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Smart Contracts and International Trade: European Legal Strategies for Managing Challenges

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Abstract

Objective: The automation inherent in smart contracts makes them an attractive tool for global trade applications, especially for the automation of transactions. The prospects foreseeable will significantly impact international economic relations and the transformation of international trade rules. This fact determines the study objective – to identify the possibilities of transforming the said rules and the political and legal strategies adopted by European countries to implement smart contracts in international trade.

Methods: the study, devoted to the current international trade regulation in the context of contracts digitalization and spread of smart contracts, uses a combination of formal-legal and comparative-legal methods. They allow researching the international trade rules, analyzing and comparing the UK and the EU political and legal positions on the smart contracts introduction in international trade, as well as predicting the legal consequences of using smart contracts in international trade.

Results: the research shows that the proliferation of smart contracts has significant implications for international trade and its regulation. Smart contracts have numerous advantages, such as increased efficiency, reduced costs, and wide availability. However, they may lead to legal challenges when harmonizing traditional legal principles with the digital

environment, in particular concerning the authentication of subjects, enforceability under specific circumstances of a case, and jurisdictional issues.

Scientific novelty: the current literature on the transformation of international trade regulation in the context of digitalization processes and the spread of smart contracts is complemented by the results of a comparative analysis of the legal positions existing in the European legal space and developed on the basis of problems, lessons and achievements in the smart contracts implementation in international trade.

Practical significance: understanding the legal implications of smart contracts is important for businesses involved in international trade. The study provides insights into the UK and the EU legal positions from which guidance can be provided to companies navigating the digital landscape. Policymakers can also benefit from the findings when developing appropriate legal acts to balance the benefits of smart contracts with the need for legal certainty and protection in international trade.

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Introduction

Smart contracts are digital agreements that can be autonomously executed, enabling the corresponding parties to transfer digital and physical assets or anything of value between themselves in an open and conflict-free way (Hewa et al., 2021). American computer scientist Nick Szabo, designer of the digital currency Bit Gold, defined «smart contracts» as «computerized transaction protocols that execute terms of a contract» in 1998[1]. Satoshi Nakamoto also has planted the idea of a smart contract in his 2008 publication, Bitcoin: A Peer-to-Peer Electronic Cash System (Nakamoto, 2008). The number of bitcoins in circulation and the authority to create and move Bitcoins are monitored and controlled by a distributed database that runs on smart contract software. Similar to how vending machines have replaced human vendors, smart contracts have the potential to make intermediaries obsolete across a variety of sectors, as explained by Nick Szabo.

An individual who needs to finalise a complex transaction involving a substantial amount of money would typically seek the advice of a lawyer or notary, pay said professional, and then wait while the task was completed and the contract's conditions were met (Vatiero, 2023). Before the lawyer verifies that all paperwork has been correctly performed, he will not get access to the funds or the property. Simply by placing a bitcoin on the ledger, it can immediately obtain the deed, contract, products, driver's license, or whatever else is promised by the smart contract. Smart contracts introduce an extra software layer between consumers and blockchain storage (Ferreira, 2021). Smart contracts execute the logic necessary to provide a complicated service in reaction to demands from customers. This includes things like managing states, enforcing governance, and checking identities. Smart contracts allow users to store and access data from blockchain storage without the need to perform searches. To instead reach the core blockchain storage structures, smart contracts provide a computer interface (Bandara et al., 2019).

For centuries, the United Kingdom has maintained a solid system of law and is among the countries that are currently investigating and implementing smart contracts. In November 2021, Dominic Raab MP, who holds the positions of Lord Chancellor and Secretary of State for Justice, delivered a proposal for Smart legal contracts Advice to Government, which is regarded as a progressive measure in the ongoing process[2]. European Union countries have also taken smart measures related to smart contracts in recent years. This paper is focusing on the implementation process of smart contracts within the UK and in EU while analysing the impact of them on international trade regulations in the context of digitalisation. The study also aims to evaluate the legal framework of the UK and the EU with respect to smart contracts. It seeks to assess the compatibility of the legal framework with smart

1 Zapotochnyi, A. (2022, October 19). What are smart contracts?. Blockgeeks. https://clck.ru/36kyjY

2 The Law Commission. (2021). Smart legal contracts Advice to Government. https://goo.su/FohUZ

contracts and examine the challenges and achievements encountered in promoting smart contracts in international trade (Zhang et al., 2023).

