AD ASTRA

Program badań nad astropolityką i prawem kosmicznym

Nr 7/2023

A Theoretical Review of Studying on Smart Contract in Blockchain Technology Revolution

dr Qingmei wen
Qinghai minzu University

mgr Haowei Fang
Qinghai minzu University

1. INTRODUCTION

The concept of Smart Contract was raised by American computer scientist whose name is Nick Szabo in 1994. Actually its original model is automatic vending machine. But due to technical limitations, there are quite a lot security risks,especially for documents would be easily corrupted or tampered with in the process of computer's digital system, so Smart Contract did not flourish at that time. However, with the maturity of blockchain technology, the realism of combination between Smart Contract and blockchain improved smart contract's nature, of which could prevent documents from tampering and keep contract safe, reliable, transparent and efficient, thus the development of Smart Contract has entered a new stage. In recent years, more and more legal scholars are trying to make research on blockchain smart contract from diversified perspectives. In order to form a holistic theoretical framework, it is necessary to sort out the existing outcomes and analyze the current studying progress on blockchain smart contract. Therefore, this paper will make a comprehensive summary on these studies among China and other countries, and evaluates the further possible direction of blockchain smart contract.

2. RESEARCH STATUS IN CHINA

2.1 Summary in China

As for blockchain smart contract, Chinese scholars are mainly focused on three aspects. Firstly, the legal attribute or nature of smart contract. Secondly, the influence of smart contract to traditional contract law. Thirdly, the possible problems of smart contract and the corresponding legal regulation.

(I) legal attribute or nature of smart contract.

In terms of the legal attribute or nature of smart contract, most Chinese scholars insist that smart contract belongs to legal act and it could be incorporated into Contract Law with technical adjustment. Scholar Jidong Chen believes that blockchain smart contract is legal act. Since the purpose of legal act is to produce a certain legal effect in Civil Law. The essence behind it is the intention of parties. The process of parties issuing smart contracts has the intention to change their rights. Therefore, the issuance of smart contract belongs to the intention expression of the parties and can be recognized as a legal act[1]. Scholar Ke Xu further believes that smart contract is not only a legal act, but also a form of data message, which is very similar to EDI (Electronic Data Interchange). Although the traditional electronic data interchange does not include the type of smart contract, according to the provisions of UNCITRAL Model law on Electronic Commerce, the computer data transmission that uses some standard to deal with the information structure can be widely considered as an exchange mode of electronic data. So smart contract actually belongs to electronic data interchange, and this is also a written form of legal act[2]. Scholar Shaofei Guo believes that although blockchain smart contracts have difficulties in judging whether parties have the intention, it should still be recognized that smart contracts can be incorporated into Contract Law, but the perspective of law and technology should be controlled by engineering theory. He further believed that the identification of smart contract agreement should be based on different types of smart contracts. One situation is that in addition to the smart contract existing in blockchain, the parties have signed the traditional contract, of which should be identified as parties have reached agreement. The other is that there is no traditional contract, only smart contract in the blockchain. The situation is often controversial. It can only be identified that there is a general agreement, and whether there is a definite agreement needs to be explained and identified by combining multiple factors[3]. Scholar Zhenguo Chai also believes that although smart contract have unique characteristics, such as automatic execution and anonymity, they are still only a computer program, and the content is written according to Contract Law. Therefore, smart contract are actually expressed through another digital technology, and it should be identified as contract[4]. Some scholars believe that smart contract is not a legal act. For example, Yanchuan Wang believes that blockchain smart contract is not legal act, because it has no intention to reach agreement. Anyway, the essence of traditional contract is the intention. Usually, once two parties reach an agreement, the contract is established and become effective, thus both of parties should implement the contract. The above aspects of the traditional contract are separated, need to rely on the intention of two parties. As for smart contract, the intuition or meaning of parties is absorbed by computer code, and the establishment, validation and implementation of the contract tends to a line. The whole process is automated and no longer requires human's will, so it is not a legal act, nor a contract[5].

(II). Impact of smart contract on traditional contract law.

As a new trading method, smart contract undoubtedly has an impact on contract rules in civil law, including the following parts :

(a) The conclusion of a contract.

Scholar Zhenguo Chai believes that smart contract has a great influence on the rules in the traditional contract law. First of all, smart contract have great particu-

larity in meaning expression. The formation of meaning expression and the defects of meaning expression are difficult to be regulated by rules. Secondly, the commitment of smart contract is completed through performance, which expands the boundary of traditional Contract Law. In addition, the offer and commitment in the process of concluding traditional contract can be withdrawn, but once smart contract is undertaking, it is irrevocable, which is different from the conclusion of traditional contracts[6]. Scholar Jidong Chen thinks that smart contract conforms to the typical way of contract: offer and commitment. The release of smart contract firstly belongs to the offer. The constituent elements of the offer include:

a. the content of the offer is specific and definite.

b. the offeror has the meaning of being bound by the meaning.

The content of blockchain smart contract is realized in the form of computer code, and the computer language must be very clear, otherwise it will not be able to run, so the smart contract conforms to the first feature of the offer. Moreover, because smart contract has the characteristics of automatic execution, it means that the person who publishes smart contract must bear a legal consequence: when other people meet the requirements of smart contract, they will inevitably perform the contract, that is, the automatic performance of smart contract is set at the beginning. Therefore, the person who publishes smart contract has the intuition of being constrained by its meaning. In fact, smart contract is an offer. The commitment mode of smart contract is special, because its realization needs to rely on the behavior of the relative person, so its commitment belongs to a meaning expression without notice: meaning realization. Since the completion of a particular act, the contract has been established and entered into force[7].

(b) The effectiveness of the contract.

