Sunt valabile clauzele de arbitraj ICSID în contractele de investiții încheiate prin contracte inteligente?

Are the ICSID Arbitration Clauses in Investment Contracts Concluded via Smart Contracts Valid?*

Elnur Karimov[1]

Abstract: Blockchain technology gained popularity with the emergence of intellectual technologies, as cryptocurrencies are also being discussed within contract law along with the interpretation of the concept of consent, and the validity of the consent written in computer codes. This article discusses the validity of arbitration clauses included in smart contracts in the light of the ICSID arbitration, decisions of tribunals and argues that although the institutional arbitration centres such as the ICSID do not possess required technical capacity, taking into account the level of flexibility of the condition of „consent in writing" interpreted in ICSID tribunal decisions on the jurisdiction, a valid arbitration agreement can be concluded in the form of smart contracts encoded and self-executed. Besides, revisiting ICSID model clauses, this paper has suggested a new model arbitration clause adaptable to smart contracts.

Keywords: blockchain, smart contracts, ICSID arbitration, arbitration clause, validity

Introduction

Technology is developing rapidly. Since their invention, calculation machines, primary computers, and smartphones have been proven technological advances. However, today the Internet and intellectual technologies have reached such a level that there is a need to rethink our traditional way of living, fundamental conceptions of law and state.

One of these technological advances is the blockchain that has gained popularity along with virtual cryptocurrencies. In terms of technology, (public) blockchain is an encrypted distributed database that everyone with enough technical resources can access on the Internet[2]. Having no central authority on the

---

*The author has presented this paper at the Fifth Edition of the "Legal Perspectives on the Internet" International Conference on October 30, 2021, organized online by the Faculty of Law of Universitatea „Alexandru Ioan Cuza" din Iaşi, in partnership with the Faculty of Computer Science and the National Institute for Training and Professional Development of Lawyers – Iasi Territorial Center and Wolters Kluwer Romania.

[1] LLD (Doctoral Program in Law) Student, Kyushu University Graduate School of Law, e-mail: karimov.elnur.712@s.kyushu-u.ac.jp, ORCID: 0000-0003-1997-7076.

[2] Zibin Zheng, Shaoan Xie, Hongning Dai, Xiangping Chen, and Huaimin Wang, "An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends", [Online] at https://ieeexplore.ieee.org/document/8029379/, accessed on 03/11/2021.

blockchain, each participant plays the role of a member and a centre simultaneously. This study discusses one of the areas of application of blockchain technology - smart contracts.

Unlike traditional contracts[3], smart contracts consist of program codes that require no third-party interference for performance[4]. With the help of this feature, parties of smart contracts can enter a contractual relationship much more easily than traditional contracts given the fact that the challenges posed by investment contracts are less likely to occur in the smart contracts. Because on the blockchain, the smart contract relies on its codes to decide at which moment it must perform the contract. Still, smart contracts are not immune from disputes. When parties of smart contracts do not perform at all or perform defectively to provide the contract with information to trigger the performance, and when codes say nothing about dispute resolution, third-party interference may be necessary. To this end, predicting all the possibilities, parties of the smart contract are free to include an arbitration clause.

The subject of this article is the validity of arbitration clauses within the meaning of the International Convention on the Settlement of Investment Disputes (the ICSID Convention) embedded in smart investment contracts. In this scenario, a state and an investor conclude an investment contract on the blockchain in the form of a smart contract or otherwise transform their written investment contract into a smart contract and insert an ICSID arbitration clause encoded in a programming language. Discussing the validity of such a clause, this article is nurtured by literature, supplementary texts of the ICSID Convention and ICSID arbitral awards and decisions on jurisdiction.

Part I explains blockchain technology and smart contracts, their legal nature and their relationship with other contracts.

Part II focuses on the elements of arbitration clauses, the requirements sought by the ICSID Convention, and the scope and applicability of „written consent” in arbitral decisions.

Conclusion concludes the discussion on the scope of smart ICSID arbitration clauses and attempts to produce a model clause.

---

[3] Susan Atkinson and Gabrielle Benefield, "Software Development: Why the Traditional Contract Model is not Fit for Purpose", [Online] at https://ieeexplore.ieee.org/document/6480428, accessed on 03/11/2021; Robert Herian, "Legal Recognition of Blockchain Registries and Smart Contracts", [Online] at https://doi.org/10.13140/RG.2.2.12449.86886/1, accessed on 12/01/2020.

[4] Jeremy M. Sklaroff, *Smart Contracts and the Cost of Inflexibility*, University of Pennsylvania Law Review, vol. 166, nr. 1/2017, p. 267; Jonathan G. Rohr, *Smart Contracts and Traditional Contract Law, or: The Law of Vending Machine*, in Cleveland State Law Review, vol. 67, nr. 1/2019, p. 76.

1. The Concept and Definitions of Blockchain and Smart Contracts

1.1. Understanding Blockchain Technology

A smart contract is a written code concluded on the blockchain; hence, smart contracts cannot be defined without the specifications of blockchain technology.

The distinguishing features of the blockchain lie in its **peer-to-peer communication structure, cryptography, distributed ledger**, and **consensus mechanism[5]**. Among them, the peer-to-peer network and distributed ledgers help blockchain participants eliminate the centrality of controlling authorities. Participants of the blockchain are not only the operators but also the hubs in the blockchain structure composed of the compilation of operators. While in the centralized systems, transactions need a trusted third party (such as banks or administrative agencies) for their enforcement (*see* Figure 1), blockchain replaces such intermediary mechanisms with distributed public ledgers. As a result, in a trust-free blockchain network, the transactions can be enforced freely and uninterruptedly across the peers[6]. But the absence of central authorities does not itself make the network untrustworthy. The cryptology behind blockchain ensures the trust sought by the parties to transactions[7]. In this way, the parties can overcome almost all the possible security gaps on the blockchain[8].

Meanwhile, the secret inventor of the Bitcoin virtual currency Satoshi Nakotomo, whose mystery also contributed to the worldwide fame of blockchain[9], introduced routine escrow mechanisms to replace trusted third parties in centralized transaction systems. Routine escrow mechanisms can be preferred to build a trusted relationship between vendors and recipients. Using this mechanism, instead of directly releasing the payment to vendors' accounts, recipients can send the routine escrow and block it until the performance of the contract. As soon as the vendor performs the contract following the previously agreed terms, the

---

[5] Melih Sefa Yavuz, *Ekonomide Dijital Dönüşüm: Blockchain Teknolojisi ve Uygulama Alanları Üzerinde Bir İnceleme* [Digital Revolution in Economy: A Study on the Blockchain Technology and Its Areas of Application], Finans Ekonomi ve Sosyal Araştırmalar Dergisi, vol. 4, nr. 1/2019, pp. 16-17.

[6] Winston Maxwell and Gauthier Vannieuwenhuyse, *Robots Replacing Arbitrators: Smart Contract Arbitration*, ICC Dispute Resolution Bulletin, vol. 1, nr. 1/2018, p. 26.

[7] Jerry Hsiao, *'Smart Contract' on the Blockchain Paradigm Shift for Contract Law?*, US-China Law Review, vol. 14, nr. 10/2017, p. 686.

