng, Y., Chen, Z., Xu, B. (2021) "Smart Contract Development: Challenges and Opportunities" TRANSACTIONS ON SOFTWARE ENGINEERING, VOL. 47, NO. 10
[12] European Commission proposal for a Regulation on harmonised rules on fair access to and use of data (Data Act) COM/2022/68 final

In a very simplified way, smart contracts work on a "if/when-then" program.[13] For example, in the context of this research, a very simplified smart contracts would be to set a requirement "if horse number 13 wins, then A will be transferred 100€". In such setting, not only would there be no ambiguity between the parties regarding the possible outcome, but because of the self-executing nature of smart contracts, there would also be no danger of one party not wanting to perform. In addition, smart contracts are immutable, as once the conditions have been set in a block, they cannot be changed afterwards.[14] In other words, neither of the parties have the possibiliy to arbitrarily go and change the terms set in the code and corrupt the chain. Hence, the utilization of smart contract in such a transaction would naturally reduce risks in this regard.

As mentioned, smart contracts differ from traditional contracts in the sense that they do not need an intermediary, such as banks, in order to be executed. Instead, integrating decentralized blockchain technology in a smart contract has enabled the realization of peer-to-peer (P2P) betting, i.e. a bet between only two parties without the need for third parties, such as bookmakers.[15] This, in turn, automatically improves the efficiency of smart contract comparing to traditional ones.[16] Additionally, smart contracts are enforceable by a code contrast to traditional contracts which are enforced by the state in a judical manner.[17]

So, the characteristics of smart contracts in this sense can be summarized as follows: immutable computer programs which has the capacity to enforce the outcome of the transaction automatically once the predetermined conditions are met, all characteristics and aspects which will be further examined in this paper.

1.1. Blockchain technology and its components

In order to fully understand how smart contracts work, it is necessary to also have an overview of the technology it is built on, namely blockchains and the components it comprises of. Therefore, this chapter focuses of blockchain technology, distributed ledgers, decentralized applications and oracles harnessed for the frictionless functinality of smart contracts.

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[13] Dutta, S. K. (2020). Smart Contracts. In *The Definitive Guide to Blockchain for Accounting and Business: Understanding the Revolutionary Technology* (pp. 61-78). Emerald Publishing Limited.
[14] Antonopoulos, A. M., & Wood, G. (2018). *Mastering ethereum: building smart contracts and dapps*. O'reilly Media. P. 128
[15] Zheng, Z., Xie, S., Dai, H. N., Chen, W., Chen, X., Weng, J., & Imran, M. (2020). Supra Nota 6
[16] Ibid
[17] Raskin, M. (2016). The law and legality of smart contracts. *Geo. L. Tech. Rev.*, *1*, 305.

As already briefly covered in the previous chapter, blockchain technology has many strength, such as immutability, trust and transparency. The idea of blockchain was first coined in 1991 by Stuart Haber and W. Scott Cornetta, who pictured them as "cryptographically secured chain of blocks".[18] However, it was only in 2008, when this idea, i.e., the model for a blockchain, was brought to life by an unknown entity going by the name Satoshi Nakamoto, who introduced the concept for Bitcoin.[19] Their intention for creating the blockchain was to let parties exchange money without the need for a third party.[20] This idea was intended to be enabled by different connection points in communication network, or network "nodes", which would maintain the shared ledger used for the actual transaction.[21] Nakamoto created a multi-dimensional mehcanism, which enabled that only "valid", and, due to their nature, immutable, transactions could utilize the blockchain.[22] Nakamoto's method created cryptographically secured chains of blocks to not only be unchangeable but also arrange the data in a chronological way, each block having a reference point to the previous closed block. He implemented the blockchain in a Bitcoin protocol as a public, decentralized ledger, thus, making Bitcoin to be the first to wide-spread application for blockchain technology.[23]

Blockchains are, as can be dervied from its name, a chain of blocks consisting of certain data.[24] A blockchain can be regarded as a decentralized, distributed, public digital legder which aims to "record transactions across many peered nodes so that the records cannot be altered retroactively without the alteration of all subsequent blocks and the consensus of the network".[25] In other words, blockchains are established to be a P2P network and decentralized in storing and the exhange of data. Nodes are able to read and execute contracts.[26]

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[18] Mueller, P. (2018). Application of blockchain technology. *it-Information Technology*, *60*(5-6), 249-251.
[19] Gatteschi, V., Lamberti, F., & Demartini, C. (2019). Technology of Smart Contracts. In L. DiMatteo, M. Cannarsa, & C. Poncibò (Eds.), *The Cambridge Handbook of Smart Contracts, Blockchain Technology and Digital Platforms* (Cambridge Law Handbooks, pp. 37-58). Cambridge: Cambridge University Press. doi:10.1017/9781108592239.003
[20] Ibid
[21] Ibid
[22] Ibid
[23] Li, Y. Emerging blockchain-based applications and techniques. *SOCA* **13**, 279–285 (2019). https://doi.org/10.1007/s11761-019-00281-x
[24] Fauziah, Z., Latifah, H., Omar, X., Khoirunisa, A., & Millah, S. (2020). Application of blockchain technology in smart contracts: a systematic literature review. *Aptisi Transactions on Technopreneurship (ATT)*, *2*(2), 160-166
[25] Ibid
[26] Canessane, R. A., Srinivasan, N., Beuria, A., Singh, A., & Kumar, B. M. (2019, March). Decentralised applications using ethereum blockchain. In *2019 Fifth International Conference on Science Technology Engineering and Mathematics (ICONSTEM)*(Vol. 1, pp. 75-79). IEEE.

As shown, blockchains have, therefore, three core elements: decentralization, proof-of-work consensus and practical immutability, all features which are needed in order carry out the functionality accordingly, all while maintaining the lack of need for an intermediary.[27]

Here's a simplified example of transactions on blockchain: A creates a transaction where they want to send x amount of money to B. Once this has been established, it gets broadcasted to network of nodes, which will then confirm the transaction is valid by fulfilling certain requirements, such as whether A has x amount of money. Once there is consensus amongst the nodes that this is the case, the transaction and new data is added to the blockchain as a new block, which cannot be tampered because of the unique identifier, hash. This way, the transaction has now become a permanent part of the ledger.