Scholar Shaofei Guo mainly discusses the effectiveness of smart contracts in terms of the capacity of civil subjects, third party fraud, unilateral errors and incomplete blockchain mechanism. Firstly, in terms of the capacity of civil subjects, the permissioned blockchain and the public chain should be distinguished. For the former, because the user' s identity is known in advance, so the parties , capacity is easier to judge, and the latter is due to the user is anonymous, which leads to the parties, capacity is difficult to judge. In future, the dilemma could be alleviated by means of identity authentication at the time of registration. Before that, the effectiveness judgment method based on objective situation can be used to maintain the validity of the contract.Secondly, for the third party fraud, because the blockchain subject is anonymous, there is no possibility of knowing or should know fraud, so the smart contract cannot be revoked. Again, a distinction should be made between motivational errors and content errors in respect of unilateral errors in accordance with the current law. Again, for bugs, errors, etc. caused by incomplete blockchain mechanisms, judge separately according to the type of error, and if it is an encoding error, judge responsibility according to the identity of the code provider. If the code error is caused by external attacks, the parties should be given the right to rescind. At the same time, it is necessary to judge the relief mode of the injured party and the responsibility of the attacker according to whether it has been automatically completed and a variety of factors. Finally, if the external data resources lead to errors, should be based on the fault of the parties or not to judge the responsibility

and relief[8]. Scholar Xudong Li and Songyuan Ma further discussed the influence of smart contract on the effective time, invalid contract and pending contract. Firstly, for the time when the contract enters into force, the smart contract with traditional contracts is established and effective since it is written on the block chain. If it is a conditional contract or a contract requiring approval, it shall enter into force upon completion of the approval formalities or upon achievement of the corresponding conditions. Secondly, with regard to invalid contracts, although users in blockchain have the characteristics of subject anonymity, which leads to difficulties in identifying invalid contracts due to unqualified subjects, the content of public contract also reduces the difficulty of identifying invalid contracts due to illegal contract content. Finally, for the contract with pending validity, on the one hand, it is difficult to confirm whether it belongs to the contract concluded by the person with limited capacity due to the anonymity of the subject. On the other hand, the situation of unauthorized agency needs to be analyzed in detail. In the case of smart contract is mixing with traditional contract, since parties generally negotiate well before smart contract is designed, there is usually no unauthorized agency. However, if there is an unexpected reason for setting smart contract in the operation process, and smart contract responds to this change, it belongs to the situation of unauthorized agency, and the contract validity is thus reflected in the state of pending validity[9].

(c) Performance and alteration of contracts.

From the perspective of contract performance, scholar Zhenguo Chai believes that although the performance of smart contract is quite different from that of traditional contract, the characteristics of automatic implementation can make the performance of contracts safer and more efficient, but it still needs to be regulated by Contract Law, because smart contract at this time are still in the initial stage, and it still needs the participation of people, and it is impossible to avoid the possible problems in the performance process. When there are problems, still need to use contract law to make up[10]. Scholar Xudong Li and Songyuan Ma believe that smart contract has an impact on the Counterargument right while carrying out contracts. First of all, there will be no room for the counterargument right for simultaneous performance, while counterargument right of plea against the advance performance will have room for application in pure blockchain smart contracts. As for the application of the counterargument right for security, it is necessary to distinguish the situation. If the trade is carried out in platform digital currencies such as ETH, then because there are other means to monitor the account balance on the blockchain, it is easier to realize the economic status of the counterparty of the transaction, and it is easier to exercise the counterargument right for security. But without trading in platform digital currencies, it would be harder to verify each other's economic state and the counterargument right for security would therefore be harder to exercise[11].

From the perspective of modification of contract, scholar Shaofei Guo believes that on the one hand, in the case of coexistence of smart contracts and traditional contracts, the original agreement can be modified through the modification of traditional contracts. However, in a strict sense, this does not belong to the modification of blockchain smart contracts, but the modification of traditional contracts. On the other hand, for the pure blockchain smart contract, parties should not modify the smart contract unless the other party is purely profitable[12]. Scholar Qingfeng Xia believes that contracts in the traditional sense are incomplete because the parties

cannot predict perfectly all the problems that may occur in the future, so there is a need to change the contract, while smart contract is more similar to complete contract, and there is no room for contract modification. However, after all, the current blockchain smart contract cannot be completely divorced from reality, so it will also be affected by changes in the real situation. The most typical is the change of the situation, so in this case, it is necessary to adjust the rights and obligations of the unbalanced parties[13].

(d) Smart contract and contract guarantee.

Scholar Yunwei Ni believes that smart contract is actually attached to a certain guarantee mechanism on the basis of the traditional contract, but such a guarantee mechanism is realized by technical means, which is different from the traditional guarantee. He believed that the deployment of smart contracts on the block chain increased the certainty of property interest transfer, and made the relative person have priority over other creditors in receiving payment, thus realizing the function of guarantee. He also compared smart contract with the traditional letter of credit, and believed that smart contract was very similar to the letter of credit and belonged to an independent guarantee, but the scope of its guarantee was wider than that of the letter of credit. Therefore, the structure of smart contract can be summarized as two kinds:

a. When there is only smart contract on blockchain, the structure could be labeled as ‚offer*independent guarantee' .

b. When smart contract and traditional contracts exist, the structure is ‚contract + independent guarantee'[14].

Scholar Qingfeng Xia views the relationship between smart contract and guarantees from another perspective. It argues that although it seems that smart covenants play a priority role, it is possible to damage the interests of other creditors when applied in some areas. For example, in bankruptcy cases, when the debtor and the bankrupt belong to one person, if it allowed to automatically execute the property of the bankrupted company in the absence of other guarantees, it is likely to violate the equality of other creditors, so this behavior will deviate from the bankruptcy law system and spirit. It also puts forward new quesitons on the view that smart contract is applied to the vehicle starter interrupter as a kind of lien mentioned by some. He thinks this way of performance is different from the traditional lien. On the one hand, the retained property in the traditional lien is owned by the creditor, while in the smart contract lien, it is owned by the debtor. On the other hand, in the field of bankruptcy, when the debtor is the bankrupt at the same time, through the exercise of smart contract lien, the debtor's property will be unable to use, but the law does not stipulate that the bankruptcy property can not be used normally during bankruptcy, on the contrary, if the bankruptcy property can be used during bankruptcy, the probability of debt repayment can be increased[15].

(e) Other effects on contract law.

Smart contract and model contract.

Scholar Zhenguo Chai believes that smart contract also conforms to all the characteristics of model contract, but smart contract is more efficient than model contract, so model contract can be used as the basis of smart contract[16]. Scholar Ke

Xu believes that although there are similarities between smart contract and model contract, they are not exactly the same. The key difference is that the ,signature equals consent, rule. Model contract adopts this rule, that is, as long as the parties sign the contract, they default to agree to be bound by the terms of the contract, and whether the parties have read it or not will not be questioned. However, in an smart contract, because its content is written in code, it may not be understood even if the parties read it, so the smart contract cannot be equal to a format contract. On the issue of , intelligibility , of computer code, the rule of ,knowing equals consent' should be adopted. The compiler of smart contract should explain and explain the content of smart contract to ensure that the counterpart can understand the content of smart contract[17].