[8] Yu Nandar Aung and Thitinan Tanditham, "Ethereum-based Emergency Service for Smart Home System: Smart Contract Implementation", [Online] at https://ieeexplore.ieee.org/document/8701987, accessed on 03/11/2021.

[9] Balazs Bodo, Daniel Gervais and Joao Pedro Quintais, *Blockchain and Smart Contracts: The Missing Link in Copyright Licensing?*, International Journal of Law and Information Technology, vol. 26, nr. 4/2018, p. 312.

routine escrow as a service provider instructs the payment to the vendor's account. Then, both vendors and recipients are expected to trust routine escrows[10].
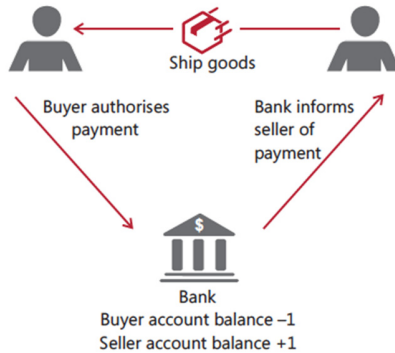

Figure 1. The Illustration of the Sales Contract in the Centralized System

On the blockchain, participants interact in the assigned nodes via private and public keys. They sign a transaction on the blockchain via private keys but send transactions to another participant's address via their public keys. The transactions validated by other participants are gathered in candidate blocks that once validated by the blockchain network, are added to the chain and this process renews the network regularly[11]. Each recently validated block takes the address of the previous one, and a chain is made from encrypted blocks[12]. That is why any change in one block affects the entire chain requiring a modification in each block which is hardly possible[13].

The advantages of blockchain networks are trustworthiness, transparency, traceability, and decentralization[14]. (*See* Figure 2) Blockchain stores data in multiple nodes instead of a centralized intermediary, which makes it arguably difficult to hack because any security threat must be directed to at least 51% of the nodes to

---

[10] Pietro Ortalani, *The Impact of Blockchain Technologies and Smart Contracts on Dispute Resolution: Arbitration and Court Litigation at the Crossroads*, Uniform Law Review, vol. 24, nr. 2/2019, p. 433.

[11] Konstantinos Christidis and Michael Devetsikiotis, *Blockchains and Smart Contracts for the Internet of Things*, IEEE Access, vol. 4, nr. 1/2016, p. 2293; Sefa Akca, Ajitha Rajan and Chao Peng, "SIF: A Framework for Solidity Contract Instrumentation and Analysis", [Online] at https://doi.org/10.1109/APSEC48747.2019.00071, accessed on 03/11/2021.

[12] Eliza Milk, *Smart Contracts: Terminology, Technical Limitations and Real World Complexity*, Journal of Law, Innovation and Technology, vol. 9, nr. 2/2017, p. 276.

[13] Fengkie Junis, Faisal Malik Widya Prasetya, Farouq Ibrahim Lubay, and Anny Kartika Sari, "A Revisit on Blockchain-based Smart Contract Technology", [Online] at https://arxiv.org/ftp/arxiv/papers/1907/1907.09199.pdf, accessed on 03/11/2021.

[14] Maren K. Woebbeking, *The Impact of Smart Contracts on Traditional Concepts of Contract Law, Journal of Intellectual Property*, Information Technology and Electronic Commerce Law, vol. 10, nr. 1/2019, p. 106.

come successful[15]. Additionally, because the transactions on the blockchain are encrypted in blocks that are chained to each other, any change on the blocks requires the consent of the majority[16]. If the quota is not reached, neither transactions nor data can be interfered with or changed, nor are registered transactions amended or removed from distributed ledgers. The same applies to the changes to terms and conditions of smart contracts. These advantages have triggered the application of the blockchain to agriculture, economics, or political elections[17].
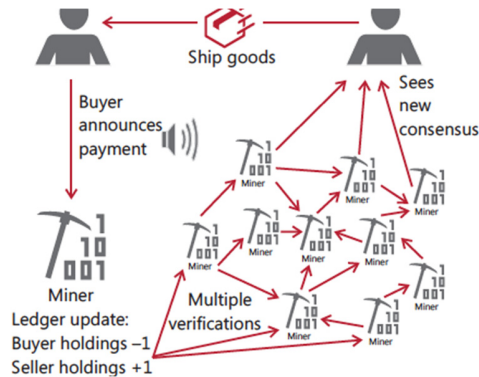

Figure 2. The Illustration of Sales Contracts in the Decentralized Blockchain

1.2. Understanding Smart Contracts

1.2.1. Definition and Characteristics of Smart Contracts

There is no international treaty dedicated to smart contracts; nor are these contracts regulated in most national laws, except the United States at the state level. For example, according to Section 5 of the Blockchain Technology Act adopted by the Illinois General Assembly, „'[s]mart contract' means a contract stored as an electronic record which is verified by the use of a blockchain"[18].

The common point of the scholarly definitions of smart contracts is classifying computer codes as a constituent part of smart contracts and self-execution as its main working mechanism[19]. Smart contracts were first defined

---

[15] Ibrahim Shehata, "Smart Contracts & International Arbitration", [Online] at https://ssrn.com/abstract=3290026, accessed on 03/11/2021.

[16] Morgan N. Temte, *Blockchain Challenges Traditional Contract Law: Just How Smart are Smart Contracts*, Wyoming Law Review, vol. 19, nr. 1/2019, p. 90.

[17] Ahmed Ben Ayed, *A Conceptual Secure Blockchain-based Electronic Voting System*, International Journal of Network Security & Its Applications, vol. 9, nr. 3/2017, pp. 2-3; Rumeysa Bulut, Alperen Kantarcı, Safa Keskin, and Şerif Bahtiyar, "Blockchain-based Electronic Voting System for Elections in Turkey", [Online] at https://ieeexplore.ieee.org/document/8907102, accessed on 03/11/2021.

[18] Illinois Compiled Statutes No. 205, 01/2020, p. 730.

[19] Rohr, *op. cit.*, p. 72; Gonenc Gurkaynak, İlay Yılmaz, Burak Yeşilaltay, and Berk Bengi, *Intellectual Property Law and Practice in the Blockchain Realm*, Computer Law and Security

in 1996 as „a set of promises, specified in digital form, including protocols within which the parties perform on these promises"[20]. Another definition points out that smart contracts can be either automatic or automated[21] meaning that they can be manipulated by humans or machines via data input.

Nowadays, smart contracts are usually concluded and performed on the Ethereum blockchain[22]. The first version of blockchain which reached its audience following the introduction of Bitcoin consisted of an extremely limited number of tools to automate transactions. The distinctive feature of the Ethereum blockchain is its Turing-complete programming language that allows producing more complex software, such as those capable of interacting with distributed ledgers[23]. Each smart contract has an identification address with a 160-bit length, and a code stored on the blockchain. The code of the contract is activated by the transaction signed by the private keys of participants[24]. When participants want to send transactions to the contractual address, transactions must initially be approved by blockchain. Once approved by blockchain, they are added to the blockchain in the form of a contract code and transaction load (input). Similarly, all the participants approve the next performance step of the contract (output)[25]. In other words, both the input that activates the contract code and output achieved by the activation of contract codes are subject to the approval of the participants.

