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Legal Regulation for Resolving Smart Commercial Contract Disputes through Smart Arbitration in Jordanian law

[1]Dr. Hassan Sami Alabady, [2]Dr. Shereen Abu Ghazaleh

[1]Associate Professor of Law - Faculty of Business - Amman Arab University

(جامعة عمان العربية), The Hashemite Kingdom of Jordan

Email: h.alabady@aau.edu.jo

https://orcid.org/0000-0003-4688-2953

[2]Associate Professor of Law - Faculty of Law - Amman Arab University

(جامعة عمان العربية), The Hashemite Kingdom of Jordan

Email: shereen@aau.edu.jo

http://orcid.org/0009-0000-1572-5731

Abstract

The tremendous development in smart technologies has made its entry inevitable in various fields, and one of these fields is contracting through smart methods that are characterized by unconventional methods based on artificial intelligence techniques. Therefore, the matter requires unconventional (smart) methods for alternative means of litigation, which is through smart arbitration. this paper examines these smart technologies and their future risks to ensure their proper application and address the expected problems. it discusses arbitration development, the nature between smart contracts and smart arbitration, smart arbitration for smart contracts disputes settlements, Smart arbitration technology for smart contracts more transparent and confidential, the mechanism of smart contracts working on the Block Chain system in smart arbitration, Oracle as an auxiliary and supportive system for smart arbitration and Admission of rulings issued by smart arbitration.

Key words: Artificial Arbitration, Smart Judiciary, Artificial Intelligence, Smart contracts, Block chain, Oracle.

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1.General Introduction

Arbitration has long been a recognized method of resolving disputes, dating back to times before Islam. The Arabs had their own arbitrators whom they often sought out due to the absence of formal religions and laws during that era. Arbitrators were chosen for their wisdom, intelligence, and integrity (Al-Albani, 1989).

With the rise of Islam, arbitration became a customary approach to resolving disputes across all domains. A verse was revealed concerning family conflicts, as outlined in Surah An-Nisa, verse 35: "And if you fear a discord between them, then send an arbitrator from his family and an arbitrator from her family. If they seek reconciliation, God will bring about reconciliation between them. Indeed, God is All-Knowing and Acquainted." This verse underscores the significance of arbitration as a recognized judicial concept, particularly given its familiarity to the Arab community (Al-Qudah, 2023)).

In modern times, the judiciary has become the primary entity holding public jurisdiction, yet individuals are allowed to depart from this norm by opting for arbitration (Al-Zoubi, 2020). In the Hashemite Kingdom of Jordan, the first law governing arbitration procedures was Law No. 18 of 1953, with subsequent amendments up to 2024, regulating arbitration processes.

Most commercial dispute settlements may be linked to arbitration. Due to the expansion of business in general and the entry of electronic business into most areas of commerce at the present time, such that the use of the Internet has become the prevailing mode of implementing commercial contracts. With the increase of these businesses and the speed of their environment, it has resulted in many problems and disputes, and our urgent need for an environment fast and accurate judicial process to resolve disputes, on the one hand, away from traditional methods of litigation that take time and complex judicial procedures, and on the other hand, to overcome problems of conflict of laws if the parties are of different nationalities and reside in multiple countries. All of this makes the traditional judiciary not currently suitable for the fast-paced commercial environment.

Some people define this type of arbitration as the choice of the parties to a dispute in a commercial relationship by waiving their right to resort to the ordinary judiciary to decide on a ruling binding on them through the use of electronic means (Al-Saidi and Taha, 2021). National courts may not be suitable for resolving blockchain disputes. When disputes arise online and affect users from different parts of the world, online dispute resolution also removes challenges regarding which national jurisdiction should hear the case (Reidenberg and others, 2005).

Until it has reached its peak at the present time, which is smart commercial arbitration, according to artificial intelligence techniques, is the focus of our research. Blockchain technologies for smart contracts are among the modern systems associated with artificial intelligence. These technologies can be leveraged in the legal and judicial field by integrating them into the dispute settlement system through smart arbitration. Some believe that Blockchain technology is suitable as a means of electronic proof compared to its counterparts from other electronic means because it fulfils all the legal conditions, enabling it to hold legal authority in proof (Abd-Elmobdy, 2023). These smart technologies are less likely to generate disputes due to their lack of ambiguity. Their performance is reliable - akin to any database - and, most importantly, they are resistant to tampering (Andrew, 2022).

Therefore, this research will address the solid infrastructure for the operation of this technology in the field of arbitration as an auxiliary element in developing alternative dispute solutions for smart commercial contracts. The authors herein have previously addressed the existence of an electronic court (Abu Talib & Abu Ghazaleh, 2018), as well as the smart electronic court in the Jordanian legislation, relying on artificial intelligence (Alabady, Smart Electronic Court, 2022). Further, there was research in terms of the legal regulation of smart devices and systems in the Jordanian legislation, which was also researched according to artificial intelligence systems (Alabady, Smart Robots, 2023). However, some asked the Jordanian legislator to develop the rules of civil law by regulating responsibility around the artificial intelligence system, to reach all areas of artificial intelligence (Al-Daja, 2023). Combining smart arbitration technology with smart contracts and artificial intelligence will enable us to achieve an improvement in the level of cybersecurity because it will hinder any fraudulent activity due to the characteristics of these systems with encryption, transparency, and confidentiality, and thus will provide smart arbitration with a secure platform for resolving smart contract disputes (Shehata, 2018).