The immutable databases in the connected blocks are created by cryptographically locking the blocks by "hashing" the previous block[28], which essentially means a function in the program secure the information in the block once the requirements set are met.[29] They are considered to be the safeguards of the blocks since it is nearly impossible to hack through them to access the data stored in the block.[30] These hashes are cryptographically locked by using a private key, which is an identifier unique for all users.[31] These private keys technically also enable user identification and makes it secure.[32] The created new blocks linked to the previous ones by hashing creates immutable databases.[33] These, in turn, are are stored in distributed digital ledgers.

Distributed ledgers contain all the data of the parties,[34] and the distributed ledger technology (DLT) itself is seen as an approach which enables the recording, sharing and synchronizing of transactions through different data stores called ledgers, and which are maintained by the above-mentioned distributed, independent computers: nodes.[35] All of these nodes store a copy of the distributed

[27] Fulmer, Nathan (2019) "Exploring the Legal Issues of Blockchain Applications," *Akron Law Review*: Vol. 52: Iss. 1, Article 5. Available at : https://ideaexchange.uakron.edu/akronlawreview/vol52/iss1/

[28] Kabla, A. H. H., Anbar, M., Manickam, S., Alamiedy, T. A., Cruspe, P. B., Al-Ani, A. K., & Karupayah, S. (2022). Applicability of intrusion detection system on Ethereum attacks: a comprehensive review. *IEEE Access*. Vol 10

[29] Di Pierro, M. (2017). What is the blockchain?. *Computing in Science & Engineering*, *19*(5), 92-95.

[30] Ibid

[31] Ghuli, P., Kumar, U. P., & Shettar, R. (2017). A review on blockchain application for decentralized decision of ownership of IoT devices. *Adv. Comput. Sci. Technol*, *10*(8), 2449-2456

[32] Szczerbowski, J. J. (2017, November). 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*.

[33] M. Varun, B. Palanisamy and S. Sural, (2022) Mitigating Frontrunning Attacks in Ethereum, New York, NY, USA:Association for Computing Machinery, vol. 1, no. 1,

[34] K abla, A. H. H., Anbar, M., Manickam, S., Alamiedy, T. A., Cruspe, P. B., Al-Ani, A. K., & Karupayah, S. (2022) Supra Nota 19

[35] Natarajan, H., Krause, S., & Gradstein, H. (2017). Distributed ledger technology and blockchain.

ledger, meaning that any change to a ledger is recorded in other ledgers.[36] Although generally, the concepts of DLT and blockchains are mentioned in the same context, it ought to be noted that they do not in reality go hand-in-hand, but blockchains are merely a certain type of distrubuted ledgers. The international organization of Securities Commission defines DLT to be a "a consensus of replicated, shared, and synchronized digital data geographically spread across multiple sites, countries, and/or institutions. DLT are technologies used to implement distributed ledgers".[37]

Distributed ledgers differ from more commonly used shared ledgers in the sense that one single entity cannot alter the provided data nor can one entity alone approve new data to it, but instead this is done by predefined consensus mechanism.[38] Thus, distributed ledgers can be either centralized or decentralized, the latter of which is manifested in blockchains. In this sphere, smart contracts can be seen as codes written on a distributed ledger automatically exectuded by nodes.

In addition to the distributed and immutable nature of blockchains, the consensus mechanism is also an integral part of it.[39] As elaborated, in distributed ledgers the participants are required to agree on the validity of new data entries in conformity with the requirements set. This is reached through a consensus mechanism specified in the design of the ledger, i.e. predefined validation method.[40] One example of this mechanism is the "proof-of-work", used by Bitcoin. Proof-of-work is generated by running a one-way cryptographic hashing algorithms until a string of numbers satisfies a predefined condition. The large amount of node validate the changes in the distributed ledger, thus, creating consensus.

Ever since its introduction, Bitcoin has established a distinct basis as a blockchain network in the cryptocurrency market. That being said, as the interest in the topic has grown, also newer blockchain networks have emerged, one of the most prominent examples is Ethereum launched by Vitalik Buterin in 2015. Different blockchain also differ in their purposes.[41] For instance, whereas

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[36] Ibid
[37] Berryhill, J., T. Bourgery and A. Hanson (2018), "Blockchains Unchained: Blockchain Technology and its Use in the Public Sector", *OECD Working Papers on Public Governance*, No. 28, OECD Publishing, Paris,
[38] Ibid
[39] Ibid
[40] Ibid
[41] Werbach, K. (2018). *Trust, but verify: Why the blockchain needs the law.* Berkeley Technology Law Journal, 33(2), 489–549. https://doi.org/10.15779/Z38H41JM9N

the previously introduced Bitcoin exists to provide a platform for digital money transactions, Ethereum, in turn functions with the general purpose to execute code.[42]

Ethereum was the first blockchain system to actually execute the code on smart contracts, and it has become the most popular blockchain platform for them over time as well.[43] Ethereum functions on a decentralized Turing-complete machine (which is used to recognize data-manipulation), and the Ethereum Virtual Machine (EVM), to execute scripts through an international network of public compute nodes.[44] Programs of EVM are Ethereum smart contracts.

1.3. DApps and oracles: an overview of Augur

Decentralized applications, or DApps, are trustless or peer-to-peer applications without a single server or entity controlling them.[45] They are, thus software applications operating on decetralized network and they run on a distributed network of independent nodes. DApps utilize the blockchain in the processing of data and storage, and differ in this regard from classical applications. To simplify, they are, thus, decentralized blockchain-based smart contract-powered applications. Ethereum blockchain is one of the most notable platforms upon which dApps are built on.