Compared to traditional contracts, smart contracts are written in a simpler and easily programmable language. Thus, they mostly use sentences with „if…, then…" templates to be translated into codes[26], for example, „if A transfers B

Review, vol. 34, nr. 4/2018, p. 849; Qiping Wang, Raymond Yiu Keung Lau and Xudong Mao, "Blockchain-Enabled Smart Contracts for Enhancing Distributor-to-Consumer Transactions", [Online] at https://ieeexplore.ieee.org/document/8889545, accessed on 03/11/2021.

[20] Nick Szabo, "Smart Contracts: Building Blocks for Digital Markets", [Online] at https://bit.ly/3cOhyual, accessed on 01/12/2019.

[21] Christopher D. Clack, Vikram A. Bakshi and Lee Braine, "Smart Contract Templates: Foundations, Design Landscape and Research Directions", [Online] at https://arxiv.org/pdf/1608.00771.pdf, accessed on 13/12/2019.

[22] Yining Hu, Madhusanka Liyanage, Ahsan Mansoor, Kanchana Thilakarathna, Guillaume Jourjon, and Aruna Seneviratne, "Blockchain-based Smart Contracts Applications and Challenges", [Online] at https://arxiv.org/pdf/1810.04699.pdf, accessed on 03/11/2021; Ahmed Kosba, Andrew Miller, Elaine Shi, Zikai Wen, and Charalampos Papamanthou, "Hawk: The Blockchain Model of Cryptography and Privacy-preserving Smart Contracts", [Online] at https://ieeexplore.ieee.org/document/7546538, accessed on 03/11/2021; Rohr, *op. cit.,* p. 72.

[23] Bodo, Gervais and Quintais, *op. cit.,* p. 315.

[24] Christidis and Devetsikiotis, *op. cit.,* p. 2296.

[25] Loi Luu, Duc-Hiep Chu, Hrishi Olickel, Prateek Saxena, and Aquinas Hobor, "Making Smart Contracts Smarter", [Online] at https://dl.acm.org/doi/10.1145/2976749.2978309, accessed on 03/11/2021.

[26] Bodo, Gervais and Quintais, *op. cit.,* p. 316; Herian, *op. cit.,* p. 16; Margo Tank, David Whitaker and Patricia Fry, "Smart Contracts, Blockchain and Commercial Law", [Online] at hhttps://bit.ly/3ifwH8U, accessed on 12/01/2020.

amount of money to the blockchain, then the contract will self-execute". No doubt, it shall be simplified further in the smart contract. On the other hand, the need for inflexible, clear, and precise language in smart contracts limits the autonomy of parties to come with complex contractual terms. Thus, smart contracts are not suitable for less stable (or programmable) contract forms containing uncertainty for now[27].

The set of promises in the smart contract comprises the obligations that more or less reflect real-world contractual conditions in the digital environment. In this regard, to self-execute, smart contracts may need data input from the outer world. The external data flow is executed via oracle systems installed on the blockchain[28]. (*See* Figure 3)
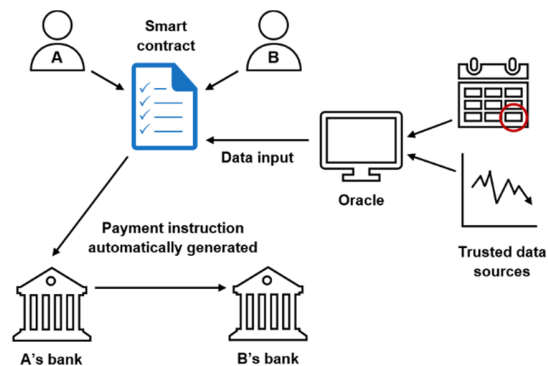

Figure 3. The Illustration of Data Flow by Oracle Programs to Smart Contracts

In principle, for performance, smart contracts do not need any additional procedure or intervention by third parties[29]. The involvement of oracle programmes does not lead to control over the transaction either. As a result, transactions speed up on the blockchain, and possible errors, delays, or cases of misunderstanding are prevented to a great extent[30]. Since smart contracts

---

[27] Temte, *op. cit.,* p. 98.

[28] *Idem*, p. 96; Maxwell and Vannieuwenhuyse, *op. cit.,* p. 25; *See also* Ortalani, *op. cit.,* p. 439; Fan Zhang, Ethan Cecchetti, Kyle Croman, Ari Juels, and Elaine Shi, "Town Crier: An Authenticated Data Feed for Smart Contracts", [Online] at https://eprint.iacr.org/2016/168, accessed on 03/11/2021; *See generally* Roman Alexander, *Das Ethereum Handbuch: Eine Anleitung in das Investieren, Anlegen und Programmieren der Blockchain-Technologie* [The Ethereum Handbook: A Guide to Investing, Creating and Programming Blockchain Technology], vol. 1, Via Tolino Media, 2017, p. 128; Yorghos Voutos, Georgios Drakopoulos and Phivos Mylonas, "Smart Agriculture: An Open Field for Smart Contracts", [Online] at https://doi.org/10.1109/SEEDA-CECNSM.2019.8908411, accessed on 03/11/2021.

[29] Karen E. C. Levy, *Book-smart, Not Street-smart: Blockchain-based Smart Contracts and the Social Workings of Law,* Engaging Science, Technology, and Society, vol. 3, nr. 2/2017, p. 2; Yavuz, *op. cit.,* p. 22; Woebbeking, *op. cit.,* pp. 106-107.

[30] Hsiao, *op. cit.,* p. 687.

self-execute as soon as encrypted obligations are fulfilled, the contractual trust sought in the traditional contracts can be said to have transformed into trust in computer codes[31].

1.2.2. *Legal Nature and Validity of Smart Contracts*

Smart contracts are not a new *type* of contract, but another digital *form* of physical contract. In the case of an investment contract between a state agency and an investor and concluded with the consensus on the party obligations, the smart contract is an encrypted form of those obligations on the blockchain. Smart contracts have been known and studied for their technical structure, rather than social and legal aspects[32]. The existence of hybrid smart contracts in practice – the contracts that are encrypted on the blockchain and concluded in writing simultaneously – may delay the discussion on the legal nature.

Even though considered as a digital reflection of traditional contracts, smart contracts are not a pure copy or reflection of traditional contracts. First, while the written traditional contracts are fixed in texts, computer codes serve the same function in smart contracts. Second, human interaction is irreplaceable in the interpretation of traditional contracts, while smart contracts, namely their pre-determined codes self-interpret the terms and conditions. Thus, for a performable smart contract, computer codes must be able to „understand" promises and match them with the condition that occurred (or failed to occur)[33].

It has been suggested that in smart-contract disputes, arbitrators can still concentrate on the meaning of encoded obligations converted into human-readable texts and treat the smart contract like a written contract[34]. However, in that case, the validity of smart contracts may be questioned because contracting parties are not playing an active role after they conclude the smart contract. Savelyev[35] argues that smart contracts cannot result in any obligation, since parties cannot interfere with the contract following the conclusion.

