국제학석사 학위논문

Study on Legal Consideration of E-Contracts in International Digital Trade

디지털 무역 거래에서의 전자계약서에 관한 법적 고찰

2023년 2월

서울대학교 국제대학원
국제학과 국제지역학전공

이 지 은

Master's Thesis of International Studies

Study on Legal Consideration of E-Contracts in International Digital Trade

디지털 무역 거래에서의 전자계약서에 관한 법적 고찰

February 2023

Graduate School of International Studies
Seoul National University
International Areas Studies Major

Jieun Lee

Study on Legal Consideration of E-Contracts in International Digital Trade

디지털 무역 거래에서의 전자계약서에 관한 법적 고찰

Professor Dukgeun Ahn

Submitting a master's thesis of International Studies

February 2023

Graduate School of International Studies
Seoul National University
International Areas Studies Major

Jieun Lee

Confirming the master's thesis written by Jieun Lee

February 2023

Chair	Woo-Sik Moon (Seal)
Vice Chair	Seong-Ho Sheen (Seal)
Examiner	Dukgeun Ahn (Seal)

Abstract

The fourth industrial revolution and technological development have accelerated the digital transformation. With this advancement, cross-border trade is becoming simpler and faster. Electronic purchase, documentation, data storage, exchanges of data from customers to traders push forward the implementation of ‘e-contracts’. Especially since 2010, the digitalized trade ecosystem is being processed more widely. Perhaps, the unprecedented global pandemic and the environmental-friendly movement have brought the digital transformation faster in diverse fields including trade. Countries are concluding bilateral and multilateral digital partnership agreements to promote economic activities while ensuring the national economic security.

Unfortunately, the regulatory gaps exist because legislation procedure has not kept up with the speed of the progress in technology. The adaptation of digitalization seems systematical and prompt as people and industries follow the trend. However, it has certainly brought vagueness and asked for a pioneering leader to set standards to the modification in industrial movement be legally valid to execute.

The world is closer to one another more than ever. The global trade scale has increased drastically. According to the WTO survey, 4300% growth has been reached in the international trade from 1950 to 2021.[1] In order to facilitate trade ecosystem, digital transformation is unavoidable. One of the

[1] “World Trade Organization.” WTO. Accessed November 16, 2022. https://www.wto.org/english/res_e/statis_e/trade_evolution_e/evolution_trade_wto_e.htm.

changes would be implementing e-contracts that is better known as smart contracts.

Considering beneficiaries that e-contracts have: cost and time reduction, simple documentation and customs clearance, and guaranteeing privity and security, it is more favourable to utilize them. With their advantageous features notwithstanding, the absence of typical protocol disturbs more widespread usage of e-contracts. In fact, there is no concrete norm to define ‘e-contract’ worldwide. Perhaps it is because e-contracts contain not only technical concepts but various related legal issues such as contractual relationship practice and e-identity. As a result, e-contracts lift many concerns not only in contract law but also in multiple legal fields like financial law, electronic transaction law and data protection law. This is why it is worth reviewing legal concerns of e-contracts and profits from using them on behalf of existing contracts.

This research will provide a general preview of the concept, legal conditions and effects of e-contracts. How e-contracts are used in a real trade ecosystem will also be introduced to show the validity of the study goal. Then, the review of blockchain technology on e-contracts will follow to explain the technical conditions and the structure of e-contracts. Finally, already existing domestic laws and partnership agreements will be reviewed to be able to make suggestions for policymakers and trade negotiators to update the current legal framework for e-contracts. Therefore, it is important to review from the current status of e-contracts from the definition and the cornerstone technology to the

legal framework to suggest comprehensive digital partnership agreements in the digital trade era.

Keyword : Blockchain Technology, Digital Economy, Digital Trade, E-Contract, Paperless Trade, Trade Security

Student Number : 2021-29471

Table of Contents

Abstract ..... **i**

List of Abbreviations ..... **iv**

List of Figures ..... **vi**

List of Tables ..... **vi**

Chapter I. Introduction **1**
1. Study Background 1
2. Purpose of Research 3

Chapter II. What is an E-contract **6**
1. Definition of E-Contracts 6
2. Legal Characteristics of E-Contracts 8
3. Effects of Using E-Contracts 11

Chapter III. E-Contract issues and trends in trade **14**
1. Current Status of E-Contracts in South Korea 14
2. E-Contract Usage in International Trade 19

Chapter IV. Blockchain and E-contracts **22**
1. What is Blockchain Technology 22
2. Blockchain Application in Digital Trade 23
3. E-Contracts in Digital Trade 26

Chapter V. Legal Agreement Analysis **32**
1. Comparisons of Bilateral Agreements 32
2. United States' Legislation Status and Prospect 36
3. Europe's Legislation Status and Prospect 38
4. South Korea's Legislation Status and Prospect 41

Chapter VI. Conclusion **43**

Bibliography **47**

Abstract in Korean (국문 초록) **51**

List of Abbreviations

AI	Artificial Intelligence
A.R.S.	Arizona Revised Statutes
ASDEA	Australia-Singapore Digital Economy Agreement
BPU	Bank Payment Undertaking
COVID-19	SARS-CoV-2 / Coronavirus disease
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
DEPA	Digital Economy Partnership Agreement
DLTs	Distributed Ledger Technologies
EFTA	Electronic Financial Transactions Act
FAET	Framework Act on Electronic Trade
E-contracts	Electronic Contracts
EP	European Parliament
ESA	Electronic Signature Act
ESIGN	Electronic Signatures in Global and National Commerce Act
ETH	Ethereum
EU	European Union
GDPR	General Data Protection Regulation
GTD	Global Trade Decentralization
IoT	Internet of Things
KBIPA	Korea Blockchain Industry Promotion Association

KCS	Korea Customs Service
KISDI	Korea Information Society Development Institute
KITA	Korea International Trade Association
KSDPA	Korea-Singapore Digital Partnership Agreement
KTNET	Korea Trade Network
MOTIE	Ministry of Trade, Industry and Energy
NFT	Non-Fungible Token
OECD	Organization for Economic Co-operation and Development
RCEP	Regional Comprehensive Economic Partnership
RCM	Remote Container Management System
UETA	Uniform Electronic Transactions Act
UN/CEFACT	United Nations Centre for Trade Facilitation and Electronic Business
UNCTAD	United Nations Conference on Trade and Development
UNECE	UN Economic Commission for Europe
UNICITRAL	United Nations Commission on International Trade Law
URPERA	Uniform Real Property Electronic Recording Act
USJDTA	USA-Japan Digital Trade Agreement
USMCA	USA-Mexico-Canada Agreement
WCO	World Customs Organization
WTO	World Trade Organization
WTO TFA	WTO Trade Facilitation Agreement

List of Figures

Figure 1. Implementation of Paperless trade measures **20**

Figure 2. Traditional Contractual Relationship **26**

Figure 3. E-Contracts Contractual Relationship **27**

List of Tables

Table 1. History of Creation and Settlement of KTNET for Electronic Trade . **16**

Table 2.
Countries Single Window Service Operator based on Recommendation 33 of UN/CEFACT **18**

Table 3. Comparison among Digital Partnership Agreements **35**

Table 4. Legislation Status and Prospect of the US State Governments **38**

Chapter I. Introduction

1. Study Background

The world is advancing rapidly. We are now facing faster and more advanced industrial changes with the development of science and technology. Industrial 4.0 is happening and corporates are designing their businesses with adaptation of new a trend: digitalization. According to Forbes, Industrial 4.0 signifies a new era with the fourth revolution in manufacturing industry. The fourth revolution is an extension of the third when the adoption of computers and automation have started. With smart and autonomous systems engine by data and machine learning, computers and automation process become more advanced in the Industrial 4.0.[2]

Digitalization, also known as digital transformation, is being adapted in various fields from economic activities to daily lives. There is no need to go to a bank on site to do some transactions, data is saved in a code so that the access can be valid everywhere, and people do grocery shopping everywhere via online platforms. Perhaps many unnoticeable changes resulted from digitalization are already deeply affecting daily lives; however, digital transformations are notoriously difficult to scale up in business world, yet.[3]

---

[2] Marr, Bernard. “What Is Industry 4.0? Here's a Super Easy Explanation for Anyone.” Forbes. Forbes Magazine, October 12, 2022. https://www.forbes.com/sites/bernardmarr/2018/09/02/what-is-industry-4-0-heres-a-super-easy-explanation-for-anyone/?sh=2a9954379788.

[3] Gregolinska, Ewelina, Rehana Khanam, Frédéric Lefort, and Prashanth Parthasarathy. “Capturing the True Value of Industry 4.0.” McKinsey & Company. McKinsey &

The core of digital transformation contains automation, data exchange, cloud computing, big data, and artificial intelligence. Creation of network, data collection and exchanges become more crucial to ensure nation's welfare including economic security and national security. Especially after the COVID-19 pandemic hit the world severely since 2020, countries put spurs to enhance their digital transformation. Although the pandemic severely damaged daily lives, it could not stop everything. The unprecedented situation accelerated digitalization to continue working, trading and accessing basic services. According to UNCTAD report, the pandemic disrupted economic and social life globally. Nonetheless, it has put more emphasis on digital economy to carry on work, trade and access basic services.[4] Companies have implemented work-from-home policies while schools have operated classes through online platforms. E-commerce gained more popularity. One of biggest American e-commerce companies, Amazon, its revenue skyrocketed 220% during the pandemic.[5] As easily expected, the digital transformation has permeated into routines. Even national heads have held online conferences and documentation saving programs have developed for data storage.

Among many means to perform digitalization, 'blockchain' has gained great interests from diverse industries. As one of the outstanding technological

---

Company, May 19, 2022. https://www.mckinsey.com/capabilities/operations/our-insights/capturing-the-true-value-of-industry-four-point-zero.

[4] Geneva, Recovering from COVID-19 in an increasingly digital economy: Implications for sustainable development § (2022).

[5] Weise, Karen. "Amazon's Profit Soars 220 Percent as Pandemic Drives Shopping Online." The New York Times, 2022. https://www.nytimes.com/2021/04/29/technology/amazons-profits-triple.html.

innovations in the era of Industrial 4.0, the blockchain technology is experiencing ups and downs. This new development is shown as the probable next game-changer.[6] It can enable the creation of decentralized currencies, self-executing digital contracts (smart contracts) and intelligent assets that can be controlled over the Internet (smart property)[7]. It would not be an exaggeration to state that blockchain technology has the potential to significantly enhance global trade in services. Regarding the rise of importance of digital trade, in particular, the technology can promote the trade facilitation with solid implementation of the electronic contract. Easier and quicker documentation procedure is not only good for simple and convenient trade but also for the environment.

Although potential benefits of digitalized documentation will bring, it has not been fully accepted and used by many countries due to lack of legal guidelines. The current legal safeguards and regulations are not sufficient to protect and ensure if certain illegal occasions occur. Thus, this paper is going to raise the research question about the legal consideration on e-contracts which are designed, and function based on the blockchain technology.