Liability for breach of contract.

Scholar Yunwei Ni thinks that although the technical characteristics of smart contracts are non-tamperable, they cannot guarantee their absolute implementation. On the one hand, because any computer may make mistakes. On the other hand, for the rapid changes of various factors and the environment in reality, smart contracts can not cover all the possibilities, so there is still the possibility of default in smart contracts[18]. Scholar Zhenguo Chai also believes that although blockchain makes performance objective through technology, there is still a possibility of default in smart contract. First of all, the contract is formulated by humanbeings, and it will still be affected by subjective factors, which may lead to code loopholes. Secondly, when the actual performance of the other party is difficult, in order to protect the basic interests of the other party, the contract may also stop performing. When the above situations occur, smart contract are powerless, because blockchain smart contract technology is more of an advanced means of promotion, and does not have the function of self-repairing. Post-relief still needs to rely on traditional contract law[19]. Scholar Shaofei Guo further believes that if there is a default in the blockchain smart contract, there are two remedies : public relief and private relief. Public relief is divided into two parts: entity and procedure, each involving code interpretation and traditional contract relief procedures. The way of private relief depends on the setting in advance in the smart contract, but there is a doubt of legitimacy. It must meet the requirements of the law, otherwise it will be illegal. For the traditional exemption clauses, there is also a hint problem in the blockchain smart contract. If there is a traditional contract, it can be explained in the traditional contract. If there is only a blockchain smart contract, it is necessary to design a natural language description of the relevant clauses[20].

Interpretation of the contract.

Scholar Zhenguo Chai believes that compared with smart contracts, the language of traditional contracts is often ambiguous, so it needs to be explained. However, the content of blockchain smart contracts is accurately written in computer language, which solves the problem of contract interpretation to a certain extent. Scholar Jidong Chen believes that the code language cannot cover the complexity of natural language. Therefore, when a more complex natural language is expressed through the code language, there will be various problems. At this time, if there is a dispute, it is often difficult for the court to explain this, and it can only reconstruct the entire contract or choose other remedies[21].

The jurisdiction of smart contract.

Scholar Qingfeng Xia firstly believes that because the signing of smart contracts is completed on the blockchain, and based on the characteristics of blockchain, it is difficult to understand the location of contract signing and performance, which will affect the jurisdiction of smart contract disputes. He further believed that the issue of smart contract jurisdiction should be divided into two parts : the determination of jurisdiction rule makers and the specific jurisdiction rules.In view of the previous part, there may be two viewpoints : 1 new jurisdiction rules determined by the block chain itself ; 2 jurisdiction by the country. The second view is more feasible. For the latter part, we can refer to the jurisdiction rules of electronic contract. He also acknowledged, of course, that if there were circumstances agreed in advance by the parties, jurisdiction could be determined by agreement[22].

(III). Possible risks and prevention of smart contracts

(a) Risk of smart contract.

Scholar Yunwei Ni and Zhenguo Chai believes that, first of all, because the blockchain smart contract is written in code, it is difficult for lawyers and other legal workers to read, which affects its availability. Secondly, although smart contract has improved in efficiency compared with the traditional contract, it also sacrifices flexibility[23]. Finally, although the transaction records on the blockchain can be retained and verified, the real information of the contract publisher is very difficult to obtain, which lays a hidden danger for criminal acts such as money laundering and terrorist activities. Therefore, smart contract may still be concentrated in some simple application scenarios for a long time in the future[24]. Scholar Yanchuan Wang also believes that blockchain may not be able to adapt to complex transactions. From the perspective of relational contract theory, in modern transactions, the rights and obligations of the parties to the transaction may be difficult to immediately clear, the need for repeated consultations, coordination, modification in the subsequent time to explain and adapt to changes in the relationship between the parties. Smart contract can not be modified, even if it can be done, the cost is too high, so it is likely to be flawed when writing code. In addition, it also believes that there may be code vulnerabilities in smart contracts. Hackers use loopholes to transfer USD 50 million of ETH to their private accounts. The most important thing is that according to hackers, their behavior is in line with the blockchain rules, which will bring another problem, namely the relationship between platform rules and real rules. Moreover, since smart contract will be automatically executed, it is also likely to lead to the loss of the right to repent[25] Scholar Ke Xu believes that the most admired decentralization feature of blockchain smart contracts may also be a representation. On the one hand, the execution of smart contracts depends on whether the previously set conditions are triggered, and Oracle, which is responsible for verifying these conditions, is not decentralized. Although some people have tried to introduce the consensus mechanism of blockchain into the Oracle, it ultimately fails because of the high cost. On the other hand, many of the data that need to be validated are not provided by the parties but by the country, so blockchain smart contracts do not achieve the so-called , decentralization' at the moment, and the expected results will therefore be undermined[26]. Scholar Yibo Cai further believes that smart contract not only brings impact to the contract law, but also has an impact on the whole system of

private law. First of all, due to the characteristics of automatic performance of smart contracts, the whole principle of good faith is likely to be affected. Secondly, since the blockchain is transparent, anyone can see the entire transaction process, so the publicity system in the property law will also be affected. Again, since blockchain is a decentralized distributed ledgers, the legal relationship of tripartite financial services in traditional transactions is affected. Finally, some aspects of traditional intellectual property will be greatly affected, such as copyright[27].

(b) Smart contract risk prevention.

At the micro level, Yanchuan Wang puts forward a possible solution to the above problems :

Firstly, for the problem of the defects of code, we might try to use multiple signature technology, which extends the relationship between the parties to a tripartite relationship. The transaction needs to be confirmed by a 2/3 key. If both parties agree, the transaction will naturally be successfully completed, but if not, the third party will intervene to judge and break the deadlock. Secondly, for the problem of code vulnerability, we can conduct online voting through democratic resolutions or use software updates to prevent hackers from using vulnerability to damage the interests of users[28]. Scholar Liwei OuYang further proposed to enhance the security, reliability and execution of contracts by formal verification of smart contracts. That is, through very accurate mathematical technology and analysis tools in the contract development and design process to verify its fairness, correctness and other important properties, as far as possible to avoid some common vulnerabilities with security risks, to ensure that the contract is accurate and reliable[29]. Ke Xu proposed that the state should play a special role in smart contracts at the macro level : a. the state that strengthens the rationality of smart contract. The state should make efficient use of the large amount of information. it has build a secure open data system, which is a. more professional decentralized Oracle.

b. States should establish dispute resolution mechanisms in blockchains and improve the remedies of smart contract as much as possible.

c. Countries that protect the weak of smart contracts. Blockchain is only a formal equality. Since code is difficult to read and understand for consumers, it requires state intervention. It can be achieved by adding ,super node , in blockchain[30].

