THE VALIDITY OF ARBITRATION CLAUSE IN SMART CONTRACTS: A STUDY IN BLOCKCHAIN ENVIRONMENT

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Abstract - Smart contracts are defined as a self-executing digital agreement that deployed on blockchain network, and the obligations of each party are automatically enforced upon they agreed on all conditions. However, the main challenge encountered by such modernised contracts is the resolution of disputes arising in this environment. This issues attributes to its code-based nature and decentralised blockchain environment. Arbitration is considered as one of the main significant mechanisms of alternative dispute resolution. Arbitration offers essential benefits in contrast with litigation, i.e. it is less formal, flexible, faster, binding and enforceable, and proceedings confidentiality.

The current research investigates the validity of arbitration clause in smart contracts in blockchain environment. It aims to investigates to which extent the arbitration clause that embedded in code complies with the traditional arbitration laws' requirements. To achieve the aims of the current study descriptive analytical methodology will be applied through investigating the current legal frameworks in arbitration and evaluate the extent to what the implantation of arbitration in smart contracts will be effective and guarantee the fairness and transparency.

Keywords - Smart Contract, Arbitration, Clause of Arbitration, Validity.

I. INTRODUCTION

Smart contracts are defined as a self-executing digital agreement that deployed on blockchain network, where in such contracts all contractual terms of contracts are encoded into software. In such contracts, a contract is concluded when all conditions of contract are agreed by parties, and the obligations of each party are automatically enforced upon they agreed on all conditions.

However,the main challenge encounters such modernised contracts is the resolution of disputes arising in this environment. This issues attributes to its code-based nature and decentralised blockchain environment; that creates difficulties in interpretation, conflict of jurisdiction, and conflict of applicable law. So, arbitration is considered a good option for parties to resolve their disputes arising from smart contracts due to its flexibility, neutrality, and enforceability.

Arbitration is considered as one of the main significant mechanisms of alternative dispute resolution (ADR), that parties of contract agree to submit their dispute to arbitration instead of litigation in court. This mechanism offers divergent benefits in contrast with litigation; less formal, flexible, faster, binding and enforceable, and lastly; proceedings confidentiality.

The current research investigates the validity of arbitration clause in smart contracts in blockchain environment. However, the decentralisation nature of smart contracts creates significant legal challenges related to the elements of arbitration agreement, such as consent, identification of the parties and the place of contract conclusion. So, the current study investigates to which extent the arbitration clause that embedded in code complies with the traditional arbitration laws' requirements. In addition, the current study aims to evaluate the existing legal frameworks and the effectiveness of adoption arbitration as alternative resolution mechanism. Finally, the current study aims to propose legislative and practical solutions to enhance the effectiveness of arbitration in smart contracts disputes.

1.1. Problem of Study

The main research question of the current study is to investigate the validity of arbitration clause in smart contracts in blockchain environment. This will be achieved through investigating the effectiveness of usingarbitration for resolving disputes arising from smart contracts. Thus, the legality of concluding arbitration clause in smart contracts will be discussed. The legal issues arise in the environment of smart contracts; such as conflict of jurisdiction and conflict of laws will be discussed.

1.2. The Importance of Study

This topic has been chosen for investigation based on the following reasons:

1. The rapid development of blockchain technology has reflected on the conclusion of smart contracts automatically without need for human intervention. This raises the issue of legal and practical challenges, specifically with regards of dispute resolution.
2. Arbitration has evolved as alternative dispute resolution to deal with this challenge. This is because arbitration is flexible, faster, private, and internationally effective recognised method for disputes resolution. Integrating arbitration in the disputes emerged from smart contracts that conducted via blockchain technology offers an acceptable mechanism for enhancing trust and enforceability.

3. The current research examines how arbitration can be effectively adopted to deal with disputes arising in smart contracts environment, by revising the existing legal frameworks and then proposing a coherent framework that ensure fairness, efficiency and enforceable ruling in the era of decentralised technology.

1.3. Methodology

To achieve the aims of the current study, and to present a comprehensive understanding of how arbitration can be implemented to meet the demands of smart contracts; a descriptive-analytical methodology has been adopted to examine the role of arbitration in smart contracts environment. This will be achieved through investigating and analysing theoretical and practical relevant to smart contracts, including the nature of smart contracts; its formation in blockchain technology, and the procedures of arbitration as an efficient integrating mechanism for resolving emerged disputes via smart contracts environment.

Analytically, the current research will examine the effectiveness and limitations of applying arbitration that has been arisen from smart contracts. So, this research will examine legal doctrines, regulatory approaches, and institutional frameworks across different legal systems to investigate its compatibility and efficiency with blockchain based transactions. So, primary and secondary sources will be considered as a data collection method, via analysing literature review, legislation, and institutional arbitration rules.