2. Purpose of Research

Digitalization in policies and regulations are highlighted to be considered and reviewed to lead and establish effective digital infrastructure.

[6] Ganne, Emmanuelle. Publication. Why Blockchain Could Become the New Container of International Trade, 2019. https://www.un-ilibrary.org/content/journals/15645304/2019/1/7.
[7] Wright, Aaron. Rep. Decentralized Blockchain Technology and the Rise of Lex Cryptographia, 2015. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2580664.

This thesis is aiming to review the legality and the effectiveness of electronic contracts' usage in the international trade. Digital transformation has definitely brought advantages in the trading ecosystem by reducing cost, time and efforts but different issues have risen to protect individual's or a nation's rights in trade.

The beginning will contain basic explanations of e-contracts: the definition, legal features and effects of e-contracts. Then, the paper will state the current status of e-contracts in South Korea's trading market and in the whole international trade system. Starting from the Chapter 4, there will be a full coverage of why it is essential to know and research about roles of e-contracts to suggest blockchain technology in trading system. Chapter 4 starts with the basic explanation of blockchain technology to provide more concrete ideas about blockchain application in international trade. To be specific, this chapter contains how blockchain technology will be applied in international trade, especially with the flow of digital trade tendency. Here, a bit of technical review will be included. For example, the part will contain how the technology applies to smart contracts with the relation to Ethereum (ETH) and Non-Fungible Token (NFT). Eventually, there will be explanation of how and how far e-contracts are exercised in trade.

Before the conclusion, this thesis will compare and contrast some legal agreements and current legislation status. The first step is comparing and analyzing six bilateral digital partnership agreements. With regard to the Table

3, it is notable that all six agreements include principle modules like cross-border transfer of information by electronic means, personal information protection and cybersecurity cooperation. However, some necessary modules like paperless trading and e-authentication and e-signature are omitted from a certain agreement.

The domestic legislative status and future prospects of the United States, European Union and South Korea are analyzed in a dedicated chapter of this thesis. This chapter provides in-depth information about each nation's current legal framework for e-contracts, with a focus on highlighting important legal considerations that may facilitate their use in international trade, particularly in the digital era. The comparison of the various legislative approaches will serve as a key component of this research, and the thesis will also offer insightful commentary on several modules that may enhance the implementation of e-contracts in the trade of digital goods and services.

Chapter II. What is an E-contract

1. Definition of E-Contracts

It is not always clear to define what an ‘e-contract’ is. E-contract which is an abbreviation of an ‘electronic contract’ basically signifies a contract that uses electronic tools to store, send, receive and agree on certain conditions and terms to conclude a promise between two involved parties. However, there is no unified definition to define what e-contract is. The word itself has started to be used by Nick Szabo. According to Nick Szabo, e-contracts are computerized protocols that proceed conditions of a contract. Szabo indicated that e-contracts, also known as smart contracts, will substitute traditional contracts with their more developed functions than paper-based contracts especially without usage of artificial intelligence. In fact, they can be applied to any types of transactions. The basic idea of smart contracts is that many kinds of contractual clauses (such as liens, bonding, delineation of property rights, etc.) can be embedded in the hardware and software we deal with, in such a way as to make breach of contract expensive (if desired, sometimes prohibitively so) for the breacher.[8] E-contracts can be divided into ‘strong smart contracts’ and ‘weak smart contracts’ based on the accessibility of a party or a court to withdraw or modify the contract after the contract’s final establishment.[9] Additionally, e-contracts are defined as a software that allows legal actions to be forged, controlled, and

[8] Szabo, Nick. “Smart Contracts: Building Blocks for Digital Markets.” Extropy Journal of Transhuman Thought, 1996. http://www.truevaluemetrics.org/DBpdfs/BlockChain/Nick-Szabo-Smart-Contracts-Building-Blocks-for-Digital-Markets-1996-14591.pdf.

[9] Jin-Myung Chung, Legal Issues on the Smart Contracts based on Blockchain, no.3 (2018) : 925-968.doi: 10.22922/jcpl.25.3.201808.92.

recorded in accordance with digitally verifiable events and that can be used to enter into real rights or bond contracts under certain circumstances[10].

There are already existing 'contracts' and related law to prevent and secure conditional clauses among involved parties. However, e-contracts are rapidly replacing traditional paper-based contracts. The most notable feature of e-contracts would be the usage of computerized codes. As stated in Arizona Revised Statutes (A.R.S.) Title 44-7061, "smart contract" means an event-driven program, with state, that runs on a distributed, decentralized, shared and replicated ledger and that can take custody over and instruct transfer of assets on that ledger. In other words, e-contracts are based on codes that are produced under blockchain technology and they can be valid immediately. When a counterparty meets the specific conditions required by the code, the transaction is automatically executed. This is similar to the traditional contract. Nevertheless, the performance and a negotiation of e-contracts are automatically processed via codes. It is a distinguishable feature of e-contracts from the traditional contract whose structure is based on contracting parties' approval. E-contracts can be defined as a computer program in a legal wise while it can be considered as a 'codified contract' in a legal aspect.[11] Hence, it can be said that much of the ambiguity surrounding e-contracts roots from the

[10] Kaulartz/ Heckmann, CR 9/2016, 618.
[11] Jin-Myung Chung, Legal Issues on the Smart Contracts based on Blockchain, no.3 (2018) : 925-968.doi: 10.22922/jcpl.25.3.201808.92.

interaction between traditional legal understanding of contracts and 'smart' aspects of codes[12].

2. Legal Characteristics of E-Contracts

The concept of e-contract still has vagueness to denote. In order to define and utilize the new concept of a contract in a proper way, it is necessary to review the legality of e-contracts. Legal characteristics of e-contracts are outstanding due to its electronic traits.

To start with, e-contracts become effective automatically as soon as predetermined conditions are satisfied. When certain conditions are satisfied, real rights are carried out simultaneously with the bond agreement. If the contracting party bears the obligation to deliver the goods and agrees to conditional disposition in addition to it, the e-contract is exercised by the execution of such conditional disposition. Hence, it is valid to say that e-contracts are binding contracts. Even though e-contracts are automatically executed, they still require contracting parties' agreement. Plus, the intention of the parties concerned is regarded at the point when the party has agreed on the contract. Regarding the true value of a contract: which imposes the focus on the legality of the involved parties in a contract, there is no difference between traditional contract and e-contracts. An agreement is achieved through the performance. Since the fundamental meaning of the contract is centered on the

[12] Rayan Surujnath, *supra* note 4, p.270-71

legal binding force by agreement between the two parties, there is no reason to view the rights and obligations between the parties of the smart contract differently from the legal traditional contract in the sense of occurrence. Smart contracts are also valid when involved parties have an agreement on contract conditions. Unilateral and definitive expression of intention aimed at concluding a contract a certain content exists when a program code is recorded in a distributed ledger and shared to unspecified majority. Additionally, code programmers and code executors form a relationship and obligations, and rights are exchanged between two parties are enough reason to be considered as a 'contract' even following the traditional term of the contract.[13]

The second unique characteristics of e-contracts derive from the fact that they are operated by computerized programs. This feature contains two legal concerns: possibility of edition and validity of a contract. In fact, when contract terms are recorded in codes that are based on the blockchain, it is impossible to edit. This can be solved by creating a new contract under the same address to update the previous version. If then, the modified contract will be executed under the same code. The other way is to establish a new contract with a new address. Concerns can be solved via two suggested solutions, but new questions are raised: what effects will occur if contract contents and source

[13] Cho, Hyun-Sook. "A Study on Legal Consideration of Smart Contract in International Trade Transactions." International Commerce and Information Review 21, no. 3 (September 2019): 111–28.

code are not consistent.[14] In general, it is discrepancy in manifestation of will if contract contents and source codes disagree and cause errors.[15]

It is possible to withdraw the source code before a contracting partner carries out a contract. However, it brings up a new question about the possibility of cancellation of the contract after the e-contract is in practice. According to the South Korea's domestic civil law, even if the contract has already been implemented, the expression of intention of error can be canceled 1) if there is no significant negligence under the circumstance that is created by the party to the contract and 2) it is not for a well-meaning third party.[16] In other words, e-contracts bring different risk taking proportions depend on how and when changes are implied that can affect the contract execution. E-contract operators must implement control measures, such as readjustment, to establish valid contracts and ensure proper attribution. No further approval or action from the contracting party or a third party is required for e-contracts, and law enforcement agencies are not involved in the fulfillment of these contracts. In the event of a disagreement between the parties' intent and the content written in code, the distribution of responsibility should not negatively impact the other party and should be resolved between the party and the code writer. To determine the criteria for a successful transaction in a computerized system

[14] Cho, Hyun-Sook. "A Study on Legal Consideration of Smart Contract in International Trade Transactions." International Commerce and Information Review 21, no. 3 (September 2019): 111–28.
[15] Max Raskin, "The Law and Legality of Smart Contracts," Georgetown Law Technology Review, Vol1, No.2, 2017, p.324
[16] Article 109 of South Korean Civil Law

without intermediaries, all relevant parties, including the e-contract developer, operator, and counterparty, must be considered. [17]

Another notable characteristic is that compared to traditional contracts, e-contracts can only be concluded via electronic systems. As a consequence of terms of e-contracts are written in program codes, these types of contracts possess duplicity of legality: a role of a 'document' for managing a contractual relationship of involve parties and the target of intellectual property rights. In fact, certain program codes that are based on users' requests can be considered as a development process so subsequent distribution rights should be performed in a boundary of intellectual property rights and licenses. Besides, e-contracts have a program code in their core, the terms of contracts are expressed as one of the computer languages that uses strictly defined meanings and syntax. Unlike traditional contracts which allow subjective interpretation of terms and conditions of a contract, e-contracts are depicted based on a 'boolean logic[18]'.[19] Thus, existing court rules are not applicable on e-contracts.

3. Effects of Using E-Contracts

Although e-contracts accompany ambiguous and controversial legality, e-contracts provide advantages in facilitation of documentation procedures.

[17] Yang, Young-Sik, and In-Bang Song. "Legal Issues for Commercialization of Blockchain Smart Contract." Korean Law Association 18, no. 2 (2018): 122

[18] Boolean logic is a type of algebra in which results are calculated as either TRUE or FALSE (known as truth values or truth variables).

[19] Jin-Myung Chung, Legal Issues on the Smart Contracts based on Blockchain, no.3 (2018) : 925-968.doi: 10.22922/jcpl.25.3.201808.92.

Unlike complex and disputable process is must-go-through step for concluding traditional contracts via intermediary or third-party involvement, e-contracts can save energy from it. Middle steps are all covered by computerized programs so the procedure to conclude the contract gets simpler and faster. In fact, execution of the contract can be facilitated without going over several confirmation stages.