Therefore, in this study, we will discuss the advantages of smart arbitration in general, and smart contracts in general. Then, we will explain a specific type of smart arbitration, focusing on resolving smart commercial contracts disputes through smart arbitration.

Research Problem

This research examines the organization of smart contracts that operate with blockchain technology and the use of smart arbitration as a means to settle disputes that arise from smart contracts by the Jordanian

legislator in light of the legislative and judicial environment in Jordan. Therefore, the research will address the following issues:

1- Are the mechanisms of electronic commercial arbitration identical to smart commercial arbitration?

2- Is the adequacy of Jordanian legislation to recognize smart arbitration for smart commercial contracts sufficient?

3- Is the Oracle system considering an electronic intermediary equivalent to human intermediary elements to support arbitration?

4- What is the extent of the difficulties in implementing smart arbitrator rulings in the country of their implementation?

Research Objectives

Building upon the afore mentioned inquiries, the authors endeavour to address and interpret these questions, devise solutions, and recommend legislative provisions in the presence of legal gaps, given the contemporary nature of the technology under consideration. The utilization of smart contract technology (Blockchain) to facilitate the resolution of disputes through innovative methods, notably smart commercial arbitration, is the focal point. Nonetheless, potential legal or judicial challenges may surface prior to, during, or subsequent to the implementation of this modern mechanism within commercial arbitration contexts.

Research Scope

The scope of this research is delimited to assessing the viability of endorsing smart commercial arbitration rulings grounded on blockchain technology within Jordanian national courts and exploring the feasibility of establishing a legal framework to legitimize arbitration decisions issued by specialized entities in this domain.

Methodology

This study will employ a descriptive and analytical methodology, elucidating the most recent developments in legal scholarship within this realm. Additionally, insights from the legal frameworks governing this subject in jurisdictions that have made significant strides in incorporating artificial intelligence methodologies in the judicial domain will be sought. The application of blockchain technology in commercial arbitration represents a singular facet of these advancements.

2- Arbitration Development

The evolution of international commercial arbitration throughout the twentieth century has been noteworthy. However, contemporary advancements in technology, particularly digitalization, artificial intelligence (AI), and blockchain technology, are currently reshaping the traditional structure and procedures of arbitration (Eidenmüller, Varesis, 2020).

As we move towards the establishment of smart electronic commercial arbitration, the principles of arbitration have undergone several transformations that signify the progression towards this sophisticated form of arbitration, as outlined below:

Second Stage - Electronic Commercial Arbitration

The emergence of electronic commercial arbitration is a direct outcome of the evolution of commercial enterprises and the mechanisms designed to safeguard them. Therefore, electronic commercial arbitration is contextualized within this framework to imbue its regulations with the necessary legal foundations for enforcement (Al-Haifi & Abu Mughli, 2013). The advancements in electronic science and the proliferation of electronic contracts among parties from diverse nationalities and jurisdictions necessitate expeditious dispute resolution. Consequently, the Jordanian legislator has aligned with this progression by empowering the arbitration panel to leverage modern tools. Hence, we are witnessing the advent of electronic arbitration, notwithstanding the absence of specific domestic legislation governing electronic arbitration (Al-Zoubi, 2020).

However, electronic arbitration has been increasingly utilized for the resolution of commercial disputes. Thus, the legal framework governing this form of arbitration must align with the provisions of international treaties and agreements pertaining to arbitration, as well as those agreements concerning the recognition and enforcement of foreign judgments (Al-Qudah, 2023).

Furthermore, numerous agreements have proliferated that recognize contracts concluded and executed electronically. For instance, Article 2.1.1 of the Unidroit Principles for International Commercial Contracts of 2016 addresses contracts incorporating automated performance arrangements, wherein parties agree to utilize self-executing electronic platforms without the need for human intervention to ensure contract implementation (UNIDROIT Principles, 2016). Additionally, Article 11 of the UNCITRAL Model Law on Electronic Commerce stipulates that offers can be expressed and accepted through data messages, which are accorded legal validity. Similarly, Article 2 of the UNCITRAL Model Law on Electronic Commerce defines "data messages" not only as electronically exchanged communications but also as computer-generated records not intended for communication (UNCITRAL Model Law on E-Commerce, 1985). When arbitration pertains to commercial contracts involving such practices, it should adhere to international commercial customs codified in model contracts. Thus, here the arbitrator is not left with discretionary freedom, but rather rules in accordance with these controls. (Sadi, 2013).