II. THE NATURE OF SMART CONTRACTS

Smart Contracts is considered one of the main significant evolving digital technologies that effect on the formation and execution of agreements (Cavalcanti, 2020). This happens through a decentralized computer code execution on blockchain networks. Blockchain is a technology that "stores information in a decentralized and secure cryptographically validated data blocks linked sequentially" (Micheviz& Peinado, 2025). Sazabo in 1994 introduced smart contracts by "coding contractual clauses that are automatically executed by a computer system to reduce transaction costs and minimize the risks of malicious actions or human error" ((Micheviz& Peinado, 2025). Smart contracts are defined as legal agreements that concluded via electronic messages that transform via the internet, that expression of intent is happened in digital environment without the need to physical documentation.

So, smart contracts in the supply chain context provide parties to write their agreement within an automated executed environment by utilising decentralised consensus to explore the demands of seller and buyer (Guo, 2025). But the spread of such contracts is still globally low, as the use of such contracts is spread in some states in the United States of America such New York and Tennessee. The Law of Tennessee defines smart contracts as:

"An event-driven computer program that runs on an electronic ledger that is distributed, decentralized, shared, and replicated. It is used to automate transactions, including, but not limited to, transactions responsible for assets on that ledger and directing their transfer. It creates and distributes digital assets, synchronizes information, manages user identity, and enables access to software applications". (Tennessee Code, 2021)

Smart contracts are dependent upon blockchain technology not only in the creation of a contract but also its implementation and performance. Technology allows all activities relating to the completion of the contract process to be documented in a transparent way. The technology documents information and distributes information into many groups known as "blocks" that have storage capacities. Once the maximum capacity of data is stored in a particular block, it is then connected to another block, and so on, to form a chain of blocks in a chronological sequence that can never be changed again. Such a technique is referred to as a "distributed ledger". The technology facilitates electronic documentation and preservation of information through a peer-to-peer network. In this way, data can be maintained in an accurate and reliable manner without any interference from humans (Obeidat &Khasawneh. 2023).

According to experts, blockchain technology is described as a special type of technology in which there exists a database of information kept in a sophisticated way in a series of connected blocks. Put differently, it can be referred to as a "secure and low-cost digital storage technology that is decentralized." Besides, the technology cannot be modified or changed by any user who has made transactions within the network because it has immutability properties. Further, any new transaction cannot be done without the approval of more than half of the users in the network. (Ishrafiah, 2024).

Smart contracts still a controversial concept due to legal challenges that arise about legal recognition and application. For example, despite the United States and The United Kingdom acknowledge its legal validity, but a debate is still ongoing about its contractual nature in other legal systems, including its legal validity, digital signature, data protection, and civil liability (Li, Greenwood, & Kassem, 2019). However, in traditional contracts the essential elements of contract are consent, lawful objects, and freely agreed upon terms, and for that, there is no legal hindrance of using programming language as a mean of expressing intent.

III. ARBITRATION AS ALTERNATIVE DISPUTE RESOLUTION MECHANISM

Due to the fast adoption of smart contracts, many conflicts have been experienced in their usage, thus the need to find ways through which such conflicts can be resolved effectively, taking into consideration the technicality of the smart contracts. Avoidance of court proceedings may be attributed to the fact that smart contracts' conflicts involve people from different nations, thus making it complicated (Alsayed, 2024).

As a consequence, arbitration has become a desirable method in two ways, namely off-chain arbitration and on-chain arbitration. Off-chain arbitration is somewhat comparable to electronic arbitration, wherein some processes have been automated but cannot be executed by themselves without judicial enforcement of the awarded result. On-chain arbitration, meanwhile, can be performed using software or digital systems and provides not only faster procedural processes but also unbiased decisions.Intelligent arbitration is used in the same manner as traditional arbitration, whether it is included in the contract while entering into it or through submission agreements when a dispute has already arisen, as long as it is done using an agreed-upon digital platform.

In case there occur any disputes regarding smart contracts, traditional arbitration bodies would solve the issue. Thus, smart contracts could be implemented using the existing principles of contract law. There can also appear a new kind of arbitration court specializing in solving digital disputes. There may also be an institution created inside the existing bodies of arbitration. This is a combination approach of using existing dispute resolutions mechanisms, but still without implementing a completely automated way of enforcing the award decision[1].

One such organization is Blockchain Arbitration Court associated with the Polish Chamber of Commerce for Blockchain Technology and established on November 8, 2018. Its purpose was solving disputes connected to digital technologies. According to experts, it became the first arbitration court in Europe, and the second court of such kind globally, after Japan. In addition, it uses the principles of arbitration established by the Polish Chamber of Commerce for Blockchain and New Technologies.

It is important to note that this form of arbitration fits well within the demands of the fourth industrial revolution and its implications, especially considering that blockchain technology is a decentralized system where transactions take place automatically without involving any third party. It is also different from transactions where a third party must be present, such as digital certification authorities.

Furthermore, it is not similar to electronic arbitration. Electronic arbitration usually involves an arbitration agreement that is put in place before the transaction takes place. The agreement can exist on its own, be included in a certain contract, or be created by an arbitration agreement or referral in a certain contract (Ichrakieh, 2024).