2.2. Survey reviews in China

From the above summary, Chinese scholars have made specific analysis on smart contract, but there is still room for further research, including smart contract and guarantee, interpretation, jurisdiction, model contract and so on.

Firstly, as for the connection between smart contract and model contract. Chinese scholars believe that smart contract and model contract have several similarities and can analyze smart contract from the perspective of model contract. But we should explore higher. For example, Civil Code of China adopts the unified mode of civil law and commercial law, which means that model contract should be applicable to both natural person in doing civil and commercial activities. If smart contract is understood as a model contract, and is applicable to the obligation of presentation and explanation stipulated in the Civil Code of China, can it be applied to two different civil subjects in the same way? How to coordinate with provisions of model

contract in Consumer Rights and Interests Protection Law? If the type of smart contract and model contract is stipulated separately, how to category them? All these questions deserve us to take further consideration.

Secondly, smart contract and guarantees. Chinese scholars are inclined to make comparation between smart contracts and credit, they insist that the essence of smart contracts and credit is quite similar to independent guarantee. This paper intent to reveal that it is necessary to distinguish guarantees and means with guarantee function. For example, joint debts advance notice registration and performance defense have certain guarantee function, but they are not categorized into the type of guarantee. Besides, in order to become a new guarantee method, smart contract must have the characteristics such as complementarity and the practical realization of guaranteed creditor's rights. Does smart contract have these characteristics? In the case of the smart contract as the so-called „guarantee", two parties usually have signed a contract on offline. Therefore, there are two contracts, one is on the chain and one is off the chain. In future we should take fundamental exploration on the distinctions between master contract and guaranteed contract.

3. RESEARCH STATUS IN OTHER COUNTRIES

3.1. summaries in other countries

At present, foreign scholars have more research on smart contracts, and the research content mainly focuses on the relationship between blockchain smart contracts and laws, the impact of blockchain smart contracts on the traditional contract system, and the potential risks of blockchain smart contracts.

(I). Relationship between blockchain smart contracts and law.

The mainstream view is that blockchain smart contracts still need legal regulation. For example, scholar Tiffany M. Sillanpaa believe that although supporters of blockchain smart contracts claim that blockchain is a decentralized system, the smart contracts applied in this system do not require laws. However, the users of blockchain are all human after all, so the rationality of a completely decentralized contract system is doubtful. In blockchain, people may enjoy a certain degree of freedom, but still need to comply with the law[31]. Scholar K. V. Egorov and M. V. Fetyukhin further believe that as long as there is social existence, illegal behaviors will certainly exist, and conflicts and illegal behaviors will also exist in the digital world, including blockchain smart contracts. At this time, laws are needed to adjust[32]. Scholar Jonathan G. Rohr believes that there are many activities related to offline transactions in the current blockchain smart contracts, so that the subject will be in an identifiable state, so the law will also have the possibility of intervention, and it further believes that the blockchain system and its application will increase the demand for traditional legal theories[33]. Scholar Kevin Werbach and Nicolas Cornell have made a more detailed analysis of this issue. They believe that if people want to have binding agreements, they need to be guaranteed. In the past, it was usually state power. With the development of science and technology, technology can also be used to regulate human behaviors, such as blockchain smart contracts. Even so, the traditional law remains a safeguard. The difference between the two is only that technology such as blockchain smart contracts is a means to advance the performance of contracts, which writes the content of contracts through accurate code

language, supplemented by transparent, non-tampering and automatic execution mechanisms to enhance transaction credit. The law is backward looking and a remedy, whose function is to provide relief to the victims after disputes. Therefore, the positioning of the two mechanisms is different, and there is no 'who replaces who' problem. Blockchain smart contracts still need law[34].

(II). Impact of blockchain smart contracts on traditional contract law.

(a) The legal attribute of smart contract.

First, whether the smart contract is a legal contract.

Scholar Alexander Savelyev and Morgan N. Temte argue that smart contracts may not belong to contracts. Because smart contract does not creat obligations, so the right does not exist. It believes that obligation has two important elements: one is orientation in the future,the other is "will"factor[35]. In other words, obligation is a certain behavior that the parties must do in the future, but the debtor has room for choice for the behavior, and it can choose to perform or choose not to perform. In the smart contract, nothing depends on the will of the debtor[36], so there is no obligation, it is not a contract. In addition, because there is no legal obligation in the smart contract, it will lead to all legal systems related to obligations can not be used, such as the way of performance, the time of performance, the consequences of non-performance and so on[37]. scholar Adam J. Kolber's view is similar to the above argument, but the reasons are different. He believes that the reason why smart contract is not a contract is that smart contract does not reflect the intended legal effect of the parties. He also cited the self-reported file of the decentralized organization as an example to show that the intent of parties was not to make code legally binding. In the absence of the intended legal effect, it is impossible to become a legal contract[38]. scholar Kevin Werbach and Nicolas Cornellare sceptical about this view, arguing that the difference between , ought , and , real , needs to be distinguished first. Parties may not intend to let the law adjust the smart contract at first, but it does not mean that they will not choose to be dealt with by the court after the dispute occurs. Secondly, although Ethereum pointed out that the smart contract is more like a , autonomous agent', should not be regarded as some kind of , should fulfill ,or' should abide by' things, but we should still be identified as a contract, because it is a voluntary mechanism based on the parties, and its purpose is to change the rights and obligations of the parties. In addition, even in the traditional contract law, not all contracts are executory. Some transactions can still be regarded as a contract although it leaves nothing open to be done or performed[39]. Scholar Nataliia Filatova believes that whether there is a legal effect depends on circumstances. If smart contracts are only used as automation technologies to collect some data, then they are only codes, rather than legally binding contracts. However, in the case of relying on the agreement of the two parties to conduct transactions, although the content is written in code, it does not mean that there is a lack of consensus between the two parties. Moreover, although smart contract is usually performed automatically and does not depend on the will and behavior of the debtor, it does not appear that there is no legal obligation: if the smart contract fails, the obligation is not fully fulfilled, and the victim can still require the other party to continue to perform and other liability for breach of contract[40].