The validity of smart contracts has been subject to wide discussions in legal scholarship yet. Nonetheless, these discussions must not entirely disregard the role of parties in the self-executing smart contracts. Anything that happens after the conclusion of the contract is not out of the parties' control because the data input that activates the contract is actually coming from the parties' actions. Parties' intents are largely camouflaged in their implicit actions while offering or accepting

---

[31] Argun Karamanlıoğlu, *Concept of Smart Contracts: A Legal Perspective*, Kocaeli Üniversitesi Sosyal Bilimler Dergisi, nr. 35/2018, p. 31; Helen Eenmaa-Dimitrieva and Maria Jose Schmidt-Kessen, *Smart Contracts: Reducing Risks in Economic Exchange with No-Party Trust?*, European Journal of Risk Regulation, vol. 10, nr. 2/2019, p. 246.

[32] Levy, *op. cit.,* p. 2.

[33] Hsiao, *op. cit.,* pp. 689-690.

[34] Rohr, *op. cit.,* p. 85.

[35] Alexander Savelyev, *Contract Law 2.0: Smart Contracts as the Beginning of the End of Classic Contract Law*, Journal of Information & Communications Technology Law, vol. 26, nr. 2/2017, p. 128.

the transactions[36]. Parties' intentions are encoded in smart contracts to predict possible conditions of self-execution so that smart contracts can respond to those events.

2. Smart Contracts and the ICSID Investment Arbitration

2.1. Conditions of Arbitration Agreements/Clauses

Each voluntary arbitration is instituted by an arbitration agreement, including the agreements concerning investment disputes. Arbitration agreements are concluded with the expression of parties' consent either before *(clause compromissoire)* or after the dispute occurs *(compromis),* the consent that separates arbitration from litigation[37]. Today, the arbitration clauses specified in Bilateral Investment Treaties (BIT) gradually replace independent arbitration agreements signed after the dispute arises[38].

As „a fundamental tenet of the ICSID Convention"[39], arbitration is an explicit consent-based mechanism[40]. However, the nature and implications of the state consent to the ICSID arbitration in BITs have been subject to the debate where the major opinion relies on the doctrine of „arbitration without privity" and believes that the consent in the BIT means the consent of the state to arbitration in *particular* investment disputes, hence, there is no need for a separate arbitration agreement[41], the opinion in line with those of the ICSID tribunals in *AAPL v. Sri*

---

[36] *See* Karolina Kasprzyk, *The Concept of Smart Contracts from the Legal Perspective*, Review of European and Comparative Law, vol. 34, nr. 3/2018, p. 114.

[37] Ziya Akıncı, *Milletlerarası Tahkim* [International Arbitration], 3rd ed., Vedat, Istanbul, Turkey, 2013, p. 95; İnci Ataman-Figanmeşe, *Manufacturing Consent to Investment Treaty Arbitration by Means of the Notion of 'Arbitration without Privity'*, Annales de la Faculte de Droit d'Istanbul, vol. 43, nr. 60/2011, p. 189; Ceren Eyuboğlu, Türk Hukukunda Tahkim Anlaşmasının Geçerliliği [The Validity of the Arbitration Agreements in Turkish Law], Ankara Barosu Dergisi, vol. 75, nr. 3/2017, p. 235; *See also* International Centre for Settlement of Investment Disputes, "Dispute Settlement: Consent to Arbitration", [Online] at https://unctad.org/en/Docs/edmmisc232add2_en.pdf, accessed on 10/01/2020; Kaiser Bauxite Company v. Jamaica, ICSID, Decision on Jurisdiction, nr. ARB/74/3, 1975, ¶ 24; Christoph H. Schreuer, *The ICSID Convention: A Commentary*, Cambridge, 2001, p. 195.

[38] August Reinisch, Enforcement of Investment Awards, in Katia Yanacca-Small (ed.), *Arbitration under International Investment Agreements: A Guide to the Key Issues*, Oxford University Press, 2010, p. 675.

[39] Tidewater Inc., Tidewater Investment S.R.L., Tidewater Caribe C.A., and others v. The Bolivarian Republic of Venezuela, ICSID, Decision on Jurisdiction, nr. ARB/10/5, 2013, ¶ 131.

[40] Julien Fouret, Rémy Gerbay, Gloria M. Alvarez, and Denis Parchajev (eds.), *The ICSID Convention, Regulations and Rules: A Practical Commentary*, Edward Elgar Publishing, 2019, p. 9.

[41] Cemal Şanlı, *Uluslararası Ticari Akitlerin Hazırlanması ve Uyuşmazlıkların Çözüm Yolları* [Drafting International Trade Treaties and Dispute Resolution Mechanisms], 5th ed., Beta Publishing, 2013, p. 295; Ataman-Figanmeşe *op. cit.,* p. 195; Jan Paulsson, *Arbitration without Privity*, ICSID Review, vol. 10, nr. 2/1995, p. 233; Matteo M. Winkler, *Arbitration without Privity and Russian Oil: The Yukos Case before the Houston Court*, University of Pennsylvania Law Review, vol. 27, nr. 1/2006, p. 134; Christoph H. Schreuer,

Lanka[42] and *Generation Ukraine v. Ukraine[43]*. Here the investor's reference to the arbitration clause in the BIT is interpreted to the investor's consent to arbitration[44].

In addition to the uncertainties surrounding the *nature* of consent to the ICSID arbitration, the *form* of consent is also flexible under the rules and jurisprudence of the ICSID. According to the Section 24 in the reports of the ICSID Convention, „[n]or does the Convention require that the consent of both parties be expressed in a single instrument"[45]. For example, in *SPP v. Egypt[46]*, the Tribunal interpreted the unilateral promise in the Egyptian law on the submission of investment disputes to the ICSID arbitration as written consent, not a public offer like the Respondent argued. But this view has not been popular yet[47]. Besides, „most favoured nation clauses" may denote the consent to arbitration too[48].

2.2. Forms and Subject Matter of the Arbitration Agreement

The ICSID Convention regulates in Article 25(1) the arbitration agreement that establishes the jurisdiction of the ICSID arbitration tribunal and in Article 36(1) the request for arbitration. Article 25(1) of the Convention emphasizes that consent can concern any dispute arising directly out of investment and it will be in writing[49].

In addition, following Article 36(1), „any Contracting State or any national of a Contracting State wishing to institute arbitration proceedings shall address a request to that effect *in writing* to the Secretary-General who shall send a copy of

---

Denunciation of the ICSID Convention and Consent to Arbitration, in Michael Waibel, Asha Kaushal, Kyo-Hwa Chung, and Claire Balchin (eds.), *The Backlash against Investment Arbitration: Perceptions and Reality,* Wolters Kluwer, 2010, p. 357; Sedat Çal, *Uluslararası Yatırım Tahkimine Yönelik Kimi Eleştirilerin Değerlendirilmesi* [Discussion of Some Criticism about International Investment Arbitration], Ankara Üniversitesi Hukuk Fakültesi Dergisi, vol. 57, nr. 4/2008, p. 140.

[42] Asian Agricultural Products Limited v. Republic of Sri Lanka, ICSID, Award, nr. ARB/87/3, 1990, ¶ 2.