As the whole contract performance process simplification occurs, contracting parties can also save unnecessary cost such as commission fee. Moreover, currently developed e-contracts are designed with blockchain technology. Briefly containing the technology, it can be easily defined as decentralized distributed ledger technologies (DLTs). With DLTs, there is no administrative costs for involved parties. E-contracts shrink document forgery and improve accessibility. In fact, the supply chain management which is established on smart contracts is more effective as it can help develop value and decrease wasted resources.

With simplified procedure and less cost, cross-border trade becomes more active and even the healthy competitive improvements can be expected. Especially after COVID-19 pandemic hit the world, digital market has grown immensely. Digitalized contracts allow countless customers to freely enjoy online shopping.

Furthermore, e-contracts definitely present security and privity. With decentralization and direct contract conclusion, e-contracts perform high-level of security and assurance of privity. These bring advantages in digitalized

economy by being helpful to reduce identity theft. E-contracts can be applied in various fields including the Internet of Things (IoTs), data science, machine learning, and legal contracts.[20]

Besides, e-contracts contain environmental-friendly effects. The global society is concerning about the environmental issues more than ever. This is one of reasons why digitalization is impacting contractual performances as it can facilitate paperless trade. Paperless transactions can be actualized by computerized program to allow electronic communications among users. To be specific, this usage of electronic processes let global supply chain to save paper documents from printing, dispatching, processing, and exchanging which are discarded in the end.[21] According to UNICITRAL UN/CEFACT Rec.35, legal topics that have connections with paperless trade facilitation comprises e-contracts.[22] Asia-Pacific region is using paperless trade agreement to facilitate environmentally friendly and digitalized trade. The Framework Agreement of Cross-Border Paperless Trade in Asia and the Pacific has firstly mentioned in 2012 and adopted in 2016. The Framework offers a comprehensive platform to promote digital trade with principles and goals to nurture the mutual recognition of trade data and documents in electronic forms among 53 economies.[23] With development and widespread of e-contracts, paperless trade will become more common and results in digital trade's positive outcome.

---

[20] Goodness, Ukeje. "6 Examples and Use Cases of Smart Contracts." LogRocket Blog, April 6, 2022. https://blog.logrocket.com/examples-applications-smart-contracts/.

[21] According to Duval and Hardy, 2021, even partial implementation of paperless trade in international network saved 36 million tons in average.

[22] UNICITRAL. UNICITRAL Legal Instruments for E-Commerce and Paperless Trade. p.4.

[23] WTO. Cross-Border Paperless Trade Toolkit. 2022.

Chapter III. E-Contract issues and trends in trade

1. Current Status of E-Contracts in South Korea

South Korea is well known for its digitalization. Various sectors in the society are implementing automatization such as banking, transportation, sales, even in education. Although this digital-wise developed country owns potentials to manage data flow and storage, electronic contracts are still vague concept. Surprisingly, the term ‘electronic trade’ has been used since December 2005 when the Electronic Trade Promotion Act[24] was enacted. The term ‘trade automation’ was utilized prior to its official definition being established.

[24] ELECTRONIC TRADE FACILITATION ACT (2015). Amended by Act. 11461, June.1, 2012.
Article 2.1: The term "electronic trade" means a transaction in which the whole or any part of the trade under subparagraph 1 of Article 2 of the Foreign Trade Act is handled by means of electronic trade documents.

Article 2.2: The term "trader" means a person engaged in a trade under subparagraph 3 of Article 2 of the Foreign Trade Act who files an application, report, etc. (hereinafter referred to as "application, etc.") with a trade-related agency in accordance with statutes governing foreign trade, statutes governing foreign exchange transactions, other statutes prescribed by Presidential Decree, and contracts for transportation, insurance, etc. that are concluded between the relevant parties (hereinafter referred to as “trade-related statues, etc.”);

Article 2.3: The term "trade-related agency" means an agency which provides trade-related services specified in trade-related statutes, etc. to traders, or grants authorization, licenses or certification and accepts reports, etc. (hereinafter referred to as "authorization, etc.");

Article 2.4: The term "electronic trade documents" means electronic documents under subparagraph 1 of Article 2 of the Framework Act on Electronic Documents and Transactions, which are used for electronic trade;

Article 2.5: The term "electronic trade infrastructure" means an information system that intermediates, keeps and certifies electronic trade documents by systematically interlinking traders with trade-related agencies through information and communications networks.

One of distinguishing features of Korea's electronic trade is that it has been processed and promoted by the Ministry of Trade, Industry and Energy (MOTIE). It differs from major trading countries like the United States where the electronic trade is mainly driven by the United States Customs and Border Protection. Electronic trade operation status in Korea can be explained in two big players: Korea Trade Network (KTNET) and the Korea Customs Service (KCS).

In 1991, the Korean government enacted legislation about automation of trade operation. In March 1992, KTNET was established under Korea International Trade Association (KITA). In November 1992, KTNET was designated as a core operator of trade automation and KTNET agreed on Automated Customs Clearance System with the Korea Customs Service (KCS). Afterwards, KTNET became a Value Added Network to connect Bank of Korea, Korea Financial Telecommunications and Clearing Institute, KCS, MOTIE and other core government departments. When the millennium century began, the Internet has been widespread, so the MOTIE actively researched on the electronic trade on behalf of trade automation.[25]

[25] Jung, Jae Woo. "A Study on the Current Obstacles and Countermeasures in the Operation of South Korea's Paperless Trade," 2016. p.63.

Year	History
1991	• Legislation about trade automation enacted.
1992 March	• Korea Trade Network (KTNET) was established.
1992 November	• Trade Automation service is promoted by KTNET.
2002	• Strategies for spread of Electronic Trade
2003	• Establishment of 'Comprehensive Plan for Electronic Trade Promotion' and 'E-Trade KOREA 2007'
2005	• Electronic Trade Promotion Act enacted. • KTNET is named as 'u-Trade Hub'[26] • KTNET started to promote electronic-Letter of Credit (e-L/C)
2013	• Opening and notification of e-L/C
2014	• Business of electronic negotiation (e-Nego)
2015	• Electronic Trade Promotion Act enacted. • KTNET is named as 'u-Trade Hub' (Same as 2005)

Table 1. History of Creation and Settlement of KTNET for Electronic Trade

In 1999, the World Customs Organization (WCO) agreed on the Revised Kyoto Convention which includes the maximum usage of IT for standardization, simplification, and promptitude of customs clearance procedure.[27] To follow the international trend, KCS collaborated with KTNET to establish Single Window, also known as Uni-pass. With successful

[26] KTNET is designated as an electronic trade infrastructure business entity (Article6.2 of the Electronic Trade Facilitation Act), a person to declare, apply, report, pay, etc. under this Act and to apply for the certification and confirmation of goods requiring permission, approval or fulfillment of other requirements under statutes (hereinafter referred to as "electronic declaration, etc.") by using electronic data-processing equipment of the Comprehensive Customs Duties Information Network of Korea, as prescribed by the Commissioner of the Korea Customs Service (Article 327.2 of the Customs Act). and etc.

[27] As a member of WCO, Korea automatically follows the Revised Kyoto Convention in trade.

implementation of Uni-pass, KCS provides information of customs clearance including confirmation of requirements, import and export declaration and product exportation to traders.[28] KCS has expanded electronic collaboration with requisite organization which as the most customs clearance workload by implementing the Uni-pass. Korea is even exporting Uni-pass system to developing countries.[29]

Korea has owned and promoted electronic trade longer than expected. However, international trade always contains inherent inefficiency because of a variety of parties' involvement from both public and private sectors. This is why many developed countries preferred to implement digital transformation only on customs clearance. On the other hand, Korea pursued to implement digitalization in the whole procedure of trade: currency trade, requirement confirmation, customs clearance, shipping, distribution and insurance. The approach received positive expectations; however, there are several problems to be solved.[30]

First and foremost, as mentioned above, electronic trade is facilitated in Korea by two main governmental organizations: KTNET and KCS. This would cause confusion on whose regulations to follow and especially private enterprises might asked to create identical roadmaps or manuals for all involved

[28] Johnathan. Koh Tat Tsen, "Ten Years of Single Window Implementation: Lessons Learned for the Future," Global Trade Facilitation Conference 2011 Connecting International Trade, 2011, p.4-5

[29] Jung, Jae Woo. "A Study on the Current Obstacles and Countermeasures in the Operation of South Korea's Paperless Trade," 2016. p.65.

[30] Jung, Jae Woo. "A Study on the Current Obstacles and Countermeasures in the Operation of South Korea's Paperless Trade," 2016. p.66.

public organizations. Moreover, the government is spending overlapping cost to facilitate electronic trade via both KTNET and KCS. Unlike Korea, numerous other countries enable the electronic trade mostly by the customs office. In fact, UN Economic Commission for Europe (UNECE) recommended the application of Single Window that utilizes the IT on customs clearance to promote both trade security and trade facilitation.

Single Window Service Operator	**Countries**
Customs	Australia, Canada, China, Indonesia, Korea, Peru, Russia, Thailand, United States
Different Governmental Office	China, Peru
Private Organization	Japan, Singapore

Table 2. Countries Single Window Service Operator based on Recommendation 33 of UN/CEFACT

Additionally, Korea has tried to bring electronic methods for trade facilitation on all procedure. Even though it is an innovative approach, some stages do not necessarily be substituted as many other major trading partners have not implemented the system, yet. Some countries where Korea exported the system might be available, but it is also facing challenges as many of those countries are lacking proper infrastructure.

Most importantly, there is no strict or detailed regulations to regulate e-contracts, distributed ledger technology (DLT) or blockchain.[31] The new

[31] Premier, David. "Exploring DLT, Blockchain and Smart Contracts in South Korea - International Financial Law Review Https://T.co/8vpqbt2cip Pic.twitter.com/tGqcinjs2E." Twitter. Twitter, July 26, 2022.

government under President Yoon has mentioned that it plans to establish environment to enact Framework Act on Digital Assets to adapt the digital transformation.

2. E-Contract Usage in International Trade

The world is putting more emphasis on the environmental considerations and digitalization. The trend is obviously affecting the global trade. Although international trade transactions are still relying heavily on paper forms[32], paperless trade is becoming an important economic movement worldwide. Consonance with WTO TFA articles, measures of paperless trade include electronic customs systems, electronic documentation and electronic payments of customs duties that are equivalent to factors of e-contracts. Using electronic channels allows not only the cost reduction but the simplification of the supply chain ecosystem in international trade.

Besides, as mentioned earlier, numerous countries tend to have the Single Window System for trade facilitation. This Digitalized Single Window System is linked to Article 10 Formalities Connected with Importation, Exportation and Transit. The electronic payments of customs duties are consistent with WTO TFA Article 7, Release and Clearance of Goods.[33] Regarding international organizations' criteria to define and analyze the

---

https://twitter.com/davidpremier/status/1551942690991792128.