Secondly, other legal attributes of smart contract. According to Max Raskin, smart contract is a new type of self-help behavior, because smart contract can make the third party enforcement mechanism out of scope, and the original relief can achieve the same effect through smart contract, so it can more effectively protect the interests of the parties. It also acknowledged that such a self-help behavior needed to be restricted and illustrated by examples of automotive engine stoppers, furniture alarms and smart contracts installed on people[41]. Arvind Narayanan believes that smart contracts are similar to Escrow transactions. Smart contracts simulate the function of Escrow : one party will put funds in another special third-party account, and the account will release funds only after receiving the goods, which can effectively overcome the prisoner ' s dilemma when both parties cannot fully trust each other[42]. Scholar Kevin Werbach and Nicolas Cornell argue that, first of all, it is not valid to compare smart contracts to self-help behavior because this qualitative approach ignores the substance of the protocol, in other words, the normal execution process of the protocol is not included in consideration, so this qualitative approach is too narrow. Secondly, smart contract is different from Escrow transactions, because traditional Escrow is realized by trusted third parties, and the parties themselves cannot be the third-party subjects. However, smart contracts do not meet this requirement, and they are completed by the parties themselves. Neither of the above two qualitative methods has grasped the essence of smart contract, and both regard smart contract as a means of promoting contract, while ignoring the contract nature of smart contract itself[43].

(b) The effectiveness of the contract.

The validity of the contract may not necessarily occur after its establishment, but may be flawed for various reasons, including the capacity of the subject, fraud by others, unilateral errors, etc.

Firstly, the influence of subject , s capacity on the effectiveness of blockchain smart contracts is discussed. The blockchain smart contract is difficult to identify due to its hidden user identity, which will make it difficult to identify the validity of the contract. In this regard, scholar Usha R. Rodrigues first believed that this pseudonym does not affect our identification of the user, and there are several methods to enable us to identify the identity of the parties.

1. The wallet address can be used to identify the user. If the user combines his real identity with the wallet address, the wallet address will be connected to the real identity of the parties.

2. The transaction of blockchain is completely transparent, and it is usually this transparency that makes multiple wallet addresses bound to the same user. Therefore, if one of these addresses is disclosed, the other can also be disclosed one after another[44]. Scholar Nataliia Filatova further believe that the problem of anonymity needs to be distinguished. If both parties communicate with each other offline, identification is not a particularly difficult thing.

However, if both parties only establish smart contracts on blockchain, the problem is more difficult. There are two solutions. One is to develop a new dispute resolution system to deal with disputes between digital identities in a special way. The other is to set up a general mechanism to disclose the real information of the smart contract publishers on the blockchain[45].

Secondly, With regard to fraud in smart contracts, Nataliia Filatova, a scholar, believes that in theory, the parties who sign smart contracts do not understand the content of the contract because they do not understand the code language. However, in fact, it is impossible for the signatories to have no expertise in blockchain smart contracts, because it is difficult for people who do not know to enter the blockchain[46].

Thirdly, with regard to unilateral mistake, scholar Andrew Luesley believes that because the smart contract is written by code, on the one hand, the code has the characteristics of certainty, and on the other hand, the blockchain smart contract cannot be modified. In addition, few people can understand both the law and the code to write legal provisions, so unilateral mistake will occur, which needs to be paid attention to[47].

Finally, scholar Max Raskin discussed the situation of violating the mandatory provisions of the law, and believed that this problem could be alleviated by pre-regulation. He cited the example of vending machines for analogy. For example, in some regions, alcohol sales were prohibited, so it could be supervised by prohibiting the installation of vending machines for selling alcoholic drinks. For example, if the price of goods sold by vending machines is too high and illegal, it can be achieved by monitoring the use of such vending machines in advance, and smart contracts are the same[48].

(c) Interpretation of the contract.

Firstly, with regard to the need for interpretation, scholar Mateja Durovic and Franciszek Lech argue that although the content of smart contracts is written in precise code, there is still a need for interpretation. Since the meaning of the contract is still reflected by the parties, the language of the contract is secondary, and the meaning of the parties is primary. When the meaning is inconsistent with the expression, it needs to be explained[49]. Scholar Alexander Savelyev further believed that because the technical complexity of smart contracts determines that the creation of such contracts requires advanced programming skills, in most cases the parties are entrusted to professional companies or experts to write. It is precisely because the people who write and use the code are different people that there may be a risk of understanding inconsistency between them. Therefore, it is necessary to explain this inconsistency when there is inconsistency[50]. Secondly, with regard to the rules of interpretation, Scholar Tiffany M. Sillanpaa argued that , prior rules , should be used when smart contracts coexist with traditional contracts, meaning that a prior contract would be used as a standard to determine the meaning of the parties. As for some people's concern about whether the interpretation rules should be different because of the difference between code language and natural language, she believes that taking into account the automatic execution characteristics of smart contracts may directly affect the interests of the parties, so it is valuable to adopt this interpretation. When only smart contracts exist, relevant experts can be invited to complete the task of explaining the code[51]. Scholar Nataliia Filatova believe that there are doubts about the adoption of the , prior principle ,. There are three reasons : a. it is impossible to determine whether the difference between ‚normal language' and ‚programming language , in actual effect is due to language differences ; b. it is difficult to determine which contract is the first one ; c. if the contract has been

clearly agreed, then the agreement of the parties shall prevail. On this basis, when the two are inconsistent, it should be based on the traditional contract[52].

(III). The issue of smart contracts.

(a) The rigidity of smart contract.

Scholar Jerry I-H Hsiao analyzed it from a theoretical point of view, arguing that, in the traditional sense, most contracts are incomplete and usually do not give precise and detailed explanations of what will happen in every future situation, but rather more to stay in the future. There are reasons why contracts take this approach, the most typical of which is that the cost of forecasting everything in the future is too high and that incomplete contracts can significantly reduce negotiation costs and improve efficiency. Smart contracts, on the contrary, are full contracts and cannot be changed and executed automatically, making it difficult to adapt to transactions in modern society[53]. Scholar Kevin Werbach and Nicolas Cornell further believe that the smart contract attempts to fix the contract process, which eliminates the possibility of interaction between the parties in the future and the uncertainty of judicial decisions. But behind the smart contract is the real person, reflecting the real relationship. When the various factors in the communication change, the smart contract is difficult to respond quickly[54]. From the perspective of transaction practice, Riccardo de Caria believe that in real economic transactions, it is very common for debtors to bear debts that exceed their total net assets. This mechanism plays an important economic function, which can not only double the growth of personal assets, but also increase commercial liquidity and promote economic development. However, if these operations are used in smart contracts, they will encounter huge blockages. Since smart contracts will verify the rest before they start, it is difficult to achieve the above effect[55]. such like Scholar Scott A. McKinney have made further analysis from the perspective of the compensation clause. They believe that it may be unrealistic to construct the compensation clause in the smart contract, because many of these variables are difficult to translate into certain code. Even if the conditions for triggering compensation can be set, the smart contract can not do anything once the amount of compensation and the fees of lawyers are involved[56]. Scholar Morgan N. Temte believes that it is difficult to deal with fuzzy and uncertain factors due to the characteristics of blockchain smart contracts, so it can play a more important role in the face of specific problems rather than abstract problems[57].