Black letter research, also known as doctrinal research, is an approach that primarily involves the analysis of legal sources, such as statutes, case law, and legal commentary (Fatima, 2023). A comprehensive analysis of the existing legal framework for smart contracts in the UK and EU had conducted utilising above research method. The study has analysed relevant documents, such as academic literature, government reports, and industry publications, to gain insights into the legal and regulatory framework, use cases, benefits, challenges, and lessons learned from the UK's experience with smart contracts. The analysis had focused on identifying any legal challenges facing the adoption of smart contracts in the UK and any legal solutions that can be implemented to address these challenges.

Qualitative research which is an approach that involves exploring and understanding the meanings, experiences, and perspectives of individuals or groups through methods such as observations, and document analysis also had used as a methodology in this paper.

1. How smart contracts work?

There are several kinds of smart contracts such as smart legal contracts and Ricardian contracts. Smart contracts can be used to facilitate a wide variety of business processes, asset exchanges, and other kinds of deals, the details of which are determined by the parties involved based on their level of cooperation and their desired outcomes (Ji et al., 2023; Ante, 2021). An occurrence or situation, such as a shift in a financial market indicator or a user's GPS coordinates, can initiate a smart contract either by the parties to the contract or on their behalf (Gunay & Kaskaloglu, 2022; Wang et al., 2023a). When the requirements of a computer software are met, the programme runs automatically without any further input from the programmer. Communication between the participants to a smart contract can be authenticated and transmitted securely due to encryption (Kirli et al., 2022). Ethereum is currently the most popular tool for creating and implementing smart contracts, but other blockchain-based cryptocurrencies like EOS, Neo, Tezos, Tron, Polkadot, and Algorand can do the same thing (Sathiyamurthy & Kodavali, 2023; Liu et al., 2023). Each network server will update its own record after smart contracts have been executed to reflect the operational state of the network at that time. The document can no longer be edited after it has been uploaded to the blockchain network and verified. The trustworthiness of international trade contracts can be effectively addressed by employing the immutable and distributed properties of the blockchain (Pishdad-Bozorgi & Han Yoon, 2022).

The Ethereum Virtual Machine (EVM) is accountable for the administration of smart contracts on the Ethereum blockchain within the Ethereum platform (Liu et al., 2022; Wang et al., 2023b). Prior to initiating any compiled smart contract on specific blockchains, it is mandatory to make payment of a transaction fee known as the 'gas' fee. In regards to operational procedures, a complex smart contract will incur a greater gas cost for its execution. The utilisation of gas is implemented to safeguard the Ethereum Virtual Machine

from potential overloading caused by smart contracts that are either excessively intricate or excessively numerous (Eenmaa-Dimitrieva & Schmidt-Kessen, 2019). At its fundamental level, gas can be conceptualised as the propulsive agent that propels the smart contracts of Ethereum. Insufficient gas reserves would impede the network's ability to carry out transactions. Each transaction is associated with a gas fee, and the initiation of transactions is contingent upon the distribution of contracts throughout the network. The execution of Ethereum transactions requires a significant number of computational resources. The computation required for a transaction determines the gas fee charged[3].

2. Background of smart contracts in UK and EU

2.1. Approach of the UK

The UK government's «Innovate UK» programme began selling Blockchain as a service (BaaS) on August 3, 2016. HM Revenue and Customs is evaluating the adoption of blockchain technology, in addition to exploring various other technical alternatives, for the purpose of enhancing tax and customs as well as excise systems. In May 2016, the Parliamentary Office of Science and Technology (POST) generated a concise report on Financial Technology, with particular emphasis on four nascent domains, one of which was Distributed Ledger Technology (DLT). In January 2018, POST released a document titled «topics of interest», wherein distributed ledger technologies (DLTs) were identified as an area requiring further research. A trial has been conducted by the Department for Work and Pensions in collaboration with GovCoin to explore the potential of blockchain technology in facilitating welfare payments (Hughes et al., 2018). The UK Jurisdiction Taskforce (UKJT) reached a conclusion in 2019 that the enforceability of smart contracts is contingent upon the specific circumstances of the case. The Law Commission had been assigned the task of assessing the reliability of the existing legal and legislative framework in light of the requirement to manage smart legal contracts, highlighting any uncertainties, and/or suggesting new and/or updated laws if necessary (Ferro et al., 2023). Despite these legislative efforts, however, there is still a dearth of studies evaluating the success of these measures in implementing smart contracts in the UK (Blaszczyk, 2023).