[43] Generation Ukraine v. Ukraine, ICSID, Award, nr. ARB/00/9, 2003, ¶ 12.

[44] Martins Paparinskis, *Investment Arbitration and the Law of Countermeasures*, British Yearbook of International Law, vol. 79, nr. 1/2008, p. 279.

[45] International Center for Settlement of Investment Disputes, "ICSID Convention, Regulations and Rules", [Online] at https://icsid.worldbank.org/sites/default/files/ICSID%20Convention%20English.pdf, accessed on 03/11/2021. (Hereinafter, ICSID Convention)

[46] Southern Pacific Properties (Middle East) Limited v. Arab Republic of Egypt, ICSID, Decision on Jurisdiction, nr. ARB/84/3, 1988, ¶ 115-116.

[47] Solveiga Paleviciene (Cirtautiene), *Consent to Arbitration and the Legacy of the SPP v. Egypt Case*, Baltic Journal of Law and Politics, vol. 7, nr. 1/2014, pp. 157-159.

[48] Emilio Augustin Maffezini v. The Kingdom of Spain, ICSID, Decision on Jurisdiction, nr. ARB/97/7, 2000, ¶ 64; Christoph H. Schreuer, Consent to Arbitration, in Peter Muchlinski, Federico Ortino and Christoph H. Schreuer (eds.), *The Oxford Handbook of International Investment Law,* Oxford University Press, 2008, p. 855.

[49] ICSID Convention, *op. cit.,* p. 18.

the request to the other party".[50] [emphasis added] Article 36(2) lists the information required to include in the arbitration request that is the issues in dispute, the identity of the parties, and their consent to arbitration[51]. These provisions do not regulate the arbitration *agreement* concluded between the parties, but the form and content of the arbitration *request* to be submitted to the ICSID. Nonetheless, the consent of the parties to the arbitration shall be mutual, so that it has implicitly been mentioned in the Preamble of the ICSID Convention[52]. Once the General Secretary finds the consent of parties, they record the consent and start to establish the tribunal.

Article 25(1) and 36(1) of the ICSID Convention require the written form of the arbitration agreement, but it does not explain what the written form is, or which means of communication, such as the transactions on the blockchain, falls in the written form. This gap can justify, on the one hand, an impression that any written form of arbitration agreements will meet this requirement[53]. On the other hand, according to the Rule 1 of the Rules of Procedure for the Institution of Conciliation and Arbitration Proceedings, „the request to be submitted to the Centre, shall be drawn up in an *official language* of the Centre, shall be dated, and shall be signed by the requesting party or its duly authorized representative"[54]. [emphasis added] It can be argued that the purpose of this requirement is not to exclude the consent to arbitration or arbitration agreement written in languages other than human-readable languages, such as in the programming languages. It cannot be argued that the wording of Rule 1 descopes smart contracts or the other machine-readable contractual consent relying on the ground that the discussion about the contracts written in computer codes was not actual when the ICSID Convention was drafted. Thus, the requirement of the official language of the ICSID aims to differentiate between the existing human languages and prefers the official ones.

In *Amco v. Indonesia*, the Tribunal discussed the requirement of the written consent and held that „while a consent in writing to ICSID arbitration is indispensable, since it is required by Article 25(1) of the Convention, such consent in writing is not to be expressed in a *solemn, ritual* and *unique* formulation".[55] [emphasis added] The Tribunal added that „the investment agreement being in writing, it suffices to establish that its interpretation in *good faith* shows that the parties agreed to ICSID arbitration, in order for the ICSID Tribunal to have

---

[50] *Idem*, p. 22.

[51] *Idem*.

[52] Şule Akyüz, *The Jurisdiction of ICSID: The Application of the Article 25 of the Convention on the Settlement of Investment Disputes Between States and Nationals of Other States,* Ankara University Journal of Faculty of Law, vol. 52, nr. 3/2003, p. 336; *See* ICSID Convention, *op. cit.,* p. 11.

[53] Tony Cole, *The Structure of Investment Arbitration*, Routledge, 2013, p. 27.

[54] ICSID Convention, *op. cit.,* p. 76.

[55] Amco Asia Corporation and others v. The Republic of Indonesia, ICSID, Decision on Jurisdiction, nr. ARB/81/1, 1983, ¶ 123.

jurisdiction over them"[56]. [emphasis added] In this case, the comment of the Tribunal that supported neither a narrow nor a wide/liberal interpretation of the consent to arbitration but rather gave priority to and respected the shared will of the parties while interpreting the consent to arbitration is, indeed, notable[57]. The flexibility of the understanding of the requirement of consent is not, however, limited to *Amco v. Indonesia* case. In *Holiday Inns v. Morocco[58],* the Tribunal recognized the validity of the written arbitration clause and the parties' right to benefit from the arbitration clause even though the Claimant had not signed the contract that contained the arbitration clause.

2.3. Validity of the Arbitration Clauses Contained in Smart Contracts

This paper argues that at this moment the disputes arising out of the contractual obligations agreed in smart contracts would be more adequate to arbitration than domestic litigation. The reason is the very independent and flexible characteristics of both smart contracts and arbitration compared to domestic laws[59]. Owing to the discretion allowed by the arbitration for the parties to the dispute, parties are free to choose applicable law for their smart arbitration clause.

The choice of law will allow the parties to prevent the application of *lex fori* to the arbitration agreement[60]. In principle, the judgment by the Tribunal established by the consent of the parties via the smart contract can be delivered to the smart contract via oracle programs, and the smart contract can self-execute in favour of one of the parties[61]. However, the domestic courts or arbitration centres are yet to meet the latest innovations brought by blockchain technology[62]. While this article focuses on the resolution of the dispute arising out of the online transactions on the blockchain network at an offline arbitration facility like the

---

[56] *Idem.*

[57] Benjamin H. Tahyar, *Confidentiality in ICSID Arbitration after AMCO Asia Corp. v. Indonesia: Watchword or White Elephant?*, Fordham International Law Journal, vol. 10, nr. 1/1986, p. 95.

[58] Holiday Inns S.A. and Others v. Morocco, ICSID, Decision on Jurisdiction, nr. ARB/72/1, 1974.

[59] Maxwell and Vannieuwenhuyse, *op. cit.,* p. 28.

[60] *See also* Mustafa Erkan, *Tahkim Şartının Ayrılabilirliği Prensibinin Asıl Sözleşmenin Yokluğu Durumunda Değerlendirilmesi* [Discussing the Principle of Separability of the Arbitration Clause in the Nullity of the Main Agreement], Gazi Üniversitesi Hukuk Fakültesi Dergisi, vol. 17, nr. 1-2/2013, p. 542.

[61] Maxwell and Vannieuwenhuyse, *op. cit.,* p. 29.

[62] Gürkaynak and others, *op. cit.,* p. 854; Aslı Budak and Seher Elif Köse, "Turkey: Arbitration in the Era of Smart Contracts", [Online] at https://www.mondaq.com/turkey/fin-tech/841140/arbitration-in-the-era-of-smart-contracts, accessed on 19/09/2021.

ICSID, the legal scholarship has lately also been discussing online arbitration[63] that can be extended to online subject matters shortly.