(b) The unfairness of smart contract.

Scholar Alexander Savelyev first argued that the entire architecture of smart contracts does not protect vulnerable parties, such as consumers. Because consumers have no time to read terms and conditions when signing a contract, even if they read it, they may not understand what it means, and they have no room for discussion with publishers, even if they are not satisfied and want to change the seller, the result will not change. Therefore, consumer law and other laws regulating unfair legal relationships may not be applicable to smart contracts[58]. Scholar Riccardo de Caria further believe that smart contracts may eventually enable the stronger party to have more powerful weapons to safeguard their interests, and in essence, it is suspected that it will contribute to the view that the law is a tool of the economically

powerful class. It is therefore necessary to involve laws protecting vulnerable parties in the application of smart contracts[59]. Scholar Joseph Lee and Vere Marie Khan put forward possible solutions to the above problems.

On the one hand, mixed contract mode can be adopted, that is, there are traditional contracts besides smart contracts. In this mode, provisions related to law (such as guarantee clauses) can be managed by traditional contracts, while simpler behaviors are adjusted by smart contracts.On the other hand, blockchain smart contracts should be designed to better help users understand relevant clauses before signing contracts. For example, some mechanisms can be designed to track the time spent by users on a webpage to ensure that users read all the clauses[60].

(c) Post-relief of smart contract.

Scholar Riccardo de Caria raised their own concerns about this issue. He believed that regardless of the impact of blockchain technology on traditional legal remedies (such as reducing the probability of default), it is difficult to achieve the protection of victims even from the perspective of traditional legal remedies. Taking enforcement as an example, when one party fails to perform and the court decides to enforce, it is necessary to cooperate with the parties holding the private key of the wallet. If the key exists in the mind of the holder and the holder does not cooperate, then enforcement is almost impossible, so the afterwards remedy may be invalid. And it further believes that, at least today, the power of cryptography is the strongest in centuries, which could launch an unknown ,attack' on national sovereignty, and we need to pay more attention to these issues[61].

(d) Blockchain smart contract and tort.

It is generally believed that smart contract belongs to computer software[62], and the infringement discussion related to smart contract is mainly reflected in the field of software tort. Scholar Morgan N. Temte believes that smart contracts may lead to tort, because the code of smart contracts is written by people. On the one hand, the coder may make mistakes ; on the other hand, it may mislead the execution direction of smart contracts by using the " virus " code[63]. Scholar Jeceaca An further defines the distributed account book as a software application, which is one of the most important underlying technologies of blockchain. The developer is essentially a manufacturer, and the platform company is the distributor of the developed software. If there are faults such as the effect of smart contracts is not recognized due to recording errors, it can be handled according to product liability[64].

(e)Smart contract dispute resolution and jurisdiction.

According to Scholar Reggie O'Shields, the operator of the platform should specify the law applicable to the settlement of disputes and the dispute settlement body, while the users of the platform can agree in advance on the way of dispute settlement, the use of law, the competent court, etc., in order to facilitate subsequent relief[65]. Scholar Morgan N. Temte further believed that in addition to matters such as jurisdiction agreed by the parties, jurisdiction courts can be determined according to the transaction objects of the smart contract. For example, if a real estate is traded by the smart contract, then the jurisdiction naturally belongs to the court where the real estate is located. And there may be specialized courts in the future to resolve

disputes related to smart contracts, just like intellectual property courts[66]. Scholar Scott A. McKinney et al. argued that a special independent dispute resolution body should be formed, not under the authority of the Government, and that disputes in smart contracts could be resolved by digital online means, in which parties in different countries could resolve disputes efficiently and expeditiously without travel and additional costs[67]. Scholar Michael Buchwald has made a systematic analysis of this problem. By analyzing several existing dispute resolution mechanisms on blockchains and comparing them with traditional dispute resolution mechanisms, he believes that there are the following problems in the dispute resolution mechanism on the chain: the lack of evidence mechanism based on application and authority leads to easier concealment of evidence, defective incentive mechanism, and the lack of legal guidance leads to unfair referee results. Therefore, independent chain dispute resolution mechanism is not feasible. He believes that the feasible way is based on the scale and type of disputes as the standard, the combination of on chain and off chain way to solve. Relatively simple and mechanical disputes are solved through the chain, while more complex disputes are solved by the traditional way under the chain[68].

(f) The legal qualification of smart contract writers.

Scholar Morgan N. Temte proposed that smart contracts may lead to unauthorized legal work. Generally speaking, persons who have not obtained legal professional qualifications are not allowed to engage in legal work, while the various legal provisions in smart contracts are prepared by a computer coder, which is an unauthorized legal work act[69]. Scholar Jeceaca An further believes that the coders of smart contracts are engaged in a job done by lawyers in the past. Therefore, the duties of such coders should be strengthened. They should bear higher obligations than ordinary programmers. They must provide users with accurate legal materials and protect relevant sensitive information[70]. Scholar Louis-Daniel, Muka Tshibende, from the lawyer ,s point of view, believe that the final presentation of smart contracts will be largely affected by these coders, so lawyers need to be present to ensure that what they do meets the requirements of the law. In addition, in the future lawyers in addition to the need to master legal skills, they may also need to be as familiar with digital technology as possible[71]. Scholar Kevin Werbach, Nicolas Cornell even believe that a ‚legal engineer' may be revealed to help users create smart contracts in future[72].