The Final Stage - Smart Electronic Commercial Arbitration

Smart commercial arbitration represents a recent technological innovation that has emerged worldwide. Most countries have yet to incorporate regulations specifically addressing this form of arbitration in their legal frameworks. Instead, some nations have embraced smart arbitration akin to the adoption of various artificial intelligence methodologies. However, the prospect of comprehensive legal regulation for this advanced form of arbitration or the development of specialized codes by international arbitration bodies for smart arbitration appears imminent. These codes would serve as a foundation for parties seeking to resolve disputes through this innovative arbitration mechanism.

Simultaneously, the evolution of digitization, artificial intelligence, and smart contracts leveraging blockchain technology has commenced, with these tools being increasingly utilized to enhance the efficiency and efficacy of arbitration. Smart machines are capable of rendering more rational and impartial decisions compared to traditional arbitration practices. The COVID-19 pandemic has further catalysed the adoption of smart technologies (Eidenmüller and Varesis, 2020).

However, it is worth noting that smart arbitration is the appropriate solution for all commercial smart contracts, the subject of our research, that the parties agree to resort to. This arbitration is not conducted in the traditional method of arbitration through human arbitrators or solely through software communication (electronic arbitration). Instead, arbitration is carried out in smart ways using specialized software managed with techniques related to artificial intelligence and specific kinds of smart contracts. This type of arbitration is referred to as “smart arbitration for smart contracts.” However, this smart arbitration requires special regulations and legislation, as neither the traditional rules of arbitration nor the rules for electronic arbitration are sufficient.

The authors believe that the application of these smart techniques presented by smart contracts in the Hashemite Kingdom of Jordan should be gradual. It is recommended to start by applying this type of arbitration to simple cases and smart commercial contracts. This approach will be appropriate for resolving smart commercial contracts, as the arbitrator's discretionary power is very limited in smart commercial arbitration for smart contracts. The arbitrator's work is carried out using special algorithms for smart arbitration. Those algorithms govern the vaulation of any party to the terms of the contract fairly and strictly, while this discretionary power of the traditional arbitrator is very broad, and therefore smart arbitration will be more transparent and closer to justice than traditional arbitration.

3. The Nature between Smart Contracts and Smart Arbitration

Smart arbitration in the context of smart commercial contracts is integrated into the smart contracts themselves, typically in the form of a condition or provision, to facilitate the resolution of disputes arising

from these self-executing agreements. As such, smart arbitration can be classified as a type of arbitration that leverages artificial intelligence techniques to settle commercial disputes within smart contracts, offering a high level of security and resilience against tampering. The smart arbitration process is inherently connected to the smart contract, ensuring that any breaches of contract terms by either party are automatically referred to this advanced form of arbitration for resolution.

This technology serves as a cornerstone of trust for traders and promotes investment by establishing a reliable mechanism for financial transactions based on smart contracts, thereby mitigating the shortcomings of traditional contracts. Furthermore, the sophisticated mechanisms and algorithms underlying smart arbitration enable the resolution of a wide range of disputes (Bruschi, Tumiati, Rana, Bianchi, & Sciuto, 2022).

Nevertheless, the authors posit that the rise of smart arbitration can be attributed to the advancement of commercial transactions beyond traditional software frameworks, with an increasing reliance on artificial intelligence software and smart contracts. While these contemporary contracts offer numerous benefits, their novelty may give rise to various challenges and complexities in practice.

The UNCITRAL Convention on Electronic Communications in International Contracts provides legal recognition for arbitrations on blockchains (United Nations Convention on the Use of Electronic Communications in International Contracts, 2007). Many countries have also amended their Uniform Electronic Transactions Acts (UETA) to address blockchain and smart contracts. In 2019, the British judiciary published a legal statement expressing the view that smart contracts are contracts under English law. In 2021, for the first time in the history of blockchain arbitration, Mexican courts imposed an arbitration award based on a smart arbitration protocol (Chevalier, 2022). Therefore, the authors suggest that the Jordanian legislature include explicit terms in the electronic transaction law that acknowledge the process of arbitration of smart contracts.

Smart contracts are known by several names, including smart contracts, blockchain, self-executing contracts, and crypto contracts (Farid, 2022). In this context, the authors will clearly refer to them as smart contracts, as they are closely aligned with Arab jurisprudence, where contracts operate with intelligence that can be determined by artificial intelligence. The term 'blockchain' will also be used, as these contracts operate on a complex chain internally using algorithms to protect them from being hacked.

The link between two smart programs: smart arbitration and smart contracts. Smart contracts pose a potential challenge in artificial intelligence technologies. Some proponents of this viewpoint argue that if an intelligent electronic system is available, it will generate, store, analyse, and transmit information to another smart device based on pre-programmed commands and requests (Al-Hamouri, 2024). Upon receiving the information, the other device will analyse or implement it.

To illustrate this concept in our research, we can depict the smart contract as the first device. In the event of a contract breach between the parties, the smart contract will analyse and interpret the breach to confirm its violation of the contract terms. Subsequently, based on predetermined instructions, it will transmit the breach data to the second device, which acts as a smart arbitrator. The arbitrator will interpret the breach in an intelligent and legal manner and issue a ruling. If there exists an electronic or smart court, the smart arbitrator (represented by the second device) will forward the case to the electronic or smart court (represented by the third device). This court serves as the platform for executing the ruling.