Smart contacts might need to acquire data outside of the given code. However, they cannot independently retrieve such data from the outside, as the blockchain can only access data that's been recorded in it.[46] Instead, blockchains, smart contracts and dApps rely on decentralized oracles, to connect them to external data sources. An oracle is, thus an interface that delivers the needed data.[47] Naturally, the using of an oracle is also a question which the parties need to address in detail when they want to resort to smart contracts.[48] In the context of this research, such a piece of outside data could be the outcome of a sports event which parties have made a bet on. Together with oracles, provisions including requirements of payments can be easily executed, but this

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[42] Antonopoulos, A. M. (2017). *Mastering Bitcoin: Programming the Open Blockchain (2nd ed.).* O'Reilly Media. Chapter 1.
[43] Zou , W., Lo, D., Kochhar, P., Dinh Le, X., Xia, X., Feng, Y., Chen, Z., Xu, B. (2021) Supra Nota 11
[44] Ibid
[45] Metcalfe, W. (2020). Ethereum, smart contracts, DApps. *Blockchain and Crypt Currency*, *77*.
[46] Gatteschi, V., Lamberti, F., & Demartini, C. (2019). Supra Nota 19
[47] Bashir, Imran. *Mastering Blockchain : Distributed Ledger Technology, Decentralization, and Smart Contracts Explained, 2nd Edition*, Packt Publishing, Limited, (2018). *ProQuest Ebook Central*. P 270
[48] Al-Breiki, H., Rehman, M. H. U., Salah, K., & Svetinovic, D. (2020). Trustworthy blockchain oracles: review, comparison, and open research challenges. *IEEE Access*, *8*, 85675-85685.

doesn't mean that the usage of smart contracts wouldn't raise questions with interpretation and, thus, court intervention.

Augur is one of the first major and most popular decentralized oracle and prediction market software on the Ethereum blockchain.[49] Essentially, it's a decentralized peer-to-peer marketplace comprising of a set of smart contracts, and which, thanks to Ethereum's technology, are distributed in a decentralized manner between nodes.[50] The market consists of four stages: creation, trading, reporting and settlement, and anyone is allowed to do the first one.[51] In other words, anyone can create the real-life-event -based market by setting the event, it's ending time and choosing a designated reporter for the outcome. After this (creation), the market works as follows: first users can place bets on the outcome of the event with trade shares, which consist of different possible outcomes of the event (trading). Augur's on-contract matching engine creates the complete sets. Then, the Augur's oracle, i.e. profit-motivated reporters determine the outcome of the specific event once it has happened (reporting). After this, the traders can collect their wins and "close out" either by selling their shares in exchange for currency or by settling their shares in the market (settlement).[52]

As noted, there are issues with oracles such as Augur, such as reporters aiding unlicensed gambling possibilities. This would be problematic since identifying these people would be nearly impossible since Augur does not collect personal information. In addition, in Augur, people can rely on foreign reporters, which only further causes jurisdictional issues. Furthermore, it's believed that using an oracle might hinder the vital nature of smart contracts of being tamper-proof, as it would mean relying on an entity outside of the secured blockchain.[53] However, in this context the term "tamper-proof" can be a little misleading, as it simply refers to modification of the data enshrined in the blocks, as elaborated above. Besides, the execution of any smart contract relies on an outside trigger. Therefore, relying on an oracle wouldn't mean a deviation in the application of smart contracts in this sense in general. Besides, considering the above-mentioned, oracles hold a great amount of power over the execution of the smart contract. If, for instance, the smart contract has

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[49] Hobeck, R., Klinkmüller, C., Bandara, H. D., Weber, I., & van der Aalst, W. M. (2021). Process mining on blockchain data: A case study of augur. In *Business Process Management: 19th International Conference, BPM 2021, Rome, Italy, September 06–10, 2021, Proceedings 19* (pp. 306-323). Springer International Publishing.
[50] Peterson, J., Krug, J., Zoltu, M., Williams, A. K., & Alexander, S. (2019). Augur: a decentralized oracle and prediction market platform (v2. 0). *Whitepaper, https://augur. net/whitepaper. pdf.*
[51] Ibid
[52] Ibid
[53] Cuccuru, P. (2017). Beyond bitcoin: an early overview on smart contracts. *International Journal of Law and Information Technology*, *25*(3), 179-195

been provided with bad data, this could carry out an undesirable outcome which cannot be reversed due to the nature of the blockchain.[54] Nevertheless, since oracles such as Augur open markets for illegal gambling, it would naturally face scrutiny from governments.

1.3 Regulatory framework for smart contracts in the Union

Blockchain technologies face a variety of legal issues and smart contracts are no exception to this. In fact, one of the first questions arise with application of the legal definition of traditional contracts to smart contracts, as the term "smart contract" is essentially used to a technological instrument in the lack of a better term. Thus, issues emerge already with the legal validity.[55] Besides, regulatory problems aren't limited to this aspect only, but extend to matters of decentralization, anonymity and automation, which are the core characteristics of smart contracts.

However, for the sake of this research, all of the issues raised by the implementation of smart contracts cannot be reviewed. Instead, this section aims to shed light specifically on the applicability of current contract regulation of the EU in the sphere of smart contracts, i.e. their legal status, and then about the regulation of blockchain technology.

There is no comprehensive legal framework for smart contracts in the EU, at least not yet. Therefore, it is necessary to see where do smart contracts stand in the current state of law in the EU and more specifically in the contract law.

In addition, new regulations that should be taken into consideration are brewing in the EU, such as the before-mentioned proposal for Data Act, and, for instance the proposal for regulation on markets in crypto-assest (MiCA), the purpose of which is to provide guidelines for crypto-assets, including those that are traded via smart contracts. Although their ultimate legal affect remains to be seen since the no specific regulation has yet been adopted, this research takes these two proposals briefly into consideration.