2.2. Approach of the EU

On April 11, 2018, twenty-two countries across Europe joined forces to establish a new body known as the European Blockchain Partnership. This coalition of nations includes the Netherlands, Germany, France, Norway, and Spain, amongst others. Mariya Gabriel, the European Commissioner for Digital Economy and Society, stated that Blockchain

[3] Frankenfield, J. (2022, September 27). Gas (Ethereum): How Gas Fees Work on the Ethereum Blockchain. Investopedia. https://clck.ru/36kytz

is an excellent opportunity for Europe and member states to reconsider their information systems, to encourage confidence in users and the safety of personal data, to help develop new business opportunities and to establish emerging fields of leadership, which will benefit the public, public services, and business entities.

The concept of an "E-Resident" was first introduced in Estonia in 2014. People from all over the world participated in the digital programme by becoming digital residents and registering companies in Estonia. Confronting this situation, the blockchain movement emerged, which promotes the decentralisation of services. Combining Estonia's E-resident programme with blockchain technology is a smart move. E-Estonia is an Ethereum-based programme at the moment. Official preparations for an ICO in Estonia are still in the works. The ESTcoin was created to add a new dimension and convenience to the E-resident scheme. Improvements are on the horizon for the E-resident Ecosystem (Kim, 2023).

The European Parliament approved new data controls for inclusion in a bigger bill on data privacy on March 14th, 2023. The bill is intended to handle data privacy without stifling innovation (Perez & Zeadally, 2023). All smart contracts must now have a «kill switch,» per a new provision in the law known as the Data Act. In the event of a security breach, administrators of IT frequently use a «kill switch» method to immediately disable a system. In the event of a critical flaw or breach, a kill switch in a smart contract programme can either immediately terminate the contract or stop, patch, and re-release it[4].

3. Legal background for international trade in UK and EU

3.1. International trade policy of the UK

The prosperity of both the UK's economy and the global economy is contingent upon the presence of unrestricted and impartial trade. Consequently, the escalation of wages leads to an increase in the accessibility of a wider spectrum of reasonably priced commodities and amenities, thereby resulting in augmented household earnings, especially for the most susceptible segments of the populace. More than 50 % of the UK's Gross Domestic Product is comprised of its international trade activities. The UK formally departed from the EU on January 31, 2020, following a referendum held in June 2016. The European Union (Withdrawal) Act 2018 was implemented by the UK to assimilate EU laws and regulations into the domestic legal framework of the country. This was done by substituting references to EU organizations, laws, and regulations with corresponding UK references, with the aim of ensuring continuity in legal coverage and processes and avoiding any potential disruptions. Following the events of January 1, 2021, it can be observed that the legal and regulatory frameworks of both the UK and the EU were almost similar. However, it is noteworthy that the UK now possesses the autonomy to modify its laws and regulations without seeking

[4] Shamai, S. (2023, March 29). The EU's Smart Contract 'Kill Switch' Mandate Won't Kill Crypto. Coindesk. https://clck.ru/36kywE

consultation from the EU. The UK and EU have recently reached an agreement on the UK-EU Trade and Cooperation Agreement (TCA), which came into effect on January 1, 2021. This new trade deal ensures that both parties can continue to access each other's markets without incurring tariffs or quotas, while also allowing for independent regulatory frameworks for the UK and EU (Buigut & Kapar, 2023). As per the provisions of the TCA, it is permissible for either party to endeavour to modify the agreement by altering market access obligations in the event of significant trade implications arising due to variations in domestic regulatory frameworks[5].

The implementation of the UNCITRAL Model Law on Cross-Border Insolvency in the UK has been carried out through the Cross-Border Insolvency Regulations 2006. The UK's early consideration of the implementation of these measures will serve as a clear indication of its continued dedication to mutual collaboration and adherence to global standards. Smart contracts are legally valid under the Convention on the International Sale of Goods, as they satisfy the offer and acceptance criteria specified in Articles 14 and 18. Nevertheless, it is noteworthy that the UK persists as one of the few industrialised countries globally that has yet to implement the CISG. There exist several factors contributing to this phenomenon, such as the fact that the CISG exhibits a greater inclination towards civil law, a lack of sufficient motivation on the part of businesses to advocate for its ratification, and the potential for a reduction in the significance of London as a centre for commercial arbitration (Hoekstra, 2021).