By interconnecting a network of smart technologies, they can perform their designated functions without human intervention, except for supervision.

Some believe that with the advancement of smart arbitration techniques and self-execution capabilities without intermediaries, smart arbitration will usher in a new era for resolving disputes without the need for human elements like arbitrators and mediators. This form of arbitration is seen as a highly effective means of settling disputes, particularly in the realm of commercial smart contracts, provided it is aligned with operational mechanisms. It has the potential to seamlessly integrate with smart contracts and effectively address their anticipated future disputes (Wiegandt, 2022).

4- Smart Arbitration for Smart Contracts Disputes Settlements

When implementing smart arbitration as an alternative method for settling disputes arising from smart commercial contracts, it is essential that all applicable binding arbitration rules are adhered to in the decision-making process. Moreover, a mechanism must be established to effectively enforce these binding rules within the framework of smart arbitration.

4.1 The Arbitration Agreement Must Be in Writing

There may be legal implications associated with having the smart contract solely in (software) language. Hence, it is recommended that parties secure a hard copy of the smart contract, with the first copy being in written form and holding the same legal weight as the second copy represented by the smart contract encoded in electronic language. The existence of a written copy aligns with the stipulations of the New York Convention, which mandates that the arbitration agreement be documented in writing (Ibrahim, 2018).

For instance, Paragraph (a) of Article 10 of the Jordanian Arbitration Law sets forth the requirement that the arbitration agreement must be in writing; otherwise, it will be deemed invalid. The law specifies what constitutes a written agreement, including correspondence, paper or electronic communications, or any other written modes of communication that can be verified.

Given that the New York Convention and most of the arbitration laws worldwide mandate a written arbitration agreement, this requirement may conflict with the automated nature of smart arbitration techniques. The preservation of this agreement electronically, along with the acknowledgment that any electronic communication or email exchange related to an agreement to engage in smart arbitration is binding and holds the same legal validity as a written agreement. This approach serves to pre-empt challenges to the recognition of smart arbitration.

4.2 Eligibility of parties to conclude smart contracts.

The eligibility of the contracting parties for smart contracts is determined according to general rules, based on the personal law (nationality) of each party. Therefore, the eligibility of the parties is not determined according to the law of the arbitration seat. The eligibility of the parties is crucial to the smart contract and its arbitration. Without proper eligibility, the arbitration decision of the smart contract may become unenforceable.

Regarding Jordanian legislation on the eligibility required in the arbitration agreement, paragraph (a) of Article 9 of the Jordanian Arbitration Law states that legal or natural persons must have the legal capacity to enter into the arbitration agreement. However, the issue becomes more complex in smart contract agreements (Blockchain), necessitating the involvement of an external intermediary. This intermediary, known as an Oracle, will be responsible for verifying and confirming the eligibility of the parties when concluding the smart arbitration agreement for the Blockchain contract. In contrast to the eligibility of the parties, there are specific eligibility requirements for the arbitrator. Therefore, Article 15 of the Jordanian Arbitration Law states that an arbitrator must not be a minor, under legal incapacity, or deprived of civil rights due to a conviction for a felony or misdemeanour involving moral turpitude, or due to bankruptcy. The authors herein believe that these conditions contained in Article (15) are not sufficient to apply them to the smart arbitrator, while we can apply them to the human supervisor of smart arbitration only. Therefore, we propose, requiring that the human supervisor possess experience with smart systems, and the presence of special conditions that are consistent with the given nature of the work of a smart arbitrator, which is managed with special software and algorithms, for example, the enactment of binding laws requires that the smart arbitrator's software has specifications and technologies specific to this type of arbitration, or obtains quality certificates and special recognition, and includes special software for electronic intrusions and their prevention. Also, we propose a legal treatment for the eligibility of commercial parties in block chain contracts and smart arbitration and approved intermediary parties to determine the validity of such eligibility. Therefore, it becomes clear to us that the eligibility conditions in commercial smart arbitration for smart contracts are completely different from traditional or electronic arbitration.

4.3 Number of Arbitrators

Each party will choose one arbitrator. The third arbitrator will be selected based on neutral grounds to ensure a balanced selection process without favouritism. It is important to note that an odd number of arbitrators should be chosen in all cases (typically, the number of arbitrators is odd). This requirement is stipulated in Article 7 of the Arbitration Rules of the Permanent Court of Arbitration and the International Chamber of Commerce Arbitration Rules.

Regarding the Jordanian Arbitration Law, it aligns with the requirements of the International Arbitration Rules by allowing the parties to select the arbitration panel. According to Article 14 of the Jordanian Arbitration Law, in traditional arbitration, the arbitration panel is formed by mutual agreement of the two parties with one or more arbitrators. The law does not specify a maximum limit, but it mandates that if multiple arbitrators are chosen, their number must be odd. If the parties do not specify the number of arbitrators, it defaults to three. Failure to adhere to this requirement would render the arbitration invalid.