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[54] Khan, S. N., Loukil, F., Ghedira-Guegan, C., Benkhelifa, E., & Bani-Hani, A. (2021). Blockchain smart contracts: Applications, challenges, and future trends. *Peer-to-peer Networking and Applications*, *14*, 2901-2925.
[55] Dutta, S. K. (2020). Supra nota 13

1.3.1. Smart contracts in the current contract law and consumer protection in the EU

Different entities have had a different take on smart contracts relationship with traditional contract law. Some believe that they do not need legal framework at all to regulate them, some believe that they could, in fact, be an alternative to current contract laws, and some believe that they simply fall in the scope of traditional contract laws, filling the requirements of traditional contracts.[56] Occasionally, it's stated that smart contracts cannot be considered to have the same legal implications as traditional contracts, but instead, they could be used as an instrument to enforce these contracts.[57] However, another, more supported, take is that smart contracts are subject to legal principles that apply to traditional contracts, and thus, these principles dictate the applicable law.[58] Additionally, sometimes it is accepted that smart contracts are simply an encoding of a contract or sections of it, and thus its legal status is regulated by the underlying contract.[59] Furthermore, more often than not, it is probable that smart contracts can be contextualized in natural, non-coded language, which would mean that they could be reviewed, at least to certain extent, in a manned of that of regular contracts. An exception and an advantage for smart contracts compared over traditional ones, is that a computer code doesn't recognize ambiguities unlike natural language. However, whether issues would rise in regard to the understanding of the ramification of the code, that is where there could be room for interpretation for parties. This, however, in the context of this research, is not relevant. Lastly, whereas the status of smart contracts as a computer program or code versus a contract might not be clear, it has been adopted in the Union that the general principles of contract law, together with consumer protection are applicable to smart contracts as well.

One of the first issues raised is the pseudoanonymity nature of smart contract, as generally a legal contract is concluded between known parties. In the smart contract environment, defining this is borderline impossible, which ultimately raises a question of jurisdiction and applicable laws and more relevantly the enforcement.[60] This is also where the usage of permissioned ledger is preferred.

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[56] Forbes, Lucas, Consumer Protection in the Face of Smart Contracts (January 8, 2022). Loyola Consumer Law Review, Vol. 34, No. 1, 2022
[57] Cuccuru. (2017). Supra nota 66.179-195
[58] Woebbeking, M. K. (2019). The impact of smart contracts on traditional concepts of contract law. Journal of Intellectual Property, Information Technology and Electronic Commerce Law, 10(1), 105-[ii].
[59] Ibid
[60] Dutta, S. K. (2020) Supra Nota 13

The EU has established a strong consumer protection and holds it at highly important value. In the Union, the most relevant laws would be the Directive 2000/31/EC on e-commerce and the Consumer Rights Directive 2011/83/EU, where GDPR and Directive on certain aspects concerning contacts for the supply of digital content and digital services 2019/770 also hold their own value.[61]

Although smart contracts have the potential to enhance consumers' position, they don't come without problems, as the traditional contract law does not address all the problems that arise from smart contracts. More specifically, problems may occur as there are gaps in consumer law and, for instance, a wrongful definition of smart contracts might, in the worst case scenario, dispose consumers protection completely.[62] Furthermore, the lack of centralized authority raises questions regarding accountability.

Nevertheless, the EU has created a variety of regulations to protect consumers and their rights, and ultimately, it's been stated that entering into an agreement that is not directly addressed by the law should not mitigate their protection.[63] Therefore, although it is not directly stipulated in law that how and to what extent consumer protection is applicable to the sphere that is concerned in this research, it is purposeful to state that it is and should be applicable nevertheless. Besides, whereas the self-executing nature of smart contract is deemed to be one of their most efficient features, it should not be forgotten that this also means that their execution is unavoidable – a characteristics which affects the consumers position in questionable situations vastly. This even further speaks in favour of providing protection for consumers.

To summarize, at least in the lack of better, more specific laws, the general principles, and framework of traditional contract law could and should be applicable to smart contracts. Therefore, matters such as unfair contract terms (such as the elimination of right to seek redress), unfair commercial practices, information requirements and right of redrawal, to name a few, should be taken into consideration. Within this understanding, it would, therefore, naturally also mean that consumer laws and protections would be applicable in these matters.

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[61] Ibid
[62] Forbes, Lucas, Consumer Protection in the Face of Smart Contracts (January 8, 2022). Loyola Consumer Law Review, Vol. 34, No. 1, 2022, Available at SSRN: https://ssrn.com/abstract=4045053
[63] Ibid p.60

1.3.2. Regulatory guidelines for blockchain technology smart contracts in the EU

As established, there are no specific regulations regarding smart contracts, nor even blockchain technology in general. That being said, the Union is constantly trying to come up with new rules to apply to different realms of this technology. This chapter will have an overlook of those regulations which appear to be the most relevant for the sake of the research.

The first possible future regulation is the current proposal for Data Act, which concerns harmonized rules and fair access and use of data, as can be derived from its name, and it complements the already existing data framework. As mentioned, the Data act defines smart contracts as "a computer program stored in an electronic ledger system wherein the outcome of the execution of the program is recorded on the electronic ledger".[64] Generally these components, i.e. software, decentralized technology and automation, are embraced by other definitions as well, but sometimes smart contracts are also given to be a "digital agreement" as well,[65] which the Data Act seems to intentionally leave out.

It has been recognized that the proposed Data Act has five problem areas regarding smart contracts, namely that there is lack of flexibility, it does not engage in the problems that arise with the using of oracles, vague definitions regarding architecture (i.e. the requirement for „robustness" without providing any criteria to achieve this), immutability and privacy, and lastly, problems with enforcement by domestic legal systems has not been addressed at all.[66]

One of the biggest cause for concern can be found in the „general requirements" of the proposal. Included in the general requirement is the so-called „kill switch" in Article 30(1)(b), according to which the party offering smart contracts should ensure „that a mechanism exists to terminate the continued execution of transactions: the smart contract shall include internal functions which can reset or instruct the contract to stop or interrupt the operation to avoid future (accidental) executions".[67] This rule would, for instance, be applicable in situations where there is a coding error in the program. In such situations, the kill switch would oblige to interrupt the transaction. Such a feature could potentially undermine the whole purpose of smart contracts, as it's in their

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[64] Data Act Article 2(16)
[65] De Caria, R. (2018). The legal meaning of smart contracts. European Review of Private Law, 26(6), 731-752.
[66] Circiumaru, A., Casolari, F., Taddeo, M. *et al.* How to Improve Smart Contracts in the European Union Data Act. *DISO* **2**, 9 (2023). https://doi.org/10.1007/s44206-023-00038-2
[67] Proposal for the data Data Act Article 30(1)

core nature for them to automated and immutable programs. Ultimately, this could hinder the ensuring of legal certainty for smart contracts even more as one of their main characteristics would be taken away. This issue has also been addressed by others, and for example Thierry Breton, a commissioner for the internal market, has expressed his concerns by stating that this could potentially impede the establishing of clear standards for smart contracts, and ultimately hinder legal certainty in this aspect.[68]

Nevertheless, since the Data Act is yet only a proposal, and not even a generally smart contract-targeted one, it is not expedient to dive into it much deeper. However, it ought to be noted that the Data Act also has the potential to provide an established legal status for smart contracts.