Article 42(1) of the ICSID Convention accepts the choice of law by the parties to apply to the investment dispute that „the Tribunal shall decide a dispute in accordance with such rules of law as may be agreed by the parties"[64] while highlighting that „in the absence of such agreement, the Tribunal shall apply the law of the Contracting State party to the dispute (including its rules on the conflict of laws) and such rules of international law as may be applicable".[65]

"Rules of law" mentioned in Article 42(1) covers both the substantial and procedural rules of the dispute. In other words, Article 42(1) allows the parties of the dispute to choose the rules to apply to the validity of the arbitration agreement. If such a choice has never been made, the rules specified in the subsequent sentences of Article 42(1) shall be applied. In this case, a reference to the rules of the contracting state party on the conflict of laws may cause uncertainty[66]. That is why the choice of law by the parties in the disputes arising out of smart contracts should be friendly to smart contracts. In this way, the parties may abstain the Tribunal from declaring null and void the arbitration agreement concluded in the form of the smart contract, merely because of its form of expression. Another question in this stage would be whether there is any law that validates smart contracts in terms of the formal requirements, and luckily, the answer is affirmative.

The Uniform Electronic Transactions Act 1999 (UETA) proposed by the Uniform Laws Commission of the United States recognizes the contracts agreed and concluded in the electronic environment. According to Section 7(b) of the UETA, which regulates the validity of electronic records, signature, and contracts, „[a] contract may not be denied legal effect or enforceability solely because an electronic record was used in its formation"[67]. Moreover, according to Article 14(1) of the UETA on the automated transactions executed and performed via electronic agents, „[a] contract may be formed by the interaction of electronic agents of the parties, even if no individual was aware of or reviewed the electronic agents' actions or the resulting terms and agreements"[68].

---

[63] Ihab Amro, *Online Arbitration in Theory and Practice: A Comparative Study of Cross-border Commercial Transactions in Common Law and Civil Law Countries*, Cambridge Scholars, 2019, p. 236; Amy J. Schmitz and Colin Rule, *Online Dispute Resolution for Smart Contracts*, Journal of Dispute Resolution, vol. 2, nr. 1/2019, p. 103-105; Farzaneh Badiei, "Online Arbitration Definition and Its Distinctive Features", [Online] at https://www.semanticscholar.org/paper/Online-Arbitration-Definition-and-its-Distinctive-Badiei/3c644e47189165e14031370a841d96ad7bb6d12b, accessed on 03/11/2021.

[64] ICSID Convention, *op. cit.,* p. 23.

[65] *Idem.*

[66] Emmanuel Gaillard, *Some Notes on the Drafting of ICSID Arbitration Clauses*, ICSID Review, vol. 3, nr. 1/1988, p. 144.

[67] Uniform Laws Commission, "Uniform Electronic Transactions Act", [Online] at https://trackbill.com/bill/illinois-senate-bill-2176-uniform-electronic-transaction/2053114/, accessed on 03/11/2021.

[68] *Idem.*

UETA does not change the existing laws in force but aims to eliminate the legal impediments in front of the use of electronic devices to ensure the equal treatment of electronic records, signature with a written record, and signature. It has been presented to all states and succeeded except in Washington[69]. In terms of smart contracts, the states like Ohio, Nevada, Tennessee[70], Illinois and Arizona[71], have already been regulating them by law. According to Article 5 in Chapter 26 (Electronic Transactions) of Arizona Revised Statutes, „smart contracts may exist in commerce. A contract relating to a transaction may not be denied legal effect, validity or enforceability solely because that contract contains a smart contract term".[72]

The contract and transactions made by electronic agents on behalf of the persons they represent shall be considered valid. The absence of human interaction or interference with such contracts either in the conclusion or performance phases does not render the contract invalid. However, the electronic agent must be expected not to lose its electronic-agent image and deviate from the will of the represented person. As the parties to the smart contract can freely write down the codes, it is not likely to cause a problem, unless the applicable law has been chosen as the state law other than Washington. The state laws like Arizona, Illinois, Ohio, Nevada, or Tennessee that have legislation on smart contracts and electronic agents would be a preferable or smart-contract-friendly choice of law for parties. In any case, it is recommended to the parties to draft both online and offline (hybrid) arbitration agreements until that time when the legislation on smart contracts gains enough recognition to overcome the procedural obstacles in dispute resolution[73].

2.4. Drafting Model Smart Arbitration Clauses

The smart arbitration agreement, even if it is in the form of computer codes, must include the subject matter of the dispute, the identity, and the consent of the parties. On the other hand, it must be as simple as possible for computer codes but comprehensive enough to cover the required information sought by the ICSID.

The ICSID model arbitration clauses have so far either referred to any dispute arising out of the agreement without distinguishing between the disputes or concerned only a certain type of disputes[74]. The second type of model arbitration clause uses the exhaustive list of the disputes to be submitted to the ICSID

---

[69] *See* Tank, Whitaker, and Fry, *op. cit.,* p. 40.

[70] *Idem*, p. 48.

[71] Herian, *op. cit.,* pp. 16-17.

[72] State of Arizona, "Arizona Revised Statutes", [Online] at https://www.azleg.gov/legtext/53leg/1r/bills/hb2417p.pdf, accessed on 03/11/2021.

[73] Herian, *op. cit.,* p. 30.

[74] *See* International Centre for Settlement of Investment Disputes, "ICSID Model Clauses", [Online] at https://icsid.worldbank.org/resources/content/model-clauses, accessed on 03/11/2021.

arbitration. Hence, those clauses cannot be invoked in every dispute arising directly out of the investment.

It is necessary to make this distinction for smart contracts, because, in the case of the first type of model arbitration clauses, the contract will submit the case to the ICSID arbitration after the reception of information about the investment dispute by expressing the parties' identity, consent, and the subject matter. In contrast, in the second type of model arbitration clauses, the smart contract will be expected to decide whether the dispute matches the ones pre-determined by the contracting parties on a case-to-case basis. Considering the inflexible characteristics and necessarily simple algorithms, the second type of model arbitration clauses are seemingly not useful for smart contracts.

To integrate the first type of model arbitration clauses into the smart contract, the arbitration clause written and later encoded with the „if..., then..." template is required. For example, „if any dispute arising out of this contract arises, then the contract will not be performed and an arbitration request, including the subject matter of the dispute, will be submitted to the ICSID". Of course, this text needs to be encoded on the Ethereum platform, for example, specifying the ICSID with the public key of the node representing the ICSID or clarifying how the smart contract will get information about the dispute. In fact, after the dispute arises, the parties both or unilaterally can invoke the arbitration clause with their private keys on the blockchain. This activation can be otherwise executed by the oracle programs with data input.

Conclusion

The areas of application of smart contracts have been growing every day, weakening the need for the power of the central authority every day. In addition to online arbitration, the status of the disputes arising out of online (blockchain) transactions in offline arbitration can turn into a matter of dispute. For the ICSID arbitration, the smart-contract-friendly choice of law applied, among others, to the validity of an agreement can be effective in preventing objections on formal contractual requirements. The choices of the law of the states like Arizona, Illinois or Nevada can be advantageous.