The authors believe that selecting three arbitrators strikes a balance in achieving justice, avoiding the extremes of too few (one) or too many (five, seven, etc.). However, the number of arbitrators can be increased in special cases that warrant such an increase, but rather they can be increased in special cases that require this increase. According to the provisions mentioned above, the two authors herein believe that this paragraph can be applied to smart arbitration, especially the oddness rule. As for referring the parties to smart arbitration within an arbitration institution specialized in this type intelligent software is used within one program, and in this case we can consider this intelligent system as a single arbitrator. If there is the possibility of using more than one intelligent program, this software must have an odd number. It is better to stipulate this through a legislative proposal and not adhering to the pace of smart programs exposes the smart arbitrator's rule to the voidness.

5- Smart Arbitration Technology for Smart Contracts: More Transparent and Confidential

5.1 Smart Arbitration for Smart Contracts: More Transparent

Blockchain technology offers several features such as security, immutability, transparency, traceability, and trust. It is structured through a comprehensive hierarchical framework that utilizes smart contracts to ensure integrity and facilitate fair trade, promoting an environment focused on reducing corporate costs and increasing profits. Furthermore, it provides fully transparent features with automated trading and control mechanisms (Al-Sadawi, Madani, Saboor, 2021).

Blockchain technologies and their applications help detect fraud, maintain accurate documentation of essential business operations, and streamline processes, saving time that would otherwise be spent on storing, retrieving data, and verifying document authenticity in traditional contracts (Kamel, Bakhoum & Marzouk, 2023).

Smart contract arbitration removes human intervention, allowing disputes to be thoroughly examined online, leaving less room for tampering with evidence. However, smart contracts and blockchain arbitration, despite gaining traction among governments and experts worldwide, are still in early stages of development and will require additional legislation to become a viable dispute resolution option (Chevalier, 2022).

Smart contract arbitration presents an ideal structure for the trial process, as it operates without the need for constant approval and monitoring at every stage, eliminating the requirement for intermediaries. For instance, in certain legal and financial transactions, banks or credit institutions often act as intermediaries during the trial, incurring costs and time. In contrast, the smart contract arbitration system, coupled with blockchain technology, eliminates these intermediary parties. Moreover, in terms of privacy, this technology is expected to reduce security risks associated with sharing documents via email and similar means (Gencosmanoğlu, 2023).

5.2 Protection of Confidential Information in Smart Arbitration and Smart Contracts

Smart blockchain applications are considered networks that provide excellent protection for confidential information. They rely on encryption techniques and operational integrity, distinguishing them from traditional systems in safeguarding information (Al-Hamouri, 2024).

In terms of the principles of arbitration, there are no provisions mandating confidentiality during litigation, as the default stance is publicity, with confidentiality being an exception agreed upon by the parties. However, similar to traditional contracts, smart contracts in commercial dealings often prioritize keeping disputes out of the public eye to safeguard the reputations of the involved parties. Many commercial enterprises rely on maintaining a veil of secrecy in their operations and especially in dispute resolution. Consequently, merchants frequently opt for arbitration as a means of resolving conflicts due to the increased confidentiality it offers compared to traditional judicial processes.

The authors argue that the level of confidentiality and information protection in smart contract disputes within smart arbitration is unparalleled and widely recognized as the most robust among all judicial dispute resolution methods.

Some proponents suggest that electronic arbitration offers the advantage of bypassing the formalities required by national laws, thereby streamlining the process. (Al-Haifi and Abu Mughli, 2013). They contend that the reduced formalities in electronic arbitration limit public exposure and bolster confidentiality. With smart electronic arbitration, confidentiality reaches its peak by eliminating unnecessary formalities. It also outperforms electronic arbitration by not having human interaction in inputs and other matters and even in terms of exposure to hacking attacks, smart software is more difficult. Therefore, smart arbitration will achieve almost absolute confidentiality, and this is a major and encouraging requirement for merchants. It is therefore expected that most trade disputes will be referred to smart arbitration. Especially since the parties (traders) can, to increase the confidentiality elements in their disputes, explicitly agree that smart arbitration will be confidential, and this is easy to achieve in smart contract disputes.

6. The Mechanism of Smart Contracts in Smart Arbitration on the Blockchain System

The mechanism of a smart contract involves converting contractual clauses into code format for each clause within the contract. The aggregation of these clauses forms an electronic algorithm that operates intelligently. A smart contract is essentially a computer protocol capable of verifying and executing contracts in a digital form. Smart contracts react to external conditions based on predefined instructions and utilize algorithms to ensure automatic execution upon contract fulfilment. (Vacca & Visaggio, 2021)

Smart contracts are programs stored and run on the blockchain. They function akin to a ledger where data is recorded across multiple records. Typically utilized to automate agreement enforcement, smart contracts allow contract parties to directly confirm outcomes without delay or the need for an intermediary. Their key attributes include high credibility and ease of negotiation. (IBM, 2022)