The MiCA regulation, in turn aims to establish harmonized rules for crypto-assets in the EU, and more broadly it includes a proposal for DLT.[69] MiCA would, hence, provide legal certainty for those crypto-assets that are not already covered by existing EU regulations, such as the aspect of trading by smart contracts.

Therefore, it is clear that the EU is constantly taking steps towards stronger regulations in this new and constantly developing field of technology. Thus, although specific regulations do not exist quite yet, it can be expected that they will be introduced in the future. Furthermore, the current ones already provide guidelines and framework to work within, at least to a certain extent.

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[68] Schickler J., "EU Parliament's Smart Contract Plans Limit Standard-Setting Promise, EU Commissioner Says". (15.3.2023). Coindesk. Retrieved: https://www.coindesk.com/policy/2023/03/14/eu-parliaments-smart-contract-plans-limit-standard-setting-promise-eu-commissioner-says/ on 3.4.2023
[69] Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Markets in Crypto-assets, and amending Directive (EU) 2019/1937
COM/2020/593

2. Unlicensed gambling as an imperfect obligation

A great number of reasons exist as to why people might participate in illegal gambling, whether that was simply the lack of knowledge surrounding the legality of the activity, or if the game one wishes to participate in isn't allowed in their home State. No matter what the reason is, the fact is that illegal gambling is still present.

In the EU, the Member States have autonomy to establish their own regulations, and one of those freedoms is the right to define the requirements regarding licensing. This has inevitably caused different States to have different criteria for obtaining such certificate.[70] This, has raised issues of Member States not recognizing the gambling licenses issued by another Member States. Which quickly evaluated would hinder the free movement of services in the EU as provided by Article 56b of the Treaty of the Functioning of the European Union.[71] Ultimately, this set-up could lead to participating in unlicensed, and thus illegal, gambling activity outside of their home State, which the home State might not be obliged to consider or the outcome of which it might not have to enforce.

2.1. Imperfect obligations and their place in the justice system in Estonia

According to §4(1) of the Law of obligations Act of Estonia "*Võlaõigusseadus*" (VÕS), an imperfect obligation is „an obligation which the obligor may perform but the performance of which cannot be required by the obligee". In other words, the state is not obliged to enforce the outcome, and thus, in cases of failure to perform, one party of the contract does not have access to any remedies - they simply have to „accept the loss".

According to §4(2), „an obligation arising from gambling, except for an obligation arising from gambling or a lottery organised on the basis of a permit". Thus, gambling on unlicensed, and thus illegal, gambling platforms falls outside of the jurisdiction. This means that although an individual

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[70] Littler, A., & Jarvinen-Tassopoulos, J. (2018). Supra Nota 5
[71] Consolidated version of the Treaty on the Functioning of the European Union OJ C 326/47- 326/390, 26.10.2012

might win on such a platform, no one is holding the payer party accountable to actually pay and fulfil their side of the transaction.

The purpose of §4 is to give a legal value to imperfect obligations, to unify these obligations in the Estonian legal system, and to secure creditors' interests in situations where the agreement between the contracting parties is not only a legal agreement in nature, but also serves other social purposes, such as moral.[72] Furthermore, Riigikogu, i.e., the Estonian Parliament, wanted to enshrine imperfect obligations („*Mittetäielik kohustus*") in the law of obligations act to serve the purpose of warning citizens of the outcomes for participating in the activity enshrined in § 4, and to show the States stance and assessment for it, already before-hand. [73] Adding the provision §4.2.1, concerning unlicensed gambling only further highlights the States take to deter from it, as this provision shows that the government did not consider the fulfilment of obligations that arise from unlicensed gambling to important enough to be protected by criminal measures.[74]

However, §4.4 states that the „provisions of law concerning obligations apply to an imperfect obligation unless the application of such provisions is contrary to the nature of the imperfect obligation". This provision, therefore leaves open the possibility of subordinating an imperfect obligation under the perfect obligations generally subject to the law of obligations act, meaning that the imperfect obligation could become enforceable.[75] The wording of the regulation leaves room for the interpretation of the „nature" of the imperfect obligation that would enable such take. Generally, it is stated that as a rule, imperfect obligations are contracts whose nature is determined in accordance with § 29 of the VÕS, i.e., interpretation of contract, together with good faith.[76] The commentaries on VÕS provide that this interpretation could, for instance, be possible in situations where the contract must be enforced in the name of disproportion of legitimate interests of the creditor.[77]

Similar take has been adopted by other legal systems as well. For instance, the German civil code „Bürgerliches Gesetzbuch" (BGB), where Title 19, governing imperfect obligations, stipulates in

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[72] Varul, P., Kull, I., Kõve, V., Käerdi, M., & Sein, K. (2016). *Võlaõigusseadus. I, Üldosa (§§ 1-207) : Kommenteeritud väljaanne* (2. väljaanne.. ed.). P. 23.
[73] Ibid
[74] Ibid
[75] Supra nota 63. p. 26
[76] Ibid
[77] Ibid

Section 762 (1) that „No obligation is established by gaming and betting".[78] Furthermore, Section 732 states that gaming and lottery bind the parties as long as there is a state approval in the activity. In other words, just as in the Estonian legal system, the state only protects approved, i.e., licensed gambling and averts from any other gambling activity, leaving the cconsumer outside of the sphere of protection. Whereas some legal systems of the Member States have clearly expressed their take on gambling in the context of imperfect obligations, it should be noted that there are also States that do not include such provisions to their laws, such as the Finnish legal system. That being said, it is clear from strict general gambling laws (such as „Arpajaislaki" in Finland), that the States still have the same evasive attitude towards unlicensed gambling, albeit the participant's righta and ability to enforce the outcome is a little more vague compared to those legal systems that do include provisions for this.