However, such smart arbitration clauses must be encoded with „if..., then..." templates clearly and precisely enough to describe in which matters of a dispute the clause will self-execute and apply to the ICSID. One valid smart arbitration clause could be the encoded version of „if any dispute arising out of this contract arises, then the contract will not be performed and an arbitration request, including the subject matter of the dispute, will be submitted to the ICSID". In case of the identification of the dispute by smart contracts, if the smart contract can submit the information to the public key of the ICSID, the arbitration clause should be valid and the ICSID arbitration should be properly established, subject to the existence of other conditions. The interpretation of the formal requirement of the written consent under the ICSID Convention and further rules in *Amco v. Indonesia*

and the reports of the ICSID Convention is seemingly flexible and supports the determination of the consent in good faith.

For the recognition and enforcement of smart contracts in arbitration, the institutional arbitration centres, including the ICSID, should be equipped with the required technical capacity. Until that time, hybrid smart contracts are apparently a better alternative to prevent cases of misunderstanding or invalidity.

References

Akca Sefa, Ajitha Rajan and Chao Peng. „SIF: A Framework for Solidity Contract Instrumentation and Analysis". https://doi.org/10.1109/APSEC48747.2019.00071

Akıncı, Ziya. Milletlerarası Tahkim [International Arbitration]. 3rd ed., Vedat. Istanbul, Turkey. 2013

Akyüz, Şule. *The Jurisdiction of ICSID: The Application of the Article 25 of the Convention on the Settlement of Investment Disputes Between States and Nationals of Other States.* Ankara University Journal of Faculty of Law. vol. 52. nr. 3/2003. pp. 333-362. https://doi.org/10.1501/Hukfak_0000000523

Alexander, Roman. *Das Ethereum Handbuch: Eine Anleitung in das Investieren, Anlegen und Programmieren der Blockchain-Technologie* [The Ethereum Handbook: A Guide to Investing, Creating and Programming Blockchain Technology]. vol. 1. Via Tolino Media. 2017

Amro, Ihab. *Online Arbitration in Theory and Practice: A Comparative Study of Cross-border Commercial Transactions in Common Law and Civil Law Countries.* Cambridge Scholars. 2019. https://doi.org/10.5553/ijodr/235250022020007002005

Ataman-Figanmeşe, İnci. *Manufacturing Consent to Investment Treaty Arbitration by Means of the Notion of 'Arbitration without Privity'.* Annales de la Faculte de Droit d'Istanbul. vol. 43. nr. 60/2011. pp. 187-201

Atkinson, Susan, and Gabrielle Benefield. „Software Development: Why the Traditional Contract Model is not Fit for Purpose". https://doi.org/10.1109/hicss.2013.492

Badiei, Farzaneh. „Online Arbitration Definition and Its Distinctive Features". [Online]

Ben Ayed, Ahmed. *A Conceptual Secure Blockchain-based Electronic Voting System.* International Journal of Network Security & Its Applications. vol. 9, nr. 3/2017. pp. 1-9. https://doi.org/10.5121/ijnsa.2017.9301

Bodo, Balazs, Daniel Gervais, and Joao Pedro Quintais. *Blockchain and Smart Contracts: The Missing Link in Copyright Licensing?.* International Journal of Law and Information Technology. vol. 26. nr. 4/2018. pp. 311-336. https://doi.org/10.1093/ijlit/eay014.

Budak, Aslı, and Seher Elif Köse. „Turkey: Arbitration in the Era of Smart Contracts". [Online]

Bulut, Rumeysa, Alperen Kantarcı, Safa Keskin, and Şerif Bahtiyar. „Blockchain-based Electronic Voting System for Elections in Turkey". https://doi.org/10.1109/ubmk.2019.8907102.

Christidis, Konstantinos and Michael Devetsikiotis. *Blockchains and Smart Contracts for the Internet of Things.* IEEE Access. vol. 4. nr. 1/2016. pp. 2292-2303. https://doi.org/10.1109/access.2016.2566339.

Clack, Christopher D., Vikram A. Bakshi, and Lee Braine. „Smart Contract Templates: Foundations, Design Landscape and Research Directions". [Online]

Cole, Tony. *The Structure of Investment Arbitration.* Routledge. 2013. https://doi.org/10.4324/9780203758755.

Çal, Sedat. *Uluslararası Yatırım Tahkimine Yönelik Kimi Eleştirilerin Değerlendirilmesi* [Discussion of Some Criticism about International Investment Arbitration]. Ankara

Üniversitesi Hukuk Fakültesi Dergisi. vol. 57. nr. 4/2008. pp. 135-190. https://doi.org/10.1501/hukfak_0000001550

Eenmaa-Dimitrieva, Helen, and Maria Jose Schmidt-Kessen. *Smart Contracts: Reducing Risks in Economic Exchange with No-Party Trust?*. European Journal of Risk Regulation. vol. 10. nr. 2/2019, pp. 245-262, https://doi.org/10.1017/err.2019.37

Erkan, Mustafa. *Tahkim Şartının Ayrılabilirliği Prensibinin Asıl Sözleşmenin Yokluğu Durumunda Değerlendirilmesi* [Discussing the Principle of Separability of the Arbitration Clause in the Nullity of the Main Agreement]. Gazi Üniversitesi Hukuk Fakültesi Dergisi. vol. 17. nr. 1-2/2013. pp. 535-562.

Eyuboğlu, Ceren. Türk Hukukunda Tahkim Anlaşmasının Geçerliliği [The Validity of the Arbitration Agreements in Turkish Law]. Ankara Barosu Dergisi. vol. 75. nr. 3/2017. pp. 227-241, https://doi.org/10.30915/abd.463759

Fouret, Julien, Rémy Gerbay, Gloria M. Alvarez, and Denis Parchajev (eds.). *The ICSID Convention, Regulations and Rules: A Practical Commentary*. Edward Elgar Publishing. 2019. https://doi.org/10.4337/9781786435248.

Gaillard, Emmanuel. *Some Notes on the Drafting of ICSID Arbitration Clauses*. ICSID Review. vol. 3. nr. 1/1988. 136-146. https://doi.org/10.1093/icsidreview/3.1.136.

Gurkaynak, Gonenc, İlay Yılmaz, Burak Yeşilaltay, and Berk Bengi. *Intellectual Property Law and Practice in the Blockchain Realm*. Computer Law and Security Review. vol. 34. nr. 4/2018. pp. 847-862. https://doi.org/10.1016/j.clsr.2018.05.027.

Herian, Robert. „Legal Recognition of Blockchain Registries and Smart Contracts". https://doi.org/10.13140/RG.2.2.12449.86886/1.

Hsiao, Jerry. *'Smart Contract' on the Blockchain Paradigm Shift for Contract Law?*. US-China Law Review. vol. 14. nr. 10/2017. pp. 685-694. https://doi.org/10.17265/1548-6605/2017.10.002.