In blockchain arbitration, disputes are settled on the platform that does not involve a central authority or an intermediary. Arbitration related to smart contracts is performed in a completely automated form whereby the arbitrator(s) can be anonymous. Compliance with the arbitral awards is achieved via the implementation of the escrow system, which is an electronic system that serves as a virtual savings account. Within this system, the contracting parties use cryptocurrencies as collateral for the performance of their obligations towards the contracting party in whose favor the decision of the arbitrators was reached. Thus, this system facilitates arbitration processes, making them efficient, and also allowing automation of the process, thus excluding the question of recognition and enforcement of the awards by the national courts, and therefore reducing procedural costs (Ichrakieh, 2024).

Among the legal problems which can emerge in the context of electronic arbitration is the question of arbitration agreement. The formal aspects of an arbitration agreement in the framework of smart contracts should be considered taking into account certain aspects which relate to the identification of parties, including the precise description of the parties' contacts and e-mail addresses.

Moreover, the methods to be used to conclude the agreement electronically (electronic signatures or other forms of electronic certification provided that they are reliable and safe from forging) should be specified. Furthermore, it is important to define an arbitration procedure and specify the ways in which it is to be carried out electronically, the tools to exchange documents and evidence online, and the rules regulating electronic arbitrators and procedures of actions in case of conflict among parties.

The identification of the conditions of agreement between the parties in the course of making agreements is of particular significance for legal proceedings. The principle of consent plays an important role among the other conditions since it serves as the basis for the creation of the contract. At the same time, the signing of a legally valid contract is mandatory according to the current legislation. In terms of e-commerce and smart contracts, the principle of consent is one of the key conditions of conducting commercial activities and is regarded as an essential component of the contract, which is usually presented as an element of its content.In turn, this condition is obligatory because it implies appealing to electronic arbitration in case any disputes related to the implementation of the contract appear.

[1] RULES OF THE COURT OF ARBITRATION AT THE POLISH CHAMBER OF COMMERCE in Warsaw (2019). available at: https://sakig.pl/wp-content/uploads/2019/01/terms.06.en_.pdf

The above arbitration clause normally forms part of the contract and is likely to have clauses that will emphasize the need for arbitration as a mode of resolving any arising disputes during the execution of the contract. In the execution of these contracts, it is always necessary to have specific clauses on arbitration within the contract. These arbitration clauses are independent in their own right and preventive in nature as opposed to the other clauses contained in the main contract.It is also a requirement that the contract is in writing(Ichrakieh, 2024).

Regarding the actual requirements of the arbitration clause in smart contracts, the arbitration clause, just like any other contract, entails certain fundamental aspects that are necessary for the contract to be valid. Such aspects may include the existence of consent without any defects as well as that the consent has been made by someone legally competent to enter into the arbitration. Furthermore, the dispute itself should be arbitrable.

It is through the will of the parties to contract and its articulation as well as the meeting of minds between the offer and acceptance that the concept of arbitration becomes known, defined by the subjects it addresses, the law that governs it, the composition of the arbitral tribunal, its competence, and all matters relating to arbitration procedures.

In this case, if there is no consent, then we cannot talk about the existence of any arbitration agreement, and therefore, the arbitral award cannot be considered legitimate. In addition, the consent should be granted by a party that has the necessary legal competence to grant this agreement.

There are certain questions that arise in connection with the legal capacity of parties to e-contracts, defects in e-contracts, and the object of arbitration. However, it should be remembered that electronic arbitration agreements are made electronically, and because there is no direct communication between the parties, there is a question of establishing identity of parties and expressing their will.

Consequently, the problems which need to be examined in greater detail include that of consent through the analysis of electronic offer and acceptance, the subject-matter of arbitration and the cause of arbitration, and lastly the time and place of arbitration agreement.

IV. CONCLUSION

The question of the requirements for the validity of electronic arbitration agreements in smart contracts is an extensive subject matter of scholarly research. The use of electronic arbitration as an instrument for dispute resolution in smart contracts poses considerable obstacles in relation to the validity of the agreements made under these innovative systems. Consequently, it becomes important to explore and establish the formal and material conditions for the validation of electronic arbitration agreements in smart contracts.

It should be noted that there is no significant difference between the requirements for electronic arbitration agreements in smart contracts and the requirements that apply to traditional agreements in terms of their form. But the requirements manifest themselves in their new, electronic version, which was not present in traditional contracts and thus necessitates the development of special legal regulation that can keep up with this process.

Speaking about the substance of such requirements, one may state that it is necessary to have consent, subject matter, and cause for reaching an arbitration agreement. And here we conclude that there are no relevant international legal regulations for such arbitration agreements in smart contracts because of the nature of smart contracts. In other words, national legal regulations are still based on traditional concepts regarding arbitration, and thus there appears a certain legal gap.

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