As a result, disputes arising from smart contracts can be automatically resolved through predefined automated rules. The decision to opt for this form of arbitration is promptly implemented within the digital system — the platform housing the digital smart contract asset. Consequently, automatic dispute resolutions via these intelligent means become legally binding on all involved parties. (Advani H, Lamp Wala A, & Garg R, 2022)

The authors emphasize the importance of parties explicitly stating in their contract the intention to resolve disputes through smart arbitration. Consequently, any disputes that arise will be adjudicated in a technologically advanced, smart digital manner. This innovative mechanism represents a significant leap forward from previous concepts like electronic transactions and electronic arbitration, as it seamlessly integrates cutting-edge electronic technologies with smart systems. As a result, resolving smart disputes through arbitration introduces unique challenges distinct from traditional commercial or other forms of arbitration. Addressing these challenges necessitates a deep technical understanding of the underlying

technology and the establishment of legislative frameworks, explicit procedures, and judicial infrastructure in jurisdictions like the Hashemite Kingdom of Jordan.

This infrastructure would be essential for handling rulings issued by intelligent arbitrators, ultimately striving to deliver swift, exemplary justice with high transparency and utmost credibility.

The operational mechanism of this approach, leveraging artificial intelligence within smart contract systems integrated into blockchain technology for all transactions, demands the precise coding of contracts.

Smart arbitration should be without any defects or deficiencies in the meanings sought by the parties to the contract. Consequently, the matter requires experienced lawyers and professional technicians in this field, and those dealing with smart arbitration must also have experience in smart sciences to enable them to deal with the rules that govern them, whether legal, technological, or technical (Attiya, 2021).

Therefore, the authors herein see, as a complement to the smart legal environment in the future, the presence of a smart lawyer who organizes his work according to the text of the law and exercises his duties. Consequently, it is not allowed to plead before smart arbitration systems except through a smart lawyer. This matter, however, may find its extent in the event of developing a typical smart infrastructure in any country to continue the process of recognizing smart arbitration.

The authors suggest that the time has come for a legislative addition to the Jordanian Trade Law regarding commercial smart contracts (Blockchain) as a model for a modern commercial electronic contract, like currently existing commercial contracts such as the commercial mortgage contract, the transportation contract, the commercial agency contract, the commission agency contract, and the commercial contract. Brokerage. So that the details of this contract are not subject to debate and dispute and are conclusive evidence of their strength with proof. Therefore, the introduction of smart arbitration into Jordanian legislation and its elimination will be an easy matter because most of the work of smart arbitration is based on blockchain contract technology. In a more advanced step, the authority of the parties to refer any future dispute to smart arbitration could be recognized with an explicit written agreement. Thus, there will be a recognition by Jordan of accepting smart arbitration provisions, at least in the coming period, for specific smart commercial contracts.

Regarding the current status of Jordanian legislation, there is no definition or reference to it in any of the trade laws or others directly because there is no explicit recognition of these smart contracts. However, some believe that there is a difference between the electronic contract and the smart electronic contract, each of them has distinct characteristics from the other, and smart contracts have their own world that is distinct from the rest of the contracts (Sano, 2019).

We can say that the Jordanian legislator has indirectly approached smart contracts through the Jordanian Electronic Transactions Law as it clarified many definitions of these electronic systems and organized them. For example, Article (2) of this law stated that electronic transactions are transactions carried out by electronic means, and the law stated what electronic means are as a technology of using electrical, magnetic, optical, electromagnetic means, or any similar means, and the like. It also stated that an electronic information message is "information that is created, sent, received, or stored by any electronic means, including email or short messages or any electronic exchange of information."

Indeed, more than this, it gave legal effect to the contract between electronic systems through a statement of electronic information systems consisting of a group of programs, indicating the processes of sending, delivering, storing, etc., as well as between the provisions of the electronic record, the electronic bond, the electronic signature, and the intermediary. Consequently, there is an infrastructure that may be able to accommodate and accept smart contracts or blockchain technology. However, we tend to regulate these contracts explicitly and in detail in the trade law, as we recommended previously in this research. Because the rules contained in the Jordanian electronic transactions law are very general, and are not sufficient to cover all the details, problems, and rationales of smart contracts and their descendants.

7. Oracle as an auxiliary and supportive system for Smart Arbitration

The work of smart arbitration using blockchain technology means that intermediaries or human elements do not enter into the arbitration decision, but exceptional matters may occur that require the intervention of the mediator to address a specific emergency. So, the use of an intermediary party in smart arbitration cannot be done in a traditional way due to the special nature of this arbitration. Consequently, law scholars found the Oracle system as an emergency auxiliary element by providing a smart arbitrator with external information.

Some have defined an oracle as "a person or program that seeks to enlighten the blockchain platform about what is happening around it in the real world outside the virtual world in which this platform navigates" (Taria, 2019).

The importance of the mediator (oracle) appears in the event of the implementation of the smart contract when abnormal circumstances arise, such as force majeure, emergency circumstances, imbalance in contractual relations, or any other abnormal reason. So, how will the smart arbitrator act when they are distant from these facts, and which law shall apply?