Hu, Yining, Madhusanka Liyanage, Ahsan Mansoor, Kanchana Thilakarathna, Guillaume Jourjon, and Aruna Seneviratne. „Blockchain-based Smart Contracts Applications and Challenges". [Online]

International Centre for Settlement of Investment Disputes. „Dispute Settlement: Consent to Arbitration". [Online]

Junis, Fengkie, Faisal Malik Widya Prasetya, Farouq Ibrahim Lubay, and Anny Kartika Sari. „A Revisit on Blockchain-based Smart Contract Technology". [Online]

Karamanlıoğlu, Argun. *Concept of Smart Contracts: A Legal Perspective*. Kocaeli Üniversitesi Sosyal Bilimler Dergisi. nr. 35/2018. pp. 29-42.

Kasprzyk, Karolina. *The Concept of Smart Contracts from the Legal Perspective*. Review of European and Comparative Law. vol. 34. nr. 3/2018. pp. 101-118. https://doi.org/10.31743/recl.4514

Levy, Karen E. C. *Book-smart, Not Street-smart: Blockchain-based Smart Contracts and the Social Workings of Law*. Engaging Science, Technology, and Society. vol. 3. nr. 2/2017. pp. 1-15. https://doi.org/10.17351/ests2017.107

Luu, Loi, Duc-Hiep Chu, Hrishi Olickel, Prateek Saxena, and Aquinas Hobor. „Making Smart Contracts Smarter". https://doi.org/10.1145/2976749.2978309

Maxwell, Winston and Gauthier Vannieuwenhuyse. *Robots Replacing Arbitrators: Smart Contract Arbitration*. ICC Dispute Resolution Bulletin. vol. 1. nr. 1/2018. pp. 24-33

Milk, Eliza. *Smart Contracts: Terminology, Technical Limitations and Real World Complexity*. Journal of Law, Innovation and Technology. vol. 9. nr. 2/2017

Nandar Aung, Yu and Thitinan Tanditham, „Ethereum-based Emergency Service for Smart Home System: Smart Contract Implementation", https://doi.org/10.23919/icact.2019.8701987

Ortalani, Pietro. *The Impact of Blockchain Technologies and Smart Contracts on Dispute Resolution: Arbitration and Court Litigation at the Crossroads*. Uniform Law Review. vol. 24. nr. 2/2019. pp. 430-448

Paleviciene (Cirtautiene), Solveiga. *Consent to Arbitration and the Legacy of the SPP v. Egypt Case*. Baltic Journal of Law and Politics. vol. 7. nr. 1/2014. pp. 149-162. https://doi.org/10.2478/bjlp-2014-0009

Paparinskis, Martins. *Investment Arbitration and the Law of Countermeasures*. British Yearbook of International Law. vol. 79. nr. 1/2008. pp. 264-352. https://doi.org/10.2139/ssrn.1152338

Paulsson, Jan. *Arbitration without Privity*. ICSID Review. vol. 10. nr. 2/1995. pp. 232-257. https://doi.org/10.1093/icsidreview/10.2.232

Reinisch, August. Enforcement of Investment Awards, in Katia Yanacca-Small (ed.). *Arbitration under International Investment Agreements: A Guide to the Key Issues*. Oxford University Press. 2010. pp. 671-699. https://doi.org/10.1093/law/9780198758082.003.0029

Rohr, Jonathan G. *Smart Contracts and Traditional Contract Law, or: The Law of Vending Machine*. In Cleveland State Law Review. vol. 67. nr. 1/2019. pp. 71-92

Savelyev, Alexander. *Contract Law 2.0: Smart Contracts as the Beginning of the End of Classic Contract Law*. Journal of Information & Communications Technology Law. vol. 26. nr. 2/2017. pp. 116-134. https://doi.org/10.2139/ssrn.2885241

Schmitz, Amy J., and Colin Rule. *Online Dispute Resolution for Smart Contracts*. Journal of Dispute Resolution. vol. 2. nr. 1/2019. pp. 103-125

Schreuer, Christoph H. Consent to Arbitration. In Peter Muchlinski, Federico Ortino and Christoph H. Schreuer (eds.). *The Oxford Handbook of International Investment Law*. Oxford University Press. 2008. pp. 830-867. https://doi.org/10.1093/oxfordhb/9780199231386.013.0021

Schreuer, Christoph H. Denunciation of the ICSID Convention and Consent to Arbitration, in Michael Waibel, Asha Kaushal, Kyo-Hwa Chung, and Claire Balchin (eds.). *The Backlash against Investment Arbitration: Perceptions and Reality*. Wolters Kluwer. 2010. pp. 353-368

Schreuer, Christoph H. *The ICSID Convention: A Commentary*. Cambridge. 2001

Shehata, Ibrahim. „Smart Contracts & International Arbitration". https://doi.org/10.2139/ssrn.3290026

Sklaroff, Jeremy M. *Smart Contracts and the Cost of Inflexibility*. University of Pennsylvania Law Review. vol. 166. nr. 1/2017. pp. 264-303

Szabo, Nick. „Smart Contracts: Building Blocks for Digital Markets". [Online]

Şanlı, Cemal. *Uluslararası Ticari Akitlerin Hazırlanması ve Uyuşmazlıkların Çözüm Yolları* [Drafting International Trade Treaties and Dispute Resolution Mechanisms]. 5th ed., Beta Publishing. 2013

Tahyar, Benjamin H. *Confidentiality in ICSID Arbitration after AMCO Asia Corp. v. Indonesia: Watchword or White Elephant?*. Fordham International Law Journal. vol. 10. nr. 1/1986. pp. 93-122

Tank, Margo, David Whitaker, and Patricia Fry. „Smart Contracts, Blockchain and Commercial Law". [Online] at hhttps://bit.ly/3ifwH8U. accessed on 12/01/2020

Voutos, Yorghos, Georgios Drakopoulos, and Phivos Mylonas. „Smart Agriculture: An Open Field for Smart Contracts". https://doi.org/10.1109/seeda-cecnsm.2019.8908411

Wang, Qiping, Raymond Yiu Keung Lau, and Xudong Mao. „Blockchain-Enabled Smart Contracts for Enhancing Distributor-to-Consumer Transactions". https://doi.org/10.1109/mce.2019.2941346

Winkler, Matteo M. *Arbitration without Privity and Russian Oil: The Yukos Case before the Houston Court.* University of Pennsylvania Law Review. vol. 27. nr. 1/2006. pp. 115-153

Woebbeking, Maren K. *The Impact of Smart Contracts on Traditional Concepts of Contract Law, Journal of Intellectual Property.* Information Technology and Electronic Commerce Law. vol. 10. nr. 1/2019. pp. 105-112

Yavuz, Melih Sefa. *Ekonomide Dijital Dönüşüm: Blockchain Teknolojisi ve Uygulama Alanları Üzerinde Bir İnceleme* [Digital Revolution in Economy: A Study on the Blockchain Technology and Its Areas of Application]. Finans Ekonomi ve Sosyal Araştırmalar Dergisi. vol. 4. nr. 1/2019. pp. 15-29. https://doi.org/10.29106/fesa.498053

Zhang, Fan, Ethan Cecchetti, Kyle Croman, Ari Juels, and Elaine Shi. „Town Crier: An Authenticated Data Feed for Smart Contracts". https://doi.org/10.1145/2976749.2978326

Zheng, Zibin, Shaoan Xie, Hongning Dai, Xiangping Chen, and Huaimin Wang. „An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends". https://doi.org/10.1109/bigdatacongress.2017.85