[32] Ganne, Emmanuelle. Publication. Why Blockchain Could Become the New Container of International Trade, 2019. https://www.un-ilibrary.org/content/journals/15645304/2019/1/7.

[33] Algayerova, Olga. Rep. Digital and Sustainable Trade Facilitation: UNECE Regional Report 2021 . Geneva, Geneva: United Nations, 2021.

implementation of paperless trade[34], e-contracts are a means of the movement.

While paperless trade measures are executed in average 76%, cross-border paperless trade measures in the region reached around 50% in 2021. Among six categories[35], two are related to the legal and regulatory environment. It proves the necessity of establishment of legal framework in order to facilitate digital economy more prevalent.

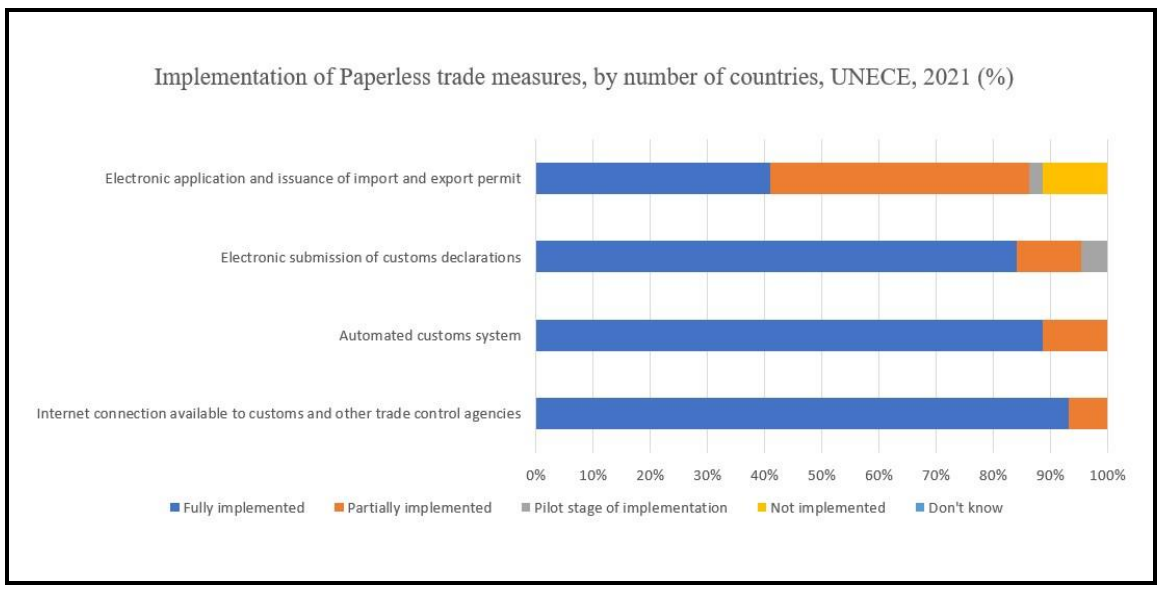

Figure 1. Source UNECE, based on United Nations Global Survey on Digital and Sustainable Trade Facilitation, 2021[36]

[34] UNECE, based on United Nations Global Survey on Digital and Sustainable Trade Facilitation, 2021.
Algayerova, Olga. Rep. Digital and Sustainable Trade Facilitation: UNECE Regional Report 2021 . Geneva, Geneva: United Nations, 2021.

[35] Six criteria consists of: Laws and regulations for electronic transactions, Recognized certification authority, Electronic exchange of customs declaration, Electronic exchange of SPS Certificate, Paperless collection of payment from a documentary letter of credit, and Electronic exchange of Certificate of Origin

[36]Algayerova, Olga. Rep. Digital and Sustainable Trade Facilitation: UNECE Regional Report 2021. Geneva: UNECE, 2021.

Laws to regulate transactions in the cyberspace and laws to resolve dispute arising from such transactions should have been enacted. A relevant example would be the UNCITRAL Model Law on International Commercial Arbitration and Uniform Electronic Transactions Act in the United States.[37] Considering the fact that digital trade is not only limited to a domestic issue but international scale, each country should not only reform the domestic legislation but also cooperate to set standards.

[37] Choi et al., 2022

Chapter IV. Blockchain and E-contracts

1. What is Blockchain Technology

Blockchain is a decentralized data base that encrypted information is stored in a single ledger, known as a ‘block’. Each block with encrypted information is connected to one another to establish a block ‘chain’. When there is new information, a new block is created and it is linked to the existing block. Continuous formation and connection of blocks are developed into a ‘network’. In fact, blocks are recorded into several nodes in the network to save and manage information. Dispersed blocks include transaction information so that the blockchain, the whole agglomeration of blocks, is considered a distributed ledger.[38]

One of distinguishing features of blockchains is that participants in the network have the same copy of the block. If the asset holder makes a transaction, other participants in the network can also detect the modification on the ledger. It is complex to forge or modulate as the procedure requires the confirmation from the whole network to process. Besides, blockchain owns advantages like trust, security and transparency of transactions. As it can prove and confirm authenticity of all transaction information, the technology is applied in various fields. With special regard to its decentralization, crowd ownership, security, permanence, transparency, and digital assets, the technology can be implemented in the trade systems for the trade facilitation.

[38] Jin-Myung Chung. Legal Issues on the Smart Contracts based on Blockchain. 934-935. doi: 10.22922/jcpl.25.3.201808.925

2. Blockchain Application in Digital Trade

Digitalization has brought convenience, effectiveness, and faster speed in transactions and procedure. These significant benefits are being seen in trade as well. Digital trade can be defined as a digitally enabled transactions of trade in goods and services. In fact, there is no unified explanation of digital trade. However, according to the OECD, an increasing consensus is formed to define 'digital trade' as an electronic transaction of goods and services that can be either digitally or physically delivered.[39] There are three big aspects of application of the blockchain technology in the international trade: establishment of pipelines for logistic information, activation of paperless trade and simple customs clearance.

To start with, blockchain technology has contributed to the establishment of pipelines for logistic information. The purpose of it is to provide the visibility of end-to-end supply chain with secure and smooth exchange of information. Maersk, a Denish global logistics company, and IBM, an American IT and consulting company, publicized their plan to found a joint venture for efficiency and security in international trade.[40] The blockchain technology can be applied in management of distribution and logistics for the purpose of increasing visibility and transparency. It will be possible to receive

[39] "The impact of digitalization on trade", Digital Trade, OECD, accessed November 13, 2022, https://www.oecd.org/trade/topics/digital-trade/.

[40] Slocum, Hannah. "Maersk and IBM to Form Joint Venture Applying Blockchain to Improve Global Trade and Digitize Supply Chains." IBM Newsroom, 2018. https://newsroom.ibm.com/2018-01-16-Maersk-and-IBM-to-Form-Joint-Venture-Applying-Blockchain-to-Improve-Global-Trade-and-Digitize-Supply-Chains.

real-time information about manufacturers of actual products and the unified records of the products such as raw materials can be swiftly delivered and detected. All information from end-to-end global supply chain and logistics procedure is released to all certain blockchain network participants. Some well-known global logistic companies have applied the technology in their businesses. For instance, UPS has tried to launch a blockchain-based platform for the industry standard protocol to connect to BiTa, a truck transport alliance based on the blockchain technology.[41]

Furthermore, the blockchain technology can contribute to promote 'paperless trade'. In accordance with the UN/CEFACT, paperless trade signifies the digitalization of trading information flows, including allowing and enabling the exchange of trade-related data and documents electronically.[42] E-contracts that are currently available are based on the blockchain technology. With active usage of e-contracts in the trading ecosystem, necessary documentation for export and import would become much simpler and cheaper. More importantly, as all needed documents are saved and delivered via electronic systems, it can promote the 'paperless trade'. According to the World Shipping Council (WSC), the annual amount of sea freight is more than $4 trillion worldwide, and the cost of processing trade-related documents is estimated to be about 20% of the actual sea freight cost.[43] The UN/CEFACT defines paperless trade as the

[41] Son, Sung Pyo. "A Study on Improvement of the Platform-Based SCM Efficiency: Focusing on the Introduction of Digital Trade Blockchain Technology in Customs Clearnace and Future Tasks." The Journal of Korea Research Society for Customs 22, no. 4 (2021): 151.
[42] UN/CEFACT. 2018. Paperless Trade Version 1[White Paper].
[43] Son, Sung Pyo. "A Study on Improvement of the Platform-Based SCM Efficiency:

digitization of trade information flows, including the electronic exchange of trade-related data and documents.

Lastly, the integration of blockchain technology into the trade sector has demonstrated promising results in facilitating customs clearance processes. Maersk is exploring the potential to modernize the remote container management system (RCM) through digitization.[44] This approach has the potential to significantly improve customs clearance efficiency. A simulation project involving 38 organizations and logistics companies in South Korea has successfully employed a blockchain-based platform for this purpose. The use of electronic channels for sharing, saving, sending and referencing necessary customs documents enhances both the trustworthiness and accuracy of the information, while simplifying the process overall. The immutable nature of the data stored on a blockchain network ensures that the information is secure and tamper-proof.

The digitalization of trade has led to improvements in its scale, scope, and speed. The introduction of online platforms as marketplaces and the increasing prevalence of electronic systems, such as e-contracts, has revolutionized traditional trade methods. Digitalization has prompted a transformation in various aspects of trade, and policy makers are responding by creating new regulations to facilitate international cross-border trade.

Focusing on the Introduction of Digital Trade Blockchain Technology in Customs Clearnace and Future Tasks." *The Journal of Korea Research Society for Customs* 22, no. 4 (2021): 155.

[44] Son, Sung Pyo. "A Study on Improvement of the Platform-Based SCM Efficiency: Focusing on the Introduction of Digital Trade Blockchain Technology in Customs Clearnace and Future Tasks." *The Journal of Korea Research Society for Customs* 22, no. 4 (2021): 155.

3. E-Contracts in Digital Trade

A contract is a legal act in which two or more parties establish a consensus and mutual obligations that are enforceable by law. It is a bilateral system that is made up of exchanges of rights and obligations.[45] As seen in the Figure 1, when a contract is concluded, a supplier has a right to provide goods or services through an intermediary to a customer. When needed goods or services are given, the customer owns responsibility of payment. It is how a traditional contract works. The role of intermediary is important to process the contractual relationship with fulfillment of one's obligations. Hence, the trust on the third party is important.