To summarize, it is apparent from the preparatory works and commentaries for VÕS, that the government wanted to add the provision for imperfect obligations into the law to provide a clear take on how the State approaches morally and ethically questionable activity and found it specifically important to include unlicensed gambling into the regulation. This way, the State has established a clear stance towards such activity, creating a deterrence effect for it, all while not wanting to completely leave out the enforcement possibilities on imperfect obligations. Thus, the law provides a legal status for imperfect obligations while also leaving room for interpretation.

2.2. Legal conundrums with unlicensed gambling in the EU

There is no specific and uniform legislation in EU governing the field of gambling services. EU member states are autonomous and free to regulate on their gambling services, as long as they comply with the fundamental freedoms and general provisions as established under the Treaty on the Functioning of the European Union (TFEU).

Within the European Union (EU), the Member States have the power to regulate their own gambling laws, as there is no sector-specific EU legislation in that field.[79] Generally, Member States allow certain types of gambling as long as the provider holds a license. Unfortunately,

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[78] Civil Code in the version promulgated on 2 January 2002 (Federal Law Gazette [Bundesgesetzblatt] I page 42, 2909; 2003 I page 738), last amended by Article 1 of the Act of 10 August 2021 (Federal Law Gazette I p. 3515).
[79] European Commission. „Online gambling in the EU". Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs. Retrieved from https://single-market-economy.ec.europa.eu/sectors/online-gambling_en on 1.4.2023

though, as the Member States have autonomy to establish their own regulations, they also get to define the requirements regarding licensing, which inevitably has led to different criteria and different takes by different states.[80] This, in turn, has raised an issue of Member States not recognizing the gambling licenses issued by another Member States. Ultimately, this set-up could lead to participating in unlicensed, and thus illegal, gambling activity outside of their home State, thus possibly discharging the State from enforcing the outcome. Nevertheless, there is no obligation of mutual recognition of authorisations or licenses to provide gambling services granted by an authority in an EU country. For instance in Estonia, you must separately apply for the licence, regardless of having one in another member state.

In the EU, there is a vast variety of case law concerning online gambling, within which the Court of Justice of the European Union (CJEU) has established the compliance of national laws with the European Union one, in the sphere of free of movement of services, one of the fundamental principles of the Internal Market. The free movement of services in the Union ensures that EU citizens can provide services in other Member States as seamlessly as possible. This freedom, which is protected by Article 56 of the TFEU, thus, prohibits restrictions on freedom to provide services by nationals who are established in one Member State but want to offer their services in another.[81]

The European Court of Justice (ECJ) has covered a plethora of cases regarding illegal and „immoral" services under Articles 56 and 57 of the TFEU, including judgements on lotteries and gambling, and issues where one activity in this field is legal in one Member State and illegal in another.[82] One of the most prominent cases on the matter is the case C-275/92 *Schindler*, in which it was argued that it was illegal to promote German public lottery in the UK on the basis that lotteries were not considered to be „economic activity" in the meaning of the TFEU. This argument was rejected by the Court, which further established that lotteries are services provided for remuneration and not fully banned otherwise either.[83] Although the free movement of services could not be prohibited on such basis, the ECJ has, in other cases, established ways for States to provide discretion for it. For instance, the ECJ has established that as the „questionable" nature of betting and its possible harmful consequences on the whole, for the people and states, might suffice

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[80] Littler, A., & Jarvinen-Tassopoulos, J. (2018). Online gambling, regulation, and risks: A comparison of gambling policies in Finland and the Netherlands. *JL & Soc. Pol'y*, *30*, 100.
[81] Consolidated version of the Treaty on the Functioning of the European Union OJ C 326/47- 326/390,
[82] Craig, P., & De Búrca, G. (2020). *EU Law: Text, Cases, and Materials UK Version*. Oxford University Press, USA. P. 870
[83] Ibid

as grounds on restricting gambling and betting, regardless of this activity already being legal in the Member State wanting to offer the service.[84] This stance has also been taken in Estonia, for instance, which justifies the recognition of gambling and betting licenses issued by Estonian government only on the basis of consumer protection. Essentially, the different rulings by the ECJ have also confirmed that a remunerated activity, such as gambling, qualifies as a service under the Treaty.[85]

Therefore, gambling has been recognized to fall in the sphere of being services, a free movement of which is generally protected in the Union. Regardless, through case law it has been established that Member States have autonomy to regulate their own gambling requirements, and this does not necessary hinder the principle of free movement of services. The recognition of gambling licenses in another Member State also falls within this scope. Although, occasionally cases regarding the restrictions being in conformity with the EU law, it is generally accepted that automatic recognition of foreign gambling licenses is not mandatory.

Whereas such perspective protects the autonomy of States, it also raises challenges in consumer protection, since, in the lack of harmonization, there is a gap in the law for unlicensed gambling. The growing gambling industry alone is already rising questions regarding consumer protection, so it's no surprise that stepping outside the sphere of protection provided by the law creates even more problematic situations.

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[84] Ibid
[85] Supra Nota 66 p. 871

3. Challenges and opportunities for smart contracts in unlicensed gambling

Unlicensed gambling can emerge in a variety of ways. However, for the sake of this research, the most relevant situations would be gambling on an entity that it has acquired a license in one State, but which is not recognized by another, making it, thus, a platform for unlicensed gambling. Or optionally, an entity has been rejected from getting a license but who still wants to practice this business, and who, in the hope of attracting more participants to gamble more "safely", wants to utilize smart contracts. These are hypothetical situations which appear to be the most welcoming for smart contracts. Even in these situations the jurisdiction might somehow be established, but how about online platforms which function without any sort of licensing at all? Options are not limited to the gambling platforms in the EU, and specifically within a globalized and online world, people will find their way to online gambling, disregarding the criticism of the legality of the website. Ultimately, the most probable scenario for the utilization of smart contracts would be where the provider want to, for one reason or another, not acquire a license in a state where it wants to provide its services, while still promoting "attractive" gambling.