3.2. International trade policy of the EU

The trade and investment policy of the EU is responsible for managing its trade and investment relations with countries outside of the EU. It is the responsibility of the EU, not the national administrations of individual member countries, to conduct trade with countries outside the EU. The EU institutions are responsible for the creation of legislation pertaining to trade affairs, as well as engaging in the negotiation and finalisation of global trade accords. The EU adheres to the fundamental principles of the World Trade Organization. During June of 2018, amidst increasing trade tensions on a global scale, the European Council emphasised the importance of safeguarding and enhancing the multilateral system that operates based on established rules. The EU has conveyed its willingness to enhance the operational efficiency of the World Trade Organization in collaboration with other nations that share similar views. Trade agreements are intricate in nature as they comprise of legal documents that encompass a broad spectrum of activities, ranging from agriculture to intellectual property. However, they exhibit a multitude of underlying principles that are common[6].

5 GOV.UK. (2018). UK trade policy: A guide to new trade legislation. https://clck.ru/ZBrtd

6 European Commission. Making Trade Policy. https://clck.ru/36kz2m

4. How digitalisation of Contracts in UK and EU

4.1. Legal Progress of the UK

The Thirteenth Programme of Law Reform requested the Law Commission to undertake research and analysis on the subject of smart legal contracts, as per the direction of the Lord Chancellor. The legal statement on crypto assets and smart contracts was published by the UK Jurisdiction Taskforce ("UKJT") in November 2019. As per the UKJT Legal Statement, it has been determined that smart contracts possess the potential to generate legally binding obligations that can be enforced in accordance with their respective terms. Subsequently, the Ministry of Justice has requested the Law Commission conduct a comprehensive examination of the existing legal framework concerning smart legal contracts. Therefore, the commission has carried out further analysis aimed at elucidating any ambiguities or deficiencies in the current legislation and determining any additional research that may be necessary at present or in the future.

In cases where contractual disagreements arise, the courts will rely on a particular publication that provides an interpretation of the contracts in question. This publication stipulates that the courts will assess the meaning of the programming language used in the contract from the perspective of a rational programmer, taking into account all relevant contextual information that was available to the parties involved at the time the contract was formed. According to the perspective of the Law Commission, it is imperative to subject even intelligent legal contracts that are composed entirely of code to interpretation, given the potential for a discrepancy between the intended meaning of the code and its actual execution. This is due to the distinction between the semantic interpretation of the code and its practical implementation. The incorporation of code within the interpretive framework may potentially result in interpretational challenges. According to the Law Commission, it is recommended that the assessment utilised should be a variant of the conventional test, wherein the interpretation of a coded term would be based on the comprehension and awareness of an individual with expertise in the relevant field (Durovic & Willett, 2023). According to the Commission, this aligns with the prevailing method of construing contracts.

The importance of certainty from a legal standpoint cannot be overstated. It is noteworthy that English law is acknowledged as having the capacity to incorporate smart contracts. This implies that in cases where a smart contract is subject to English law, the parties involved in the computerised global trade agreement should feel reassured. Furthermore, the report by the Law Commission presents factors that contracting parties should take into account, which will be especially relevant to individuals working in the realm of Decentralised Finance.

4.2. Legal Progress of the EU

Legislation pertaining to smart contracts and the internet of things was adopted by the European Parliament on March 14th of 2023, as part of the Data Act. The legislation was approved by a significant majority of five hundred votes in favour and twenty-three against,

with the objective of promoting the growth of business models to foster the emergence of novel industries and employment opportunities. The Data Act's Article 30 comprises stipulations concerning the fundamental prerequisites concerning smart contracts for the purpose of data sharing (Casolari et al., 2023). Commencing in 2024, corporations must comply with the newly established regulations in order to offer their services or merchandise to consumers located within the EU. The Act's content was adopted by the European Parliament and is currently slated for trialogue. Upon approval of the Act, a nationwide implementation period of 12 months will follow.

The implementation of the Data Act necessitates the establishment of mechanisms that can effectively cease the ongoing execution of transactions. These mechanisms may include internal functions that facilitate the resetting of the contract or provide instructions for its termination. It is imperative to establish a precise delineation of the circumstances that warrant the resetting or cessation of a smart contract. Within the realm of information technology, administrators frequently employ the kill switch mechanism as a means of terminating a device, network, or software in response to a security threat (Philip & Saravanaguru, 2022). Within the context of a smart contract environment, a kill switch has the capability to either terminate the contract or initiate a cessation, repair, and subsequent reissue of the contract in the event of a significant vulnerability or violation (Chu et al., 2023).

The Data Act represents a crucial initiative aimed at enhancing the accessibility of data in accordance with the principles and regulations of the EU. It constitutes a fundamental component of the European data strategy. This will significantly contribute to the objective of digital transformation outlined in the Digital Decade initiative. The evaluation of adherence to the fundamental prerequisites will be conducted by the smart contract vendor or provider. Subsequently, they will be required to furnish an EU declaration of conformity and assume accountability for conformity with the essential requirements. The definition of «responsible» in this particular context remains ambiguous, and it is uncertain whether users of the smart contract may face any civil liability. In the event that a supplier fails to furnish a smart contract that adheres to regulatory standards, the repercussions will be ascertained in accordance with the governing laws of the relevant member state.