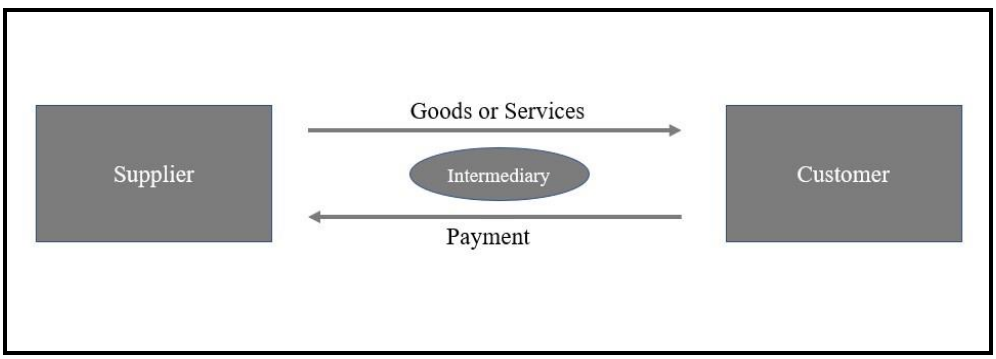

Figure 2. Traditional Contractual Relationship

Trade includes a great amount of inefficiency due to a large number of stakeholders. It affects the flow of information, documentation and goods and services whose every stage is quite demanding. Nevertheless, all these workloads can be minimized with the technological development. The way

[45] Jin-Myung Chung, Legal Issues on the Smart Contracts based on Blockchain, 938. doi: 10.22922/jcpl.25.3.201808.925

contracts function has been simplified by substituting the intermediary's work with the computerized system. Using electronic contracts will immensely reduce trading cost and time to actualize simple and quick transactions. By doing so, all middle processes are shortened and become more direct to facilitate the trade system.

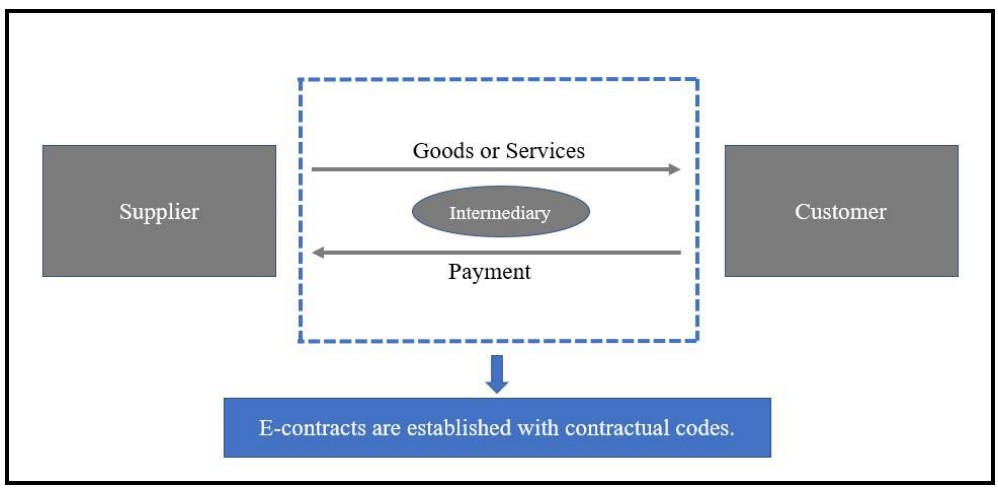

Figure 3. E-contracts Contractual Relationship

E-contracts are one of representative examples of blockchain technology applications in trade. Contracting parties record contract contents in program codes to save information in blockchain. When all necessary information is stored, a contract is valid immediately and is being processed automatically under contract conditions. These programmed contracts are processed without disruptions and even allow contractors' transactions to be completed without a third party. In other words, e-contracts are applications that function automatically if all certain necessary conditions are satisfied. Therefore, to implement e-contracts, a platform that operates blockchain

technology which can check, supervise, and execute all transaction information that occurs through the network is required. Blockchain technology is simply a way to keep a record of transactions. It does not have the ability to act as an electronic contract on its own. However, it can support something called a "smart contract", which is a program that runs on a decentralized network. This type of contract creates a unique address and automatically executes when certain conditions are met. From a technical point of view, blockchain can be said to be an essential requirement for e-contracts.[46] In short, e-contracts provide a practical approach to facilitate the international trade. They simplify the transaction procedure by sending trade documentation to all stakeholders simultaneously, reduce additional costs like commission fees and allow trading partners to store and manage documents more securely[47].

There are four detailed statements to prove validity and effectiveness of e-contracts in trade. Firstly, e-contracts can reduce cost and time that are needed to conclude and facilitate the traditional contracts. There is less risk of transaction which is not carried out via compulsory contract execution. Secondly, automatic contract execution is possible in various forms without mediators. Thirdly, an automatic purchase request can be done under the e-contract. Hence, with the export bank's purchase approval, it is possible to automate the payment application to the importer-opening bank at the same

[46] Jin-Myung Chung, Legal Issues on the Smart Contracts based on Blockchain, 936. doi: 10.22922/jcpl.25.3.201808.925

[47] Cho, Hyun-Sook. “A Study on Legal Considertation of Smart Ontract in International Trade Transactions.” International Commerce and Information Review, 3, 21 (2019): 118–19.

time. Lastly, it is possible to create a letter of credit digitally so that the exporter can receive the letter of credit without advising bank's delivery.

With these special features of e-contracts, they are currently used in three fields of trade: INCOCHAIN project, trade finance, and international transport.

INCOCHAIN is a project which tries to replace paper-based contracts in trade with e-contracts. It aims to facilitate paperless trade by combining blockchain technology with existing incoterms, standardized international commercial terms and e-contracts. In trading system, countless documentation work is required such as trade transactions, transportation, insurance, banking, finance and customs duties. All information should be saved and delivered to both the exporter and the importer. INCOCHAIN's goal is to play a role as a dashboard system between the buyer and the seller or a professional third party.[48]

Considering impractical features of existing transactions, e-contracts can solve some of these concerns in trade. In fact, e-contracts are also actively used in the field of trade finance. Trade transactions are not only operated under a certain country's domestic law or institutes, but they are a system operated by interconnections among electronic documents, systems, related companies and institutes. One of the outstanding cases that facilitates trade with digitalized contracts is We. Trade. We. Trade is a trade finance solution platform based on a blockchain technology that are invented by nine European banks including

[48] INCOCHAIN - completely paperless smart contracts for World Trade (dashboard). Accessed November 13, 2022. https://bitcointalk.org/index.php?topic=1729772.0.

Deutsche Bank and HSBC and IBM. As Ethereum (ETH) is well-known for the starter of smart contract platform, IBM and Oracle have their own smart contract nodes and networks. We. Trade works between traders. After a contract is concluded, contract terms are saved on blockchain data. When predetermined conditions are met, payment is processed automatically. The transaction is done by Bank Payment Undertaking (BPU) which guarantees to pay the price.

It has been repeatedly mentioned that e-contracts execute contract conditions when predetermined terms are corresponding. It can be interpreted that the supplier's factoring decision frankly influences the cash flow and related liquidity risk and even the supplier's capability of full reimbursement of the bank loan.[49]

The last notable usage of e-contracts in international trade is for the international transport. Maersk Line and IBM established a joint corporation to form a Global Trade Decentralization (GTD) Platform to pursue effectiveness and security of trade with e-contracts.[50]

Nick Szabo suggested 4 key principles for designing e-contracts: observability, verifiability, privity and enforceability.[51] Observability signifies

[49] Wang, Xiaoyu, and Fasheng Xu. "The Value of Smart Contract in Trade Finance." Manufacturing & Service Operations Management, 2022. https://doi.org/10.1287/msom.2022.1126.
According to the article, traditional banks fail to form concrete trustful contracts to resolve such a commitment issue because of incompleteness of a contract.

[50] According to Cho (2019), this platform tries to offer a service, marine logistic information delivery pipeline, that allows necessary documentation procedure from an exporter to importing country's government office to be delivered with 10% deducted price and faster speed.

[51] Chung, Jin-Myung. "Legal Issues on the Smart Contracts based on Blockchain". The Journal of Comparative Private Law, 25, no.3 (2018): 925-968.doi: 10.22922/jcpl.25.3.201808.925

the ability of parties to monitor or prove the proper performance to each other regarding the contractual contents. Verifiability is that contracting parties should be able to prove their performance to an arbiter or neutral third party. Privity explains that terms and performances of a contract should be only open up to as much as is necessary to involved parties. Enforceability is an ability to execute contractual relationships.[52] Before electronic contract system has been invented, four goals were met via trustful third party. However, there has been a dilemma with the existence of the third party. The observability and verifiability increase greater enforceability while the privity level decreases. E-contracts allow parties having maximized observability and verifiability even increasing the privity and enforceability. Without a doubt, no additional party in a contract is needed so that the privity escalates. In a process of executing contract terms automatically via digital protocols, less efforts are needed to verify and observe. Besides, if a breach is not allowed or extremely costly, enforceability increases while the incentive to violation shrinks.[53]

ETH is the most popular smart contract platform.[54] The total number of newly formed smart contracts in the first quarter of 2022 was 1.45 million, which is 24.7% increase in the last quarter of 2021.[55]

---

[52] Adler, David. "Smart Contracts." Fordham Journal of Corporate and Financial Law, April 26, 2018. https://news.law.fordham.edu/jcfl/2018/04/26/smart-contracts.
[53] Adler, David. "Smart Contracts." Fordham Journal of Corporate and Financial Law, April 26, 2018. https://news.law.fordham.edu/jcfl/2018/04/26/smart-contracts/.
[54] Coinbase. Accessed November 13, 2022. https://www.coinbase.com/learn/crypto-basics/what-is-a-smart-contract.
[55] "Ethereum Statistics (2022)." Alchemy. Accessed November 13, 2022. https://www.alchemy.com/overviews/ethereum-statistics#how-many-ethereum-smart-contracts-are-there-2.

Chapter V. Legal Agreements Analysis

In order to promote digitalization and ensure the security, countries are concluding new partnership agreements or including clauses to process the standardized digital trade. Multilateral communications have not found descent compromising level yet. Despite this, some nations are taking pioneering steps to conclude bilateral and regional trade agreements that support the digital economy. Regulations which allow cross-border flows of technologies and services by complementing existing rules are being established by a number of countries.[56]

1. Comparisons of Bilateral Agreements

The very first and notable agreement that deals with the digital trade issue would be the Comprehensive and Progressive Agreements for Trans-Pacific Partnership (CPTPP). The negotiation concluded in January 2018 by 11 countries except the United States. CPTPP contains larger digital trade articles including protections for data movement, tariffs on digital goods and services. However, it lacks detailed provisions and does not expand digital trade commitments to digital financial services.

Afterwards, the United States, Mexico, and Canada (USMCA) signed, the new version of North American Free Trade Agreement (NAFTA). The

[56] Gallaher, Mike. "Trade Agreements to Move the Digital Economy." Trade Agreements to Move the Digital Economy, December 2020. https://usa.visa.com/dam/VCOM/global/sites/visa-economic-empowerment-institute/documents/veei-trade-agreements-to-move-economy.pdf.