To answer this question, the Oracle will be the solution. Thus, a smart arbitrator will be provided with the required external information, and after incorporating this external information, will continue to carry out their work in arbitration by reflecting this new data provided by the Oracle and issuing their decision after considering these external data.

According to the mentioned above, the authors herein believe that human intervention in smart arbitration is an exceptional element, and this exceptionality can be addressed by proposing to the smart arbitration centres that they stipulate a paragraph in their system regarding the emergency cases mentioned above for this intervention, as well as specifying the persons authorized to enter this information, such as a part of the judicial group specialized in resolving the dispute. Thus, the human arbitrator may be accredited by the agreed-upon arbitration centre, or a judge accredited by the dispute enforcement court. Nevertheless, there may be justifications for relying on a third party (such as Oracle) to enter some important and urgent data not only in cases of force majeure and similar events but also during the implementation of commercial contracts and the transfer of disputes to smart arbitration. For example, in Article (8), it states: "All actions carried out by a merchant for commercial purposes are also considered commercial in the eyes of the law, and when doubt arises, the merchant's actions are considered to have come from him for this purpose unless proven otherwise." Therefore, considering such doubt, it might not be detected by smart software properly directly, except through entering this information from a third party (Oracle). Therefore, the smart arbitrator decides the nature of such a contract. If it is determined that it is an employment contract and the smart arbitration was commercial, then the arbitration would have exceeded its jurisdiction since the contract falls under labour law, constituting a civil relationship. This would also violate paragraph (d) of Article (10) of the Jordanian Arbitration Law, which declares the invalidity of any prior agreement to arbitrate employment contracts.

In all cases, the intervener must have technical, informational, and legal experience to be able to provide smart applications with professionalism and maturity commensurate with the nature of these disputes and enable them to maintain the confidentiality of the arbitration procedures and not disclose them as much as possible. This intervention will be outside the smart contract chain, and its mission is limited to resolving disputes that require external information from the real world and providing the chain with it. Examples of these include issues arising after incorrect implementation due to errors in the system itself or the data entered it, system failure resulting from hacking and penetration that renders further implementation impossible, or situations that would render the implementation unfair or inconsistent with the principles of good faith and other flexible principles governing contract theory in general.

However, some believe that in light of the aforementioned data, in addition to the smart arbitrator integrated with blockchain technology, an external arbitrator (Oracle) must be present and utilized through the codes in the smart contract when encountering any problem (Attiya, 2021).

Therefore, the authors believe that the application of Oracle is very important in the initial stages of implementing smart arbitration, and perhaps in the future, we will not need such intervention. On one hand, with the advancement of artificial intelligence software to address the scenarios mentioned in the examples above and other cases. On the other hand, smart arbitration will evolve in the future by addressing all its shortcomings following a series of practical and real applications of commercial cases whose disputes will be resolved through intelligent arbitration.

8. Admission of Rulings issued by Smart Arbitration

Admission of rulings issued through smart arbitration may pose an indirect problem when parties opt for this form of arbitration by agreement. The challenges arise from the failure of the judiciary in the relevant countries to recognize such arbitrations or the lack of logistical capacity to connect the arbitration rulings with the appropriate court for enforcement.

The self-execution of smart arbitration decisions presents a significant challenge as it could potentially conflict with established principles of traditional recognition procedures. If smart technologies successfully develop systems for widespread self-execution arbitration, countries may need to establish procedures to safeguard specific values of public state policy. These values are safeguarded through either Admission or Denial of the arbitration decision (Ortolani, 2019).

The authors believe that the implementation of the smart arbitrator's ruling in the courts of the country where the ruling is to be enforced can be categorized into four possibilities, each of which is assessed in terms of its compatibility with Jordanian legislation.

Firstly, there is the possibility of countries refusing to implement the smart arbitrator's ruling. In such cases, the party against whom the ruling is unfavourable may choose to evade it by claiming non-implementation and treating it as non-existent. To address this issue, it is suggested that parties proactively agree to refer the smart arbitration decision to a traditional arbitration centre that is mutually approved to validate or modify the smart arbitrator's ruling.

Subsequently, the final arbitration decision by the traditional centre will be presented to the court for enforcement. This approach may prompt the question of whether this proposal signifies a return to traditional arbitration. In response, it is argued that this interim measure is necessary until states formally recognize smart arbitration. It also serves as a temporary solution to avoid forfeiting the benefits of smart arbitration. While the smart ruling remains conclusive, it allows for consideration of case merits and decision specifics. Furthermore, in such instances, parties should only engage with arbitration centres specialized in handling this particular form of smart arbitration. Therefore, the two authors posit that if this mechanism is adopted, most rulings could be swiftly approved. This proposal could be implemented to align with Jordanian regulations concerning the potential validation of the smart arbitrator's rulings, albeit indirectly.