3.2. survey reviews in other countries

For one hand, the current studies in other countries are mostly limited to Contract Law, it should take into account the relationship between other law and Contract Law. Between civil law and the choice is not completely separated, in a sense, smart contract has already influenced on civil law, which means that it may be associated to other law, which includes public law. Taking criminal law as an example, the relationship between Criminal Law and Civil law is actually the relationship between postposition law and preposition law[73]. Theoretically speaking, the violation of postposition law is bound to violate the preposition law. Acts adjusted by Criminal Law will also be adjusted by Civil Law, anyway the difference is degree of violation. The general violations are adjusted by Civil Law, while serious violations are specially adjusted by Criminal Law. Will blockchain smart contract could break through this

boundary due to the existence of such features as automatic execution and subject pseudonymy? The validity of contracts are often affected by public interest in public law. Will smart contract have a new impact on it? As many scholars have observed the question related to smart contract and vulnerable protection, Consumer Rights and Interests Protection Law is aiming to supply with a special protect for disadvantaged consumers, while smart contract are equal in formally, but modern civil law is not only in pursuit of equality formally, but also in pursuit of substantive justice. Therefore., it is necessary to take a deep research on the legal boundaries of smart contract in terms of civil law and other laws.

The existing studies have rarely discussed about the excessive energy consumption of blockchain. Human's ability is limited, the world's resources are limited too, these two constraints determine that human need to live in harmony with the world, in order to achieve the sustainable goal of survival[74]. At present, all countries all around the world have realized the importance of energy conservation. In 1979, Japan formulated the „Rationalization of Energy Utilization Law", and it further encourages enterprises to save energy and strengthens the punishment for enterprises or products that fail to meet the standards. The EU issued Directive for Energy using Products on July 6, 2005, which regulates the design, production and other processes of products,which are relying on energy input to complete their functions, and the directive has regulated the responsibility of producers[75]. While in China, Energy Conservation Law was passed in 1997, and green principles were written into the newly promulgated Civil Code. As several scholars have mentioned that the operation of blockchain consumes plenty of resources, especially electric power resources. Therefore, it is urgent to balance the excessive consumption with the benefits brought by blockchain.

¹ J. Chen, *The legal structure of smart contract*, Oriental Law 2019, no. 3, pp. 22-23.

² K. Xu, *Smart contract in the decision of cross matrix*, Oriental Law 2019, no. 3, p. 49.

³ S. Guo, *Blockchain Smart Contracts in Contract Law*, Oriental Law 2019, no. 3, pp. 9-12.

⁴ Z. Chai, *Thoughts on Contract Law of Smart Contracts Under Blockchain*, Social Sciences in Guangdong 2019, no. 4, pp. 240-241.

⁵ Y. Wang, The Construction and Risk Prevention of Smart Contract, Law Science Magazine 2019, no. 40 (02), pp. 44-45.

⁶ See Z. Chai, *Thoughts on...,* pp. 242-243.

⁷ J. Chen, *The legal...*, pp. 24-27.

⁸ See S. Guo, *Blockchain Smart...*, pp. 12-13.

⁹ X. Li, S. Ma, *Research on Block—Chain Smart Contract under Contract Part of Civil Code*, Journal of Shanghai Normal University (Philosophy & Social Sciences Edition) 2020, no. 49 (05), pp. 52-63.

¹⁰ Z. Chai, *Thoughts on...*, p. 245.

¹¹ See X. Li, S. Ma, *Research on...*, pp. 63-64.

¹² See S. Guo, *Blockchain Smart...*, pp. 13-14.

¹³ Q. Xia, *Smart Contract and Its Application*, Oriental Law 2019, no. 03, pp. 34-35.

¹⁴ Y. Ni, Civillaw analysis,application and enlightenment of smart contract under blockchain technology, Journal of Chongqing University Social Science Edition 2019, no. 25 (03), pp. 176-177.

¹⁵ See Q. Xia, *Smart Contract...*, pp. 36-37.

¹⁶ See Z. Chai, *Thoughts on...*, p. 241.

¹⁷ See K. Xu, *Smart contract...*, pp. 49-50.

¹⁸ See Y. Ni, *Civil law analysis...*, p. 178.

¹⁹ See Z. Chai, *Thoughts on...*, pp. 245-246.

²⁰ See S. Guo, *Blockchain Smart...*, pp. 15-16.

²¹ J. Chen, *Technological Specter of Spreading Trusts,* Overview of Blockchain Legal Research, Exploration and Free Views 2019, no. 12, p. 89.

²² See Q. Xia, *Smart Contract...*, pp. 39-40.

²³ See Z. Chai, *Thoughts on...,* pp. 241-243.

²⁴ See Y. Ni, *Civil law analysis...*, p. 179.

²⁵ See Y. Wang, *The Construction...*, pp.47-48.

²⁶ See K. Xu, *Smart contract...*, p.52.

²⁷ Y. Cai, *On the Conformity of Smart Contract to the Private Law System*, Oriental Law 2019, no. 2, p. 70.

²⁸ See Y. Wang, *The Construction...*, p.49.

²⁹ L. O. Yang, Smart *Contracts: Architecture and Research Progresses*, Acta Automatica Sinica 2019, no. 3, p. 452.

³⁰ See K. Xu, Smart contract..., pp. 54-55.

³¹ T. M. Sillanpaa, *Freedom to (Smart) Contract: The Myth of Code and Blockchain Governance Law*, IALS Student Law Review, vol. 7 (no. 2), Autumn 2020, p. 42.

³² K. V. Egorov and M. V. Fetyukhin, *Protection of Rights of the Parties of the Agreement Provided by Smart-Contract: Arbitrability*, Herald of Civil Procedure, vol. 2018 (no. 1), 2018, pp. 104-105.

³³ J. Rohr, *Smart Contracts in Traditional Contract Law, Or: The Law of the Vending Machine*, 67 Clev. St. L. Rev. 67 2019, p. 87.

³⁴ K. Werbach, N. Cornell, *Contracts Ex Machina, Duke Law Journal*, vol. 67, no. 2, November 2017, p. 361.

³⁵ A. Savelyev, *Contract Law 2.0: Smart Contracts as the Beginning of the End of Classic Contract Law*, HSE Working papers, 2016, p. 17.

³⁶ M. N. Temte, *Blockchain Challenges Traditional Contract Law: Just How Smart Are Smart Contracts,* Wyoming Law Review, vol. 19, no. 1, 2019, p. 103.

³⁷ See A. Savelyev, Contract Law..., p. 18.

³⁸ A. J. Kolber, *Not-So-Smart Blockchain Contracts and Artificial Responsibility*, Stanford Technology Law Review, vol. 21, no. 2, Spring 2018, pp. 220-221.

³⁹ See K. Werbach, N. Cornell, Contracts Ex..., pp. 340-341.