USMCA includes broader ranges of digital financial services. The United States has implemented the digital chapter from the USMCA as the template for other negotiations such as US-Japan Digital Trade Agreement.[57]

The United States has always on the leading position to conclude bilateral or multilateral agreements; however, when it comes to the digital agreement, other nations seem more active. The most prominent country could be Singapore. Singapore's digital partnership starts with the conclusion of Digital Economic Partnership Agreement (DEPA), the first digital-only deal framework. It was signed among Chile, New Zealand and Singapore in 2020. DEPA contains more detailed and related articles of digital trade commitments. In fact, DEPA has described article about the paperless trade with more specific conditions than CPTPP or USMCA. For instance, the Article 14.9 of the CPTPP only limits on electronic forms of documents are provided and accepted while DEPA goes further. It of course contains the basic norm which has been provided by CPTPP but also criteria on submission, document contents, security and consistency with international organizations. Furthermore, DEPA includes more electronic business facilitation such as e-payments and e-invoicing which have not mentioned in previous agreements.

Australia and Singapore signed on the bilateral digital partnership agreement (ASDEA) as well. This carries the most finely discussed and designed for the digital trade with inclusion of data flows, digital financial

[57] Gallaher, Mike. "Trade Agreements to Move the Digital Economy." Trade Agreements to Move the Digital Economy, December 2020. https://usa.visa.com/dam/VCOM/global/sites/visa-economic-empowerment-institute/documents/veei-trade-agreements-to-move-economy.pdf.

services, and digital technologies. ASDEA suggests cooperation on standards development and conformity assessment as well.[58]

Currently, Korea also concluded the digital partnership agreement with Singapore (KSDPA). Korea already have had e-commerce related articles with Korea-US FTA; however, KSDPA is the very first 'digital' partnership agreement that Korea signed. As of the growth in digital service industry, more active exchanges between two countries are expected. When the Regional Comprehensive Economic Partnership (RCEP) comes into operation, the scale of digital trade between Korea and Singapore would even become greater. Singapore is enhancing its digital transformation more rapidly than any other nations. According to the Global Competitiveness Report 2020 by WEF, Singapore ranked on the 3rd in the world on digital legislation and 1st in Asia.[59] Both Parties are expecting positive outcomes: promoting facilitation on digital system exchanges, assisting data flow, protecting data and customers' rights, and enhancing digital industries by cooperating on new technologies.[60]

---

[58] Gallaher, Mike. "Trade Agreements to Move the Digital Economy." Trade Agreements to Move the Digital Economy, December 2020. https://usa.visa.com/dam/VCOM/global/sites/visa-economic-empowerment-institute/documents/veei-trade-agreements-to-move-economy.pdf.

[59] Kim, Arum. Rep. "Review of IP Issues Following Korea-Singapore Digital Partnership Agreement (DPA) and its Implications". IP Focus. Korea Institute of Intellectual Property, (2022): 5. https://www.kiip.re.kr/board/data/view.do?bd_gb=data&bd_cd=5&bd_item=0&po_item_gb=4&po_item_cd=&po_no=12678.

[60] Kim, Arum. Rep. "Review of IP Issues Following Korea-Singapore Digital Partnership Agreement (DPA) and its Implications". IP Focus. Korea Institute of Intellectual Property, (2022): 7-8. https://www.kiip.re.kr/board/data/view.do?bd_gb=data&bd_cd=5&bd_item=0&po_item_gb=4&po_item_cd=&po_no=12678.

Classification (Module from DEPA)	Provisions	CPTPP	USMCA	USJDTA	DEPA	ASDEA	KSDPA
Digital Product, Information, Data Flow	Customs Duties	●	●	●	●	●	●
	Non-discriminatory Treatment of Digital Products	●	●	●	●	●	●
	Cross-border transfer of Information by Electronic Means	●	●	●	●	●	●
	Location of Computing Facilities	●	●	●	●	●	●
	Location of Computing Facilities for Financial Services	-	-	●	-	●	●
	ICT products that use cryptography	●	●	●	●	●	●
	Source Code	●	●	●	-	●	●
Protection & Trust	Personal Information Protection	●	●	●	●	●	●
	Online Consumer Protection	●	●	●	●	●	●
	Unsolicited Commercial Electronic Messages	●	●	●	●	●	●
	Cybersecurity Cooperation	●	●	●	●	●	●
	Principles on Access to and Use of the Internet	●	●	-	●	●	●
	Online Safety and Security	-	-	-	●	-	●
	Interactive Computer Services	-	●	●	-	-	-
E-business Facilitation	Paperless trading	●	●	-	●	●	●
	E-Authentication & E-Signature	●	●	●	-	●	●
	Domestic Electronic Transaction Framework	●	●	●	●	●	●
	Logistics	-	-	-	●	-	●
	E-Invoicing	-	-	-	●	●	●
	Express Shipments	-	-	-	●	●	●
	E-Payments	-	-	-	●	●	●
	Digital Identities	-	-	-	●	●	●
Infrastructure &	Internet Connection Charge Sharing	●	-	-	-	●	-

Interoperability	Submarine Telecommunications Cable Systems	-	-	-	-	●	-
	Standards and Conformity Assessment for Digital Trade	-	-	-	-	●	●
-New Emerging Technology and Cooperation	FinTech and RegTech	-	-	-	●	●	-
	Artificial Intelligence	-	-	-	●	●	●
	Government Procurement	-	-	-	●	-	-
	Competition Policy	-	-	-	●	●	-
	Public Domain	-	-	-	●	-	-
	Data Innovation	-	-	-	●	●	●
	Open Government Data	-	●	●	●	●	●
	SMEs in Digital Economy	-	-	-	●	●	●
	Stakeholder Engagement	-	-	-	-	●	●
	Digital Inclusion	-	-	-	●	-	-
	Capacity Building	-	-	-	-	●	-
	Transparency	-	-	-	●	●	-

Table 3. Comparisons among Digital Partnership Agreements

Most of agreements include common modules and latest versions cover mor diverse fields of digital economy and trade. However, as indicated in the Table 3, there is no specific regulations or policies that are specifically targeting electronic contracts. Hence, existing domestic laws are important to operate them.

2. United States' Legislation Status and Prospect

According to the joint statement in response to State "Smart Contracts Legislation", the Uniform Law Commission concluded the Uniform Electronic

Transactions Act (UETA) in 1999.[61] In the following year, the Electronic Signatures in Global and National Commerce Act (ESIGN) has been activated as well. With UETA and ESIGN, electronic contracts have been legally enforceable. Surprisingly, the Commission disagreed to establish a new statute for smart contracts because there is already existing law that can assure electronic contracts so the new legislation would only cause confusion and redundancy and becomes a barrier to the development.

Despite the disagreement, the federal government enacted the Online Market Protection Act of 2014 that defines the smart contract for the first time.[62] Furthermore, current state governments negotiate new legislation to adapt digital transformation. For instance, Arizona Revised Statutes Title 44 admits the legality of smart contracts[63] and even permitted the legal enforcement of electronic contracts in Arizona Electronic Transactions Act in 2017. The state government of Vermont approved limited liability companies based on blockchain technology and authorized the usage of electronic contracts for the voting procedure.[64]

States	**Regulations / Policies**
Arizona	• AZ HB2417 passed on March 29, 2017. • It includes not only the definition of blockchain but also regulations on smart contract.[65]

[61] The Act has been enacted in 47 states, the US Virgin Islands and district of Columbia.
[62] According to the Act, a smart contract is an agreement that uses the 'multi-signature technology' that allows transactions or movement of properties can be executed and recorded when pre-conditions are satisfied.
[63] Smart contracts may exist in commerce. A contract relating to a transaction may not be denied legal effect, validity or enforceability solely because that contract contains a smart contract term. (AZ Rev Stat § 44-7061(C) (2017))
[64] Sohn, Kyung-Han, ed. Blockchain and Law. Seoul, Seoul: 박영사, 2019.
[65] It is considered to be the first state that codified the definition and features of the smart

California	• Existing law on using money that is legal abolished. • Money Transmission Act is still on-going procedure.
Connecticut	• On June 19, 2015, Connecticut Money Transmission Act has been enacted.
New York	• The first state in the US established cryptocurrency regulations in 2014 • Consumer protection, Prevention of money laundering and cyber security related regulations exist. • However, there is no explicit rules on smart contracts.
Vermont	• H.868 Bill[66] passed. • Various blockchain technology related contents are included but no specific reference on smart contract.

Table 4. Legislation Status and Prospect of the US State Governments

Overall, in the United States, electronic contracts are legally enforceable unless they do not violate any existing regulations. Following this statement, ESIGN, UETA, Uniform Real Property Electronic Recording Act (URPERA) and the US Treasury's Financial Crimes Enforcement Network (FinCEN) regulations are compatible with issues of electronic contracts.[67]

3. Europe's Legislation Status and Prospect

European Union has stricter rules regarding digitalization issues than the United States. Regardless of the fact that the EU admits the advantages of applying electronic contracts in the trading system and the international supply chain management, its adoption of the new technology is comparatively slow. The EU legislators put more emphasis on consumers' protection than the digital transformation and adoption of firms or the governments. Thus, it is a priority

contract.

[66] It includes authentication, admissibility, presumptions, and other contents related to data that is created by blockchain technology.

[67] Jung, Gyung-Young, and Myeong-Hun Baek. "A Legal Study on the Smart Contract Based on Blockchain." Legal Research for Digital Society II, August 31, 2017. https://www.klri.re.kr/kor/publication/1728/view.do.

for EU legislators to clarify and come up with the solutions to protect consumers' rights in new circumstances where the traditional transactions functions are changing with electronic contracts.[68]

On top of the discussion of electronic contracts' legislation, it is essential to point out that within the Single Market[69], digital contents, services and purchasing goods should be easy. In fact, a number of businesses are hesitant to offer digital goods or services because nations follow different contract laws. To ease troublesome situations, the European Commission suggested a directive on contracts for the supply of digital contents and services and sales of goods in 2015. The suggested Directive unified contract laws among the EU. Moreover, the Directive was ratified by the European Parliament (EP) and the Council in 2019.[70]

Although there is the official publication of the journal, opinions about legality of electronic contracts of European Union countries seem still differ from one another. In Germany, e-contracts are not considered as a 'contract' in a manner of its civil law but a form of draft of the contract.[71] On the other hand, one of fast digital accepting countries, Malta, has comparatively thorough

[68] Pichonnaz, Pascal. "ELI Principles on Blockchain Technology, Smart Contracts and Consumer Protection." Blockchains, September 2022. https://www.europeanlawinstitute.eu/projects-publications/current-projects/current-projects/blockchains/.

[69] The Single Market is an association among 27 European countries of the European Union, Iceland, Liechtenstein, Norway and Switzerland. Countries that are bound in the Single Market are exempt from technical, legal and bureaucratic barriers. It has been into effect on January 1, 1993.