It has been established that smart contracts in theory fall in the sphere of the existing contract and consumer regulations and are, therefore, not without governing framework.[86] However, it would be naive to believe that no new regulatory measures need to be taken at all. In fact, in order to avoid ambiguities and to secure the full possible potential of smart contracts, new laws on the EU level are necessary, especially since their utilization in different areas of technology has begun to be more and more common. Let's take the oracle Augur, for instance: even if such platforms would be banned as illegal tools, the software it uses is already public and accessible globally, and thus it's possible that another entity will try to harness and take an advantage it. Therefore, banning wouldn't necessarily do much – especially considering the protection of users. Thus, regulatory changes should be made, or in the very least the laws should provide a tool to distinct which laws

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[86] Forbes (2022). Supra nota 60

to apply and how to smart contracts in different environments, for example in the sphere of decentralized online market places such as Augur.

Currently, thus, the standing regulations, or the lack of thereof, could constitute ambiguities and confusion if smart contracting was widely implemented, preventing their application of their full potential. In the worst situations, they could even completely eliminate consumers right for redress and their way for executing their legal rights, especially if smart contracts are deemed to fall outside of the legal framework.

Potential use for smart contracts could be for imperfect obligations, for instance in gambling and betting, since this application could potentially be quite simple. In these scenarios, although there is an imperfect obligation at hand, the parties can be perceived to a concluded contract. In a best case scenario, this could potentially mean that the imperfect obligations would fall under the influence of contract and consumer laws, as provided above. Therefore, in theory, the legal certainty in unlicenced betting could be ensured, as imperfect obligations might, in a very extreme interpretation turn into perfect obligations, which could then be enforced.

Furthermore, as shown in the chapter 2.2, the Estonian law of obligations act, in theory leaves open the possibility of enforcing of an imperfect obligation, depending on its nature. Accordingly, in the light of unlicenced gambling and the using of smart contracts in the field could enable the possibility of enforcement, further speaking for the activity falling into the sphere of respective laws. That being said, as the law itself doesn't define what the "nature" of an imperfect obligation that might turn it into a general obligation, it cannot be stated in confidence that the law would permit this stance. As a matter of fact, such a take might diminish the initial purpose of the whole regulation, as such an interpretation would just provide a way around the law and its protection purpose.

Due to their unique nature of self-execution, one suggestion to enhance the consumers position in smart contracting is by taking an ex ante regulatory take on the matter.[87] This could reached in two ways: either by choosing a "coherentist" approach, in which locus point is on creating consistency

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[87] Forbes, Supra Nota 59 p 73

in the law by clarifying the concepts and "filling gaps" in the law.[88] Another approach would be so-called "regulatory instrumentalism" which simply aims to establish certain policy goals.[89]

Lastly, although smart contracts seem to be viable and unambiguous instruments to be used in gambling and betting, since it will execute itself once the criteria the parties have agreed upon have been fulfilled, it doesn't mean that there will never be room for interpretation and, therefore, a need for court intervention could arise.

In the light of what has been established above, it isn't impossible to state that embracing smart contracting in their gambling and/or betting could remove the obligation of the providers to separately acquire licenses in Member States.

However, accepting this view could jeopardize the entire legislator's purpose to deter from gambling. Therefore, this optimistic perception could be just, that: optimistic. However, this interpretation might eliminate consumer's protection and way to seek redress completely, which in turn, is one of core values in the Union.

Therefore, this view cannot be adopted without criticism either. In the last hand, it seems purposeful to accept smart contracts to fall into the sphere of traditional enforceable contracts, meaning that once smart contracting is implemented into imperfect obligation of unlicensed gambling, this activity would, in the EU sphere turn into a perfect, enforceable obligation. This would exponentially increase the legal certainty in unlicensed gambling. Thus, whereas the current regulatory framework is not perfect in the application of smart contracts, and therefore new regulations are necessary, the current laws do provide guidance in legal issues surrounding the matter, meaning that consumers participating in this activity are not left without protection, if smart contracting will be used in gambling before relevant, more specific laws are regulated. That being said, this research does not ignore the fact that, although implementing smart contracting into unlicensed gambling would appear to increase legal certainty in the action, this could also further encourage consumers to participate in unlicensed gambling, which in turn would have the reversed effect than what the regulators have originally intended the laws to establish. In this set up, as the current regulatory framework for blockchain technology and consumer protection is not perfect

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[88] Ibid
[89] Ibid

and ready for these issues, it is appropriate to assume that legal issues in the sphere will also only further increase.

Nevertheless, in the rise of intermediary-free platforms such as Augur, it is likely that online, and inevitably unlicensed, gambling will only gain more popularity. Therefore, it is necessary to create new instruments to enhance the legality and certainty in this sphere Union-wide. This research suggests that one way to achieve this is by adding a new provision to the already existing EU regulations that would specifically govern smart contracts, and their interpretation. Namely, specifying certain aspects such as conditions for being able to turn to redress or relation to other regulations, are matters that could be covered. Additionally, new provision could provide the courts with tools to navigate through different contracts depending on what nature of smart contract is in the concentration point of the dispute, i.e., smart contract used to carry out betting or gambling. Hence, to further the conformity of blockchain-based contracts with the law, it would be necessary to highlight the importance of consumer protection where necessary, and design ways for identification in the blockchain contract, i.e., identity number or digital signature. However, since it is in blockchain's nature to provide no information on the user's identity due to pseudonymity, adding requirements for identification might not serve the desired purpose. Nevertheless, identification via identity number and cryptographic keys is possible.[90] Therefore, some requirements for identification could be regulated, as this is one of the most viable ways to provide security and enhance legal certainty specifically in unlicensed gambling and betting where individuals want to participate in such activity.