Secondly, there is the scenario of countries endorsing the implementation of the smart arbitrator's ruling, even in the absence of an electronic court, smart legal professionals, or a smart judge - a common occurrence. In such cases, enforcement of the smart arbitration award would entail obtaining an authenticated copy of the smart arbitrator's ruling and subsequently proceeding with legal and judicial actions within the court as if it were an arbitration award issued by a conventional arbitration centre. Regrettably, this option is currently inapplicable in Jordan due to the absence of such recognition.

Thirdly, the Admission of countries implementing the smart arbitrator’s ruling, but this country has an electronic court that does not have a smart electronic court, smart lawyer, or smart judge. In this case, the arbitration award is sent in a traditional way via private electronic means of communication approved by the court for the purpose of approving, rejecting, or amending it electronically. However, the presence of this infrastructure represented by the electronic court can establish a direct electronic link between the smart arbitrator’s ruling and the court competent to implement the ruling, which is electronic.

Thus, the result of the smart arbitration is sent directly to the electronic court of the country of implementation without the intervention of a human intermediary. This possibility also cannot be implemented in Jordan due to the lack of electronic courts, although it seems that the matter will soon exist due to the presence of a complete electronic infrastructure and the Hashemite Kingdom of Jordan's efforts to introduce software into the judicial side in multiple fields.

Fourthly, this is the possibility that the authors are seeking after technological developments and introduction of artificial intelligence sciences to all aspects of the judiciary. In this possibility, which is represented by the admission of countries implementing the smart arbitrator's ruling. But the country will have a smart electronic court, a smart lawyer, and a smart judge, thus contracts will be dealt with from their conclusion to the dispute resolution. However, smart arbitration refers to submitting the arbitral decision using smart systems for the court to issue the decision, that is, from the beginning of the contract to its implementation to resolve the dispute and issue the final decision by the competent court, it is dealt with in accordance with the entire smart judicial systems through the direct smart link between the smart arbitrator and the smart court.

Nevertheless, the authors consider that the problem of legal recognition of smart arbitration faces a real challenge in integrating several advanced programs into one entity (smart contracts, artificial intelligence, Block Chain, and Oracle), where in each one of these files we need a particular legal regulation, especially since the language used in these files is a special language represented by codes, symbols, and algorithms, not a traditional language. Therefore, the matter requires specialized legislation in each field of the elements of the entity mentioned above. Thus, smart arbitration is the result of mixing these elements in one entity, if the legislation supporting such elements of smart arbitration were available, and international agreements. However, during the coming period such a development will certainly be achieved, especially in commercial disputes, because this type of smart arbitration means the development of trade and investment around the world. This possibility is far from Jordanian.

In an optimistic outlook, the authors estimate that smart arbitration will overcome many formalities, especially in international commercial disputes. We can say that smart arbitration will be better than traditional arbitration due to its many advantages. What is missing from this type of arbitration is the adoption of flexible mechanisms to implement its rulings. Although some have shown that smart arbitration for smart contracts has undergone continuous development, and therefore it cannot serve as an alternative to traditional arbitration due to the complexities in implementation, the proponents of this opposing opinion nevertheless have pointed out that the world is witnessing an eagerness from all sides to adapt to new technology, which is very important. Therefore, work and research on the effects of these modern systems will continue. (Gencosmanoğlu, 2023). Overall, it is necessary to have modern standards as quick and alternative methods of litigation, especially in the commercial environment, to quickly resolve the disputes that arise through the electronic commercial arbitration system and through integrating it with artificial intelligence, specifically blockchain business contracts. This integration will provide the infrastructure for smart arbitration, the regulations of which we hope will be detailed in laws to leverage technological advancements in expediting the resolution of commercial disputes, particularly since this type of arbitration does not involve human arbitrators. As a result, it may be appealing to larger commercial companies. We may assert that the conclusion of the ongoing technological revolution will be based on smart systems facilitating arbitration, with smart arbitration being a crucial element in the pursuit of justice. Furthermore, the concept of arbitration does not inherently require human oversight, and the New York Convention is capable of accommodating arbitration processes supported by artificial intelligence and fully integrating them.

Moreover, even countries that are reluctant to embrace smart arbitration will need to review their arbitration laws and local legal systems in general to prepare themselves for the future of radical changes towards transitioning to smart arbitration, as it will become necessary with market advancements. Additionally, arbitration decisions will be encoded and codified, making them public and easily accessible. (Eidenmüller and Varesis, 2020).

Conclusion

This research analysed the relationship between smart arbitration and smart contracts operating with blockchain technology. Both serve as additional elements in favor of justice, especially in the fast-paced commercial environment. The Jordanian legislature has not yet regulated such smart mechanisms; therefore, the authors examined the possibility of regulating smart commercial contracts and resolving disputes through smart arbitration by the Jordanian legislature in the context of the legislative and judicial environment in Jordan. Moreover, they addressed cases in which this intelligent system needs to intervene, such as instances involving force majeure, which have been addressed through Oracle technology. Finally, they emphasized the importance of linking smart commercial contracts and smart arbitration to address the enforcement of judicial decisions in an electronically automated and intelligent manner.

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