[70] "Digital Contract Rules." European Commission - European Commission, January 3, 2022. https://ec.europa.eu/info/business-economy-euro/doing-business-eu/contract-rules/digital-contracts/digital-contract-rules_en#facts-and-figures.

[71] Sections 145 ff. BGB (German Civil Code).

legislation for operating electronic contracts.[72] In some countries, even legislators recognize necessity of negotiating about implying some legislative approaches, sincere concerns about General Data Protection Regulation (GDPR) provide higher barriers to enact legality of electronic contracts. In Italy, for example, there is the already concluded definition and rules for electronic contracts.

One of the most important features from the legislation is that e-contracts must comply with the conditions granted by law for written contracts.[73] Spanish researchers showed opinions that there might be no reason to enact a new law that is redundant as e-contracts' functions are no different from traditional contracts.[74] England and Wales seem quite flexible on e-contracts. Their common law allows facilitating the use of electronic contracts even without statutory law reform.[75]

If countries of the EU have respective regulations, it would cause the dilemma for business owners in cross-border transactions. The conflicting laws of the EU nations do not offer an answer to unique characteristics of electronic contracts when selecting the applicable law.[76] 42% of offline retailers and 46%

[72] ÁGNES, ANTAL. "Smart Contracts, Legal Contracts in the Light of the Maltese Law – Part 2." FinTechZone, 2019. https://fintechzone.hu/smart-contracts-legal-contracts-in-the-light-of-the-maltese-law-part-2/.

[73] VolosA, A.A. "The Technology of Blockchain and Smart Contract and Their Regulation Under the Conflict of Laws of the European Union." ATLANTIS PRESS, 2020. https://www.atlantis-press.com/proceedings/iscde-20/125947825.

[74] It is difficult to imagine that the EU will nullify usage of smart contracts due to the legality problems. In this context, the digitalized contracts can be considered as legal following the principle of the freedom of contract, the important point from the EU contract law.

[75] Smart Legal Contracts § (2020). https://www.lawcom.gov.uk/project/smart-contracts/

[76] VolosA, A.A. "The Technology of Blockchain and Smart Contract and Their Regulation

of online retailers take into account the cost of consent to different consumer protection and contract law as critical obstacles to their cross-border sales.[77]

Indeed, traditional conflicts of laws that are acknowledged in the national legislation of the EU states should be used when selecting the applicable law. Although EU has several acts on electronic contracts, there are no specific articles that deal with the conflict of law. Each nation would design its own regulations on electronic contracts. However, supernational level of regulations is necessary for separate agreements that are applied to nations outside of the EU.[78] In other words, EU is on its way to enact more uniform and systematic regulations on electronic contracts.

4. South Korea's Legislation Status and Prospect

There is no fixed law for electronic contracts in South Korea. However, the fundamental law of blockchain industry promotion suggested by Korea Blockchain Industry Promotion Association (KBIPA) defines e-contracts. These contracts will be performed when a source code is executed and this source code should meet certain criteria in order to be treated equally as traditional contracts.

Moreover, in 2019, the Presidential Committee on the Fourth Industrial

---

Under the Conflict of Laws of the European Union." ATLANTIS PRESS, 2020. https://www.atlantis-press.com/proceedings/iscde-20/125947825.

[77]"Digital Contract Rules." European Commission - European Commission, January 3, 2022. https://ec.europa.eu/info/business-economy-euro/doing-business-eu/contract-rules/digital-contracts/digital-contract-rules_en#facts-and-figures.

[78] VolosA, A.A. "The Technology of Blockchain and Smart Contract and Their Regulation Under the Conflict of Laws of the European Union." ATLANTIS PRESS, 2020. https://www.atlantis-press.com/proceedings/iscde-20/125947825.

Revolution announced the possibility of e-contracts implementation on public sectors. When it was announced, Korea Information Society Development Institute (KISDI) anticipated that there should be legal examination on how to substitute seal and signature and how to conclude a contract. With improvement of transparency, higher involvement from the public and administrative measures, electronic contracts will be helpful in industries.[79]

Yet, South Korea has developed e-commerce industries and related government agencies established and performed regulations since 1997. The Framework Act on Electronic Trade (FAET) and the Electronic Signature Act (ESA) have been enacted in July 1999. These enactments provide bases for the legislation of e-contracts. According to the FAET, electronic documents have identical legal effects as regular written documents. The ESA validates the electronic signatures certified by the government's approval as handwritten signatures. Considering FAET and ESA, e-contracts seem valid and functioning without significant disturbance in Korea. However, there is at least one point that the FAET fails to cover. Transmission and reception of electronic messages or information are covered by the FAET; however, the conclusion of a contract is not covered by the FAET. Hence, it generates some uncertainty in the contract formation.[80]

Under the current Korean legal system, the validity of a contract

[79] Ham, Jihyun. "South Korean Government Looking into Possibly Applying Smart Contract to Public Sectors." *Korea IT News*, 2019. https://www.etnews.com/20190313000250.

[80] Lee, Tae Hee, and Kwang Bae Park. Rep. E-Commerce Regulations in Korea. Lee&Ko. Accessed 2023. https://www.leeko.com/pdf/Article_KBP_1.pdf.

between two parties depends on the method of communication they use. If they are conversing directly such as either in person, over the phone, or through other means, the contract is considered valid when one party accepts the other's offer. On the contrary, if they are communicating remotely, such as through mail, the contract becomes valid when the offeree sends their acceptance. The issue at hand is whether e-contracts will be considered as having been made between parties who were communicating directly or remotely. Also, the absence of the specific rules or jurisdiction creates challenges in facilitating e-contracts in digital trade, including e-commerce. In other words, the validity of the legality of e-contracts is still arguable.

In fact, South Korea has regulations to govern e-contracts for e-commerce transactions. The Electronic Financial Transactions Act (EFTA) provides the legal guidelines for electronic transactions, including e-contracts. The main issue regarding e-contracts under the EFTA is the validity of electronic signatures and the established rules for forming and executing such contracts, which give e-contracts enforceable power. With regard to the extant regulations, the authenticity of e-signatures and the ability to enforce e-contracts are paramount considerations in crafting comprehensive legislation to encompass the broader arena of trade. In addition to that, as South Korea actively explores and evaluates numerous opportunities to conclude digital partnership agreements, this endeavour should be sustained to fortify the economy and trade.

Chapter 6. Conclusion

Digitalization in industries has been accelerated especially after the unprecedented pandemic. Some scholars say that legislations cannot precede the speed of the technological development, but they should at least not hinder the advancement. One of key innovations during the fourth industrial revolution, blockchain technology, is clearly the hot potato in both public and private sectors. Undeniably, electronic contracts based on the blockchain technology can be sensational in international trade. E-contracts can reduce the cost and offer immediacy in trading system by simplifying transaction process and documentation workloads. By removing bureaucratic burdens, emerging markets can save costs. Indeed, digitalized contracts will bring more benefits to emerging markets than developed countries as they spend around 1.5 times more trading cost than developed countries.[81]

Even though prospect benefits that e-contracts will bring are notable, most nations are worried about several vagueness that electronic contracts contain. There is no unified definition of electronic contracts nor single country already has enacted a specific legislation on them yet. Nevertheless, the legislation tendency of electronic contracts is quite positive worldwide. Regarding efficiency and validity, e-contracts can follow traditional contract law although there are some remaining issues that should be newly discussed: availability of legal force, applicable law and trial jurisdiction.

[81] Yu, Kwang-Hyun, and Jong-Kwon Kim. "The Consideration on Possibility of Trade Activation and Promotion by Blockchain Based Technology." The International Commerce & Law Review 85 (February 2020).

The future of international trade will greatly be influenced by the adoption of electronic contracts. Great reductions in transaction costs, efforts and time from all documentation workloads are gigantic benefits in trade process. With regard to current trade systems which are mostly run by e-commerce, e-contracts seem more suitable and even carry facilitation effects. Importation, exportation and transportation procedure based on the blockchain technology is connected to trade facilitation issue by WTO.

According to the Trade Facilitation Agreement (TFA) of the WTO, trade facilitation contains cross-border customs clearance, acceleration in transportations and collaborations among trading parties. Governmental level of efforts are invested to promote transparency, cooperation on customs clearance process and data exchanges for the trade facilitation. With national-level of endeavours, the compliance with the use of electronic means plays an important role in trade transaction activities in cross-border trades.[82] With positive anticipation in international trade with e-contracts, federal and regional governments endeavour to collaborate on development in technology and legislation. The UN/CEFACT[83] is taking a leading role to promote global cooperation. Besides, paperless trade can be facilitated with the usage of e-contracts. With the emergence of the green economy that emphasizes the importance of the environment protection, paperless trade will be more

[82] Yu, Kwang-Hyun, and Jong-Kwon Kim. "The Consideration on Possibility of Trade Activation and Promotion by Blockchain Based Technology." The International Commerce & Law Review 85 (February 2020).

[83] UN/CEFACT is an international organization that actually belongs to the European economic committee. It mainly does standardization of e-commerce and trade facilitation.

enhanced by countries. If then, e-contracts are inevitable means of international trade facilitation.

As digital trade disputes between countries begin to become major issues such as digital taxation, data protection, and data flow, countries around the world have made various efforts to resolve these conflicts through bilateral, trilateral or multilateral agreements involving all parties since 2018. With the establishment of a system in which traders can trade safely and the laws related to blockchain technology is secured, it is believed that world trade by e-contracts can be further activated and promoted in the global trade sector in the future.

Taking into account prior concluded digital partnership agreements and the legislative direction of the US, EU and South Korea towards e-contracts, the data flow, the validity of e-signatures and the authenticity of electronic documentation are crucial elements in executing e-contracts. In order to admit the digitalized innovation in trade, deeper and further discussions are necessary to promote e-contract legislation on both domestic and international level.

Bibliography

Articles

ÁGNES, ANTAL. “Smart Contracts, Legal Contracts in the Light of the Maltese Law – Part 2.” FinTechZone, 2019. https://fintechzone.hu/smart-contracts-legal-contracts-in-the-light-of-the-maltese-law-part-2/.

Algayerova, Olga. Rep. Digital and Sustainable Trade Facilitation: UNECE Regional Report 2021. Geneva: UNECE, 2021.

Chung, Jin-Myung. "Legal Issues on the Smart Contracts based on Blockchain”. The Journal of Comparative Private Law, 25, no.3 (2018).

Cho, Hyun-Sook. “A Study on Legal Consideration of Smart Contract in International Trade Transactions.” International Commerce and Information Review 21, no. 3 (September 2019).

Digital Contract Rules.” European Commission - European Commission, January 3, 2022. https://ec.europa.eu/info/business-economy-euro/doing-business-eu/contract-rules/digital-contracts/digital-contract-rules_en#facts-and-figures.