Since the European Council has decided that it doesn't want to regulate gambling, it is unlikely that new provisions concerning consumer protection in gambling would take place. Therefore, this research merely concentrates on regulatory possibilities of the blockchain technology – regulations which can then be reflected whatever the field of usage of smart contracts is. Such additions could be problematic since it would attempt to create harmonization in the gambling realm where States want to maintain their autonomy. Besides, blindly adding provisions to the consumer regulatory frames is naïve, since it would be contradictory with Member State's autonomy to create gambling laws, as national authorities are the ones in charge of enforcing consumer protection. This would create a paradox that States would be allowed to exclude unlicensed gambling from the protection

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[90] Szczerbowski, J. J. (2017). Supra Nota. 32

of law, since such a provision would bring the issue right back to national authorities, as long as the provider uses blockchain technology in the action. Then, the suggestion is to add

Thus, blockchain-based contracts should be brought into the scope of Directive 2000/31/EC on electronic commerce, that already deals with electronic contracts in business-to-consumer transactions.[91] This research, thus, suggests amending the Directive to include a provision defining smart contracts and their legal status as being comparable to electronic contracts in this set-up. More specifically, the respective provision would call for certain requirements regarding the identification, for instance by digital signature to ensure even better legal certainty.

Although such additions cannot be exhaustive in defining the interpretation of smart contracts due to their complexity, they could function as a key for the courts to approach situations of dispute with a little less friction. Lastly, there are legal systems in the Union, such as in Finland, that do not directly recognize the term "imperfect obligation" at all, let alone include unlicensed gambling to this unenforceable sphere in similar manner, although the states have maintained the same deterring stance on the activity. Such differences in systems within the EU only further speak in favor of adopting clarifying provisions on the EU level, and, thus, the suggestions above could be one way to enhance the legal certainty and provide clarification on the matter.

To conclude, although it remains to be seen how these issues will be tackled on the EU-level, this research proposes for above-mentioned measures to ensure legal certainty for smart contracts and establishes more clarity for them in the light of consumer protection in the Union. However, whereas such provision would finally give blockchain-based contracts a clear legal status, shifting the concentration away from gambling into contracting, and provides with guidelines for their interpretation, it must be noted that Member States might not be too welcoming for such take. Thus, perhaps consideration should be given to the inclusion of a clause highlighting the responsibility of the provider of smart contract instrument responsibility, since it might alert the providers of the risks of using this technology in their activity. In this proposal this research also acknowledges the Member States' autonomy to regulate gambling and averts from uncalled harmonization in the matter, while still bringing the core issue into the sphere of consumer protection.

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[91] 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 ('Directive on electronic commerce') *OJ L 178, 17.7.2000,*

CONCLUSION

The aim of this research was to see whether smart contract technology could harnessed to unlicenced gambling, and whether they could, therefore, ultimately to ensure and strengthen the legal certainty of such activities. As provided in this research, this could exactly be the case for how smart contracts work in these settings.

This research also established that smart contracts have great advantages ranging from the reducing of risks, thanks to the immutability of blockchains, to the improved efficiency due to the elimination for the need of third parties. Nevertheless, as smart contracts have two aspects: that of legal and of technological, both of these two should be executed and regulated synchronously in order to gain a possbility for their legal enforcement.

However, because gambling providers can directly provide statistics and odds of gambling services to consumers via smart contracts, consumers may intentionally deviate from regulated sites to unregulated ones. As it is difficult to determine the whereabouts of the operator of a fully decentralized gambling provider due to the anonymity and decentralized nature of blockchain, pinpointing the culprit and determining the applicable law comes difficult. This would ultimately undermine the entire purpose of incorporating smart contracts into unlicensed gambling, because if gamblers begin to prefer this method of play, the State regulation would drift even further away from being applicable in these settings.

Nonetheless, smart contracts provide a variety of possibilities as well. For instance, where the gambling provider is already licensed in one Member State, smart contracts may prove to be an instrument that benefits both parties by mitigating jurisprudence issues and, ultimately, increasing legal certainty. Participating in unlicensed gambling is an issue that will not be going away anytime soon, whether it was for the reasons of misunderstandings or intentionality. Furthermore, the rise of decentralized oracles and the possibility to utilize smart contracts in the activity makes it prone to only further the enganging in the activity that has purposefully been left outside of the protection of the law. However, there are ways to enhance legal certainty even in this sphere, all while allowing the Member States to maintain their will to deter from such activity, and one example of

this could in the form of smart contracting. Thus, this research displays that smart contracts could be a crucial instrument in ensuring the outcome and certainty in unlicensed gambling. To enable this, regulatory changes must be made, or in the very least the laws should provide to a tool to distinct which laws to apply to smart contracts in different environments. It's been established, that smart contracts in theory fall in the sphere of the existing contract and consumer regulations and are, therefore, not without a governing framework. However, it would be naive to believe that no new regulatory measures need to be taken at all. In fact, in order to avoid ambiguities and to secure the full possible potential of smart contracts, new laws on the EU level are necessary and they ought to be created as soon as possible, especially since the field of blockchain technolgoy evolves constantly and rapidly.

Thus, this research suggests, that adding new clarifying provisions on interpretation of blockchain contracts and their relation to different regulations could eventually provide the courts with the tools to navigate through differnet issues arising from the utilization of this complex instrument. More specifically, this research established that the most viable option for creating legal status for smart contracts, would be by adding a blockchain-based contracts provision to the already-existing e-commerce directive. This suggestion only aims to regulate, thus, the legal status of the smart contracts in consumer-to-business relation, and intentionally leaves out the regulatory changes for gambling laws. This way, both, the Union and the Member States get to maintain their current stances in this field, while it still demonstrates how smart contracts have the ability to bring legal certainty to unlicensed gambling.

Ultimately, although implementing smart contracts into gambling and betting, in situations of participating in unlicensed gambling, could provide legal certainty in the activity, the utilization of these instruments are prone to attract more individuals to participate in unlicensed, and thus illegal, gambling and betting. Such scenarios would drift only further away from the legal certainty in gambling in general. Therefore, while there is potential with smart contract technology in the field, the implementation, and the implications of utilization of smart contracts should be contemplated in great detail before actually accepting these instruments into action. Although creating new provisions to law might seem like a feasible option for now, there's still the possibility that it would only hamper the already arduous issue with smart contracts.

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