⁴⁰ N. Filatova, *Smart contracts from the contract law perspective: outlining new regulative strategies,* International Journal of Law and Information Technology 2020, no. 28(3), p. 224.

[41] M. Raskin, *The Law and Legality of Smart Contracts*, 1 GEO. L. TECH. REv. 2017, no. 305, pp. 333-340.

[42] A. Narayanan et al, *Bitcoin and cryptocurrency technologies*, 2016, pp. 84-85.

[43] See K. Werbach, N. Cornell, *Contracts Ex*..., p. 348.

[44] Rodrigues, *Usha R, Law and the Blockchain*, Iowa Law Review, vol. 104, no. 2, January 2019, pp. 711-712.

[45] See N. Filatova, *Smart contracts*..., pp.233,236,238.

[46] See ibid., pp.237-238.

[47] A. Luesley, *Unravelling Smart Contracts: Smart Contracts and the Law of Rescission in Canada,* Asper Review of International Business and Trade Law 2019, no. 19, p. 164.

[48] See M. Raskin, *The Law*..., p.325.

[49] See A. Savelyev, *Contract Law*..., p. 24.

[50] See ibid., p. 24.

[51] See T. M. Sillanpaa, *Freedom to*..., pp. 39-40.

[52] See N. Filatova, *Smart contracts*..., pp. 230-233.

[53] J. I.-H. Hsiao, *Smart Contract on the Blockchain-Paradigm Shift for Contract Law,* US-China Law Review, vol. 14, no. 10, October 2017, p. 692.

[54] See K. Werbach, N. Cornell, *Contracts Ex*..., p. 367.

[55] R. de Caria, *Blockchain and Smart Contracts: Legal Issues and Regulatory Responses Between Public and Private Economic Law*, Corporate and Financial Markets Law, p. 375.

[56] S. A. McKinney, R. Landy & R. Wilka, *Smart Contracts, Blockchain, and the Next Frontier of Transactional Law*, 13 Wash.J. L. Tech.& Arts 2018, pp. 328-329.

[57] See M. N. Temte, Blockchain Challenges..., p. 98.

[58] See [39], p.20.

[59] See [59], p.371.

[60] J. Lee and V. M. Khan, *Blockchain and Smart Contract for Peer-to-Peer Energy Trading Platform: Legal Obstacles and Regulatory Solutions*, UIC Review of Intellectual Property Law 2020, vol. 19, no. 4, pp. 290-295.

[61] See [59], Riccardo de Caria.

[62] See Alexander Savelyev, Max Raskin.

[63] See M. N. Temte, B*lockchain Challenges*..., pp. 109-111.

[64] J. An, *Framing Regulation around the Potential Liabilities of Parties in the Blockchain & Smart Contrac*t Industry, Fordham Journal of Corporate and Financial Law 2020, vol. 25, no. 2, pp. 544-547.

[65] Reggie O'Shields, *Smart Contracts: Legal Agreements for the Blockchain*, North Carolina Banking Institute 2017, no. 21, p. 191.

[66] See M. N. Temte, *Blockchain Challenges*..., pp. 108-109.

[67] See S. A. McKinney, R. Landy & R. Wilka, *Smart Contracts*..., p.34.

[68] M. Buchwald, *Smart Contract Dispute Resolution: The Inescapable Flaws of Blockchain-Based Arbitration*, University of Pennsylvania Law Review, vol. 168, no. 5, April 2020, pp. 1386-1390, 1395, 1405-1408.

[69] See M. N. Temte, *Blockchain Challenges*..., p.106-108.

[70] See J. An, *Framing Regulation*..., pp. 556,562.

[71] L.-D. M. Tshibende, *Contract Law and Smart Contracts Property and Security Rights Issues, European Review of Private Law 2019*, pp. 871–884.

[72] See K. Werbach, N. Cornell, Contracts Ex..., pp. 374-375.

[73] X. Chen, *The Influence of Civil Law on Criminal Law and the Response of Criminal Law to Civil Law*, Studies on Law and Business 2021, no. 38(02), pp. 27-30.

[74] G. Xu, *Philosophy of Civil Law*, Beijing:Legal Press 2021, no. 1, pp. 21-22.

[75] S. Xia, L. Y. Hao., *The significance of EU's Ecological Design Directive for improving China's laws and regulations toward energy conservation and emission reduction legal study*, Legal Press 2008, no. 6, pp. 11-13.

ABSTRAKT:

PL: Artykuł został poświęcony problematyce inteligentnych kontraktów (smart contracts) zawieranych w sieci blokchain. Teoretyczna analiza poglądów na wskazany temat prowadzi do wniosku, że są w tym zakresie różnice pomiędzy badaniami prowadzonymi w Chinach a badaniami prowadzonymi w innych państwach. W pierwszym z państw zwraca się przede wszystkim uwagę na trzy aspekty inteligentnych kontraktów. Są nimi: charakter prawny inteligentnych kontraktów, ich wpływ na tradycyjne prawo umów, a także możliwe problemy związane z zastosowaniem w stosunku do nich odpowiedniej regulacji prawnej. Badania w innych państwach koncentrują się na: związku z inteligentnych kontraktów z prawem, wpływu tych kontraktów na prawo umów oraz potencjalnym ryzyku jakie niosą za sobą inteligentne kontrakty.

ENG: This paper reveals that there are different perspectives for theoretical research of Blockchain Smart Contracts between China and other countries. Chinese scholars are mainly focused on three aspects in terms of the legal attribute, influence among traditional Contract Law and potential legal problems of Blockchain Smart Contract. While relative researches in other countries contain the relationship between Blockchain Smart Contracts and Laws, the impact of Blockchain Smart Contracts on traditional contract system and potential risks of Blockchain Smart Contracts. Survey reviews that although Chinese scholars have made specific analysis on Smart Contract, but there is still room for further research, including Guarantee, Interpretation, Jurisdiction of Smart Contract. Yet current studies in other countries are inclined to conduct the study from the perspective of Contract Law theory, probably the relationship between other Law and Contract Law should be considered. Nowadays most countries have realized the importance of energy conservation. the operation of blockchain consumes plenty of resources, especially electric power resources. Therefore, it brings an important issue on balancing the Legislative contradiction between energy conservation and rational utilization of Blockchain Smart Contracts.

SŁOWA KLUCZOWE:

PL: Blockchain Smart Contract, akt prawny, prawo zobowiązań, oszczędność energii

ENG: Blockchain Smart Contract, Legal Act, Contract Law, energy conservation