“Ethereum Statistics (2022).” Alchemy. Accessed November 13, 2022. https://www.alchemy.com/overviews/ethereum-statistics#how-many-ethereum-smart-contracts-are-there-2.

Gallaher, Mike. “Trade Agreements to Move the Digital Economy.” Trade Agreements to Move the Digital Economy, December 2020. https://usa.visa.com/dam/VCOM/global/sites/visa-economic-empowerment-institute/documents/veei-trade-agreements-to-move-economy.pdf.

Ganne, Emmanuelle. Publication. Why Blockchain Could Become the New Container of International Trade, 2019. https://www.un-ilibrary.org/content/journals/15645304/2019/1/7.

Geneva, Recovering from COVID-19 in an increasingly digital economy: Implications for sustainable development § (2022).

Goodness, Ukeje. “6 Examples and Use Cases of Smart Contracts.” LogRocket Blog, April 6, 2022. https://blog.logrocket.com/examples-applications-smart-contracts/.

Gregolinska, Ewelina, Rehana Khanam, Frédéric Lefort, and Prashanth Parthasarathy. “Capturing the True Value of Industry 4.0.” McKinsey & Company. McKinsey & Company, May 19, 2022. https://www.mckinsey.com/capabilities/operations/our-insights/capturing-the-true-value-of-industry-four-point-zero.

INCOCHAIN - completely paperless smart contracts for World Trade (dashboard). Accessed November 13, 2022. https://bitcointalk.org/index.php?topic=1729772.0.

Johnathan. Koh Tat Tsen, “Ten Years of Single Window Implementation: Lessons Learned for the Future,” Global Trade Facilitation Conference 2011 Connecting International Trade, 2011, p.4-5.

Jin-Myung Chung, Legal Issues on the Smart Contracts based on Blockchain, no.3 (2018) : 925-968.doi: 10.22922/jcpl.25.3.201808.92.

Jung, Gyung-Young, and Myeong-Hun Baek. “A Legal Study on the Smart Contract Based on Blockchain.” Legal Research for Digital Society II, August 31, 2017. https://www.klri.re.kr/kor/publication/1728/view.do.

Jung, Jae Woo. “A Study on the Current Obstacles and Countermeasures in the Operation of South Korea's Paperless Trade,” 2016.

Kim, Arum. Rep. “Review of IP Issues Following Korea-Singapore Digital Partnership Agreement (DPA) and its Implications”. *IP Focus*. Korea Institute of Intellectual Property, 2022. https://www.kiip.re.kr/board/data/view.do?bd_gb=data&bd_cd=5&bd_item=0&po_item_gb=4&po_item_cd=&po_no=12678.

Lee, Tae Hee, and Kwang Bae Park. Rep. E-Commerce Regulations in Korea. Lee&Ko. Accessed 2023. https://www.leeko.com/pdf/Article_KBP_1.pdf.

Marr, Bernard. “What Is Industry 4.0? Here's a Super Easy Explanation for Anyone.” Forbes. Forbes Magazine, October 12, 2022. https://www.forbes.com/sites/bernardmarr/2018/09/02/what-is-industry-4-0-heres-a-super-easy-explanation-for-anyone/?sh=2a9954379788.

Max Raskin, “The Law and Legality of Smart Contracts,” Georgetown Law Technology Review, Vol1, No.2, 2017, p.324

Nemoto, T. and J. López González (2021), “Digital trade inventory: Rules, standards and principles”, OECD Trade Policy Papers, No. 251, OECD Publishing, Paris, https://doi.org/10.1787/9a9821e0-en.

Pichonnaz, Pascal. “ELI Principles on Blockchain Technology, Smart Contracts and Consumer Protection.” Blockchains, September 2022. https://www.europeanlawinstitute.eu/projects-publications/current-projects/current-projects/blockchains/.

Premier, David. “Exploring DLT, Blockchain and Smart Contracts in South Korea - International Financial Law Review Https://T.co/8vpqbt2cip Pic.twitter.com/tGqcinjs2E.” Twitter. Twitter, July 26, 2022.

Slocum, Hannah. “Maersk and IBM to Form Joint Venture Applying Blockchain to Improve Global Trade and Digitize Supply Chains.” IBM Newsroom, 2018. https://newsroom.ibm.com/2018-01-16-Maersk-and-IBM-to-Form-Joint-Venture-Applying-Blockchain-to-Improve-Global-Trade-and-Digitize-Supply-Chains.

Sohn, Kyung-Han, ed. Blockchain and Law. Seoul, Seoul: 박영사, 2019.

Son, Sung Pyo. “A Study on Improvement of the Platform-Based SCM Efficiency: Focusing on the Introduction of Digital Trade Blockchain Technology in Customs Clearance and Future Tasks.” The Journal of Korea Research Society for Customs 22, no. 4 (2021).

Szabo, Nick. “Smart Contracts: Building Blocks for Digital Markets.” Extropy Journal of Transhuman Thought, 1996. http://www.truevaluemetrics.org/DBpdfs/BlockChain/Nick-Szabo-Smart-Contracts-Building-Blocks-for-Digital-Markets-1996-14591.pdf.

UN/CEFACT. 2018. Paperless Trade Version 1[White Paper].

UNICITRAL. UNICITRAL Legal Instruments for E-Commerce and Paperless Trade. p.4.

Wang, Xiaoyu, and Fasheng Xu. “The Value of Smart Contract in Trade Finance.” Manufacturing & Service Operations Management, 2022.

Wright, Aaron. Rep. Decentralized Blockchain Technology and the Rise of Lex Cryptographia, 2015. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2580664.

“World Trade Organization.” WTO. Accessed November 16, 2022. https://www.wto.org/english/res_e/statis_e/trade_evolution_e/evolution_trade_wto_e.htm.

WTO. Cross-Border Paperless Trade Toolkit. 2022.

Yang, Young-Sik, and In-Bang Song. “Legal Issues for Commercialization of Blockchain Smart Contract.” Korean Law Association 18, no. 2 (2018)

Yu, Kwang-Hyun, and Jong-Kwon Kim. “The Consideration on Possibility of Trade Activation and Promotion by Blockchain Based Technology.” The International Commerce & Law Review 85 (February 2020).

Agreements and Official Documents

“World Trade Organization.” WTO. Accessed November 16, 2022. https://www.wto.org/english/res_e/statis_e/trade_evolution_e/evolution_trade_wto

e.htm.

Article 109 of South Korean Civil Law (AZ Rev Stat § 44-7061(C) (2017))

Sections 145 ff. BGB (German Civil Code).

Smart Legal Contracts § (2020). https://www.lawcom.gov.uk/project/smart-contracts/

ELECTRONIC TRADE FACILITATION ACT (2015). Amended by Act. 11461, June.1, 2012.

Websites

"The impact of digitalization on trade", Digital Trade, OECD, accessed November 13, 2022, https://www.oecd.org/trade/topics/digital-trade/.

News Article

Adler, David. "Smart Contracts." Fordham Journal of Corporate and Financial Law, April 26, 2018. https://news.law.fordham.edu/jcfl/2018/04/26/smart-contracts.

Coinbase. Accessed November 13, 2022. https://www.coinbase.com/learn/crypto-basics/what-is-a-smart-contract.

Ham, Jihyun. "South Korean Government Looking into Possibly Applying Smart Contract to Public Sectors." *Korea IT News*, 2019. https://www.etnews.com/20190313000250.

VolosA, A.A. "The Technology of Blockchain and Smart Contract and Their Regulation Under the Conflict of Laws of the European Union." ATLANTIS PRESS, 2020. https://www.atlantis-press.com/proceedings/iscde-20/125947825.

Weise, Karen. "Amazon's Profit Soars 220 Percent as Pandemic Drives Shopping Online." The New York Times, 2022. https://www.nytimes.com/2021/04/29/technology/amazons-profits-triple.html.

국문 초록

디지털 무역 거래에서의 전자계약서에 관한 법적 고찰

서울대학교 국제대학원
국제학과 국제지역학전공
이지은

4차 산업혁명의 발생으로 인한 디지털기술발전은 사회의 많은 영역에의 디지털 전환을 가속화하고 있다. 기술 발전으로 세상은 그 어느때보다 긴밀히 연결되어 있으며, 글로벌 가치 사슬을 통해 세계 무역 규모 역시 급격히 증가했다. WTO 조사에 따르면, 1950년부터 2021년까지 국제 무역은 4300%의 성장을 이루었다. 특히 전례 없는 코로나19를 겪으며 전자상거래를 비롯한 국경을 넘나드는 무역(Cross-border trade)의 디지털 전환을 더욱 앞당겼다. 무역업무과정에 발생하는 모든 단계들(구매, 서류의 문서화, 데이터 저장, 데이터 교환 등)은 '전자 계약(e-contract)'을 통해 더욱 용이하게 이행될 수 있다. 즉, 무역 생태계를 원활하게 하기 위해서는 디지털 전환이 불가피하다. 실제로 많은 국가들은 각국의 경제 활동을 촉진하고 국가 경제 안보를 보장하기 위해 양자 및 다자간 디지털 파트너십 협정을 체결하고 있는 실정이다.

하지만 기술 발전의 속도가 너무 빠르면 법 제정 절차가 이를 따라가지 못해, 기술 발전과 규제 사이에 격차가 발생한다. 산업이나

일상을 생각해보면 디지털전환이 꽤나 자연스레 이루어지는 것 같지만, 아직 진행 중인 과정에서의 법적 구속력을 결정짓기엔 고려해야할 어려움이 뒤따르고 있다. 비용과 시간의 절감, 통관절차 간소화, 프라이버시와 보안 보장 등 전자계약이 가진 이점들은 결코 무시할 수 없다. 이러한 장점에도 불구하고, 정형화된 기준 및 규제의 부재는 더 광범위한 전자 계약의 사용을 방해한다. 사실 전 세계적으로 정해진 '전자 계약'의 정의는 없다. 아마도 전자계약에는 기술적 개념 뿐만 아니라 계약관계 관행, 전자정체성 등 다양한 관련 법적 문제가 포함되어 있기 때문일 것이다. 이에 따라 전자계약은 계약법은 물론, 금융법, 전자거래법, 데이터보호법 등 여러 법률 분야에서 검토되어야 한다.

본 연구는 전자계약의 개념, 법적 조건 및 효과에 대한 일반적인 시사점을 소개하면서 전자계약이 실제 무역 생태계에서 어떻게 활용되는지를 검토한다. 이어 블록체인 기술과 이를 기반으로 한 전자계약에 대한 검토를 통해 전자계약의 기술적 조건과 구조를 설명한다. 마지막으로 관련 항목을 가진 한국, 미국, 유럽 연합의 국내법과 파트너십 협정의 검토를 필요로 한다. 이를 통해 정책 입안자나 무역 전문가들이 전자계약에 대한 현행법 개정 또는 새로운 디지털 파트너십 계약을 체결할 때 고려해보 수 있을 것이라 판단된다.