4.3. The view of WTO

WTO has published several reports on smart contracts and related technologies, and according to those reports, they are of the opinion that the inherent automation of smart contracts renders them a compelling instrument for employment in the realm of global commerce, specifically for the purpose of automating transactions. The utilisation of smart contracts gives rise to legal concerns that necessitate careful consideration, particularly with respect to matters of enforcement and liability that may require attention in the event of erroneous coding of the contract (Papadouli & Papakonstantinou, 2023). Furthermore, smart contracts are software applications that, akin to any code, may harbour inadvertent errors. 'The blockchain ecosystem' is susceptible to security vulnerabilities primarily in the layer of smart contracts as well as the user interface, which may include

devices such as mobile phones, tablets, or computers utilised for internet access[7]. WCO/WTO Study Report on Disruptive Technologies also shows how can the smart contracts utilise in international trade and in the shipping process[8].

Therefore, it is clear that the international trade organisation is on the process of considering to adapt smart contract in international trade which may be an encouragement to the buyers and sellers to engage more in this technology to save the time and money.

Conclusion

Smart contracts are made up of lines of code that automatically carry out all or parts of an agreement. Even smart contracts written entirely in code can be valid under the CISG because they satisfy the Convention's offer and acceptance conditions in Articles 14 and 18.

The UK and the EU are currently taking a progressive approach to smart contracts. The UK is trying to adapt an existing legal framework to regulate smart contracts, and conflicts arise pertaining to those, while the EU is trying to regulate the execution of legal contracts with new legislation. WTO is also continuing the feasibility studies regarding smart contracts and other related technologies. Therefore, it can be concluded that the international trade rules will not be much affected by the digitalization of the contracts as per the current situation. However, as smart contracts are still an emerging technology, there can be a need for new legislation to address the novel issues that might arise in the future.

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Смарт-контракты в международной торговле: европейские правовые стратегии преодоления трудностей

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цифровизация,
цифровое соглашение,
цифровые технологии,
электронная форма

Аннотация

Цель: присущая смарт-контрактам автоматизация делает их привлекательным инструментом для применения в сфере глобальной торговли, особенно с целью автоматизации транзакций. Прогнозируемая перспектива окажет серьезное влияние на международные экономические отношения и трансформацию правил международной торговли, что фокусирует настоящее исследование на выявлении возможностей трансформации указанных правил и принимаемых европейскими странами политико-правовых стратегий внедрения смарт-контрактов в международную торговлю.

Методы: исследование текущего состояния регулирования международной торговли в условиях процессов цифровизации, оцифровки контрактов и распространения смарт-контрактов основывается на совокупности формально-юридического и сравнительно-правового методов, позволяющих изучить правила международной торговли, проанализировать в сравнении политико-правовые позиции Великобритании и Европейского союза по вопросу внедрения смарт-контрактов в международную торговлю, а также спрогнозировать юридические последствия использования смарт-контрактов в указанной области (прогностический метод).

Результаты: исследование показывает, что распространение смарт-контрактов имеет существенные последствия для международной торговли и ее регулирования. Обладая многочисленными преимуществами,

такими как повышенная эффективность, снижение затрат и широкая доступность, они при согласовании традиционных правовых принципов с цифровой средой могут привести к юридическим проблемам, в частности, касающимся аутентификации субъектов, возможности принудительного исполнения от конкретных обстоятельств дела, вопросов юрисдикции.

Научная новизна: имеющаяся литература по вопросам трансформации регулирования международной торговли в условиях процессов цифровизации и распространения смарт-контрактов дополняется результатами сравнительного анализа правовых позиций, имеющихся на европейском правовом пространстве и выработанных на основе проблем, уроков и достижений при внедрении смарт-контрактов в международную торговлю.

Практическая значимость: понимание юридических последствий смарт-контрактов имеет важное значение для предприятий, участвующих в международной торговле. Исследование дает представление о правовых позициях Великобритании и Европейского союза, на основе которых можно выработать рекомендации компаниям, ориентирующимся в цифровом ландшафте. Директивные органы также могут извлечь пользу из полученных результатов для разработки соответствующих правовых актов, которые уравновешивают преимущества смарт-контрактов с необходимостью правовой определенности и защитой в международной торговле.

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