COMPARISON OF SMART CONTRACTS WITH THE NOTARY SYSTEM

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Abstract

Notaries are guardians of the seal of the state. Individuals make use of notaries in order to secure their transactions and fulfill the requirements for specific legal issues. However, the notary system is getting old-fashioned, and perhaps technology should be integrated into the notarial system; the blockchain and the smart contracts can be useful for improving this system.

The smart contract is a computer protocol that allows parties to make transfers of digital or pyhsicall assets between themselves on a digital platform. The smart contracts are conserved and stored on blockchain and distributed ledgers and digital signatures used in smart contracts. These features provide protection to agreements, like protection of the notaries on notarial documents. This paper seeks to answer two main questions; how will smart contracts have an impact on the notary system and what should be the proof ability of smart contracts. For clarifying these questions, the author discusses the smart contract, blockchain, contractual law and the notary system from a legal perspective.

Keywords: Smart contracts, the blockchain, the notary system, proof ability of smart contracts

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Introduction

Background

A notary is a person that is authorized by the government in order to witness appropriate signatures on documents and performs specific legal affairs[1]. The oldest notary can be traced to Ancient Egypt (2750-2250 B.C.)[2]. The purpose of the notary is to avoid conflicts between the parties, ensure the transactions that are made by the parties and provide transparency about these transactions to the public. The notarial documents have powerful proof ability than the other documents in some jurisdictions[3], because the signature on the document is witnessed and approved by the notary. However, this system is getting old-fashioned, innovative changes should be integrated into the notary system.

At the beginning of the Twenty-First Century, technological developments and innovations, especially blockchain, have begun being used and tested in making transactions. In regards to that, smart contracts have begun to alter business life. The smart contract is a computer protocol that allows the transfer of assets and currencies between parties[4]. Smart contracts can be stored on the blockchain and distributed ledgers. Stephane Blemus defines blockchain as;

> "*the Blockchain, which is, in simple terms, a decentralized and cryptographic ledger of immutable data records replicated and distributed to each member/node of a peer-to-peer network*.."[5].

[1]Süleyman Çetin, Derya Ateş, Avukatlık ve Noterlik Hukuku, October 2018, Seçkin Yayınevi, 1st Edition, Page 187
[2]National Notary Association, https://www.nationalnotary.org/knowledge-center/about-notaries/notary-history, accessed 5 April 2019
[3] For instance in Turkish jurisdiction; Leyla Müjde KURT, NOTERLERİN HUKUKİ SORUMLULUĞU, Gazi Üniversitesi Hukuk Fakültesi Dergisi, "..the documents that witnessed by the notary are hard evidence.."
[4] Techopedia https://www.techopedia.com/definition/32499/smart-contract, accessed 2 April 2019
[5] Stephane Blemus, Law and Blockchain: a legal perspective on current regulatory trends worldwide, Sorbonne University, 2017, page 1

Storage on more than one node and combining it with a decentralized and cryptographic ledger prevents undesirable interferences[6]. This feature provides protection to business transactions and smart contracts. Also, blockchain provides efficiency, transparency and speed to business transactions. Adopting this technology can provide efficiency to business transactions.

It has been argued that people lose a lot of time and money by struggling with the bureaucracy in their transactions with notary republics [7]. Some compulsory regulations mandate corporations or individuals to have specific operations verified by notaries. Some transactions, or agreements that they made, should be signed or drafted with a notary or approved by a notary. For instance, transferring the shares of a limited company shall be made at a notary in the Netherlands,[8] or transactions regarding vehicles shall be made with notaries in Turkey[9]. This situation harms the efficiency and speed of the transactions. Also, notaries generate new expenses to transactions. Notarization can be an obstacle for some operations and slow down the transaction process[10]. Notaries can be supported with blockchain technology and smart contracts. It can provide efficiency, speed and it can reduce the expenses of the notarization.

Certain features of smart contracts can meet the criteria of the notary system. Storage of smart contracts on a blockchain and distributed ledger provides protection to documents like notaries. The purpose of archiving documents at notaries is the security feature that is provided by notaries to the documents. The documents cannot be lost or tampered by third parties. Notaries witness or approve the signatures of the documents; in some instances, documents shall be prepared at the notary. The notarial documents have some advantages; the signature is witnessed by the notary, so if there will be a conflict about this document, the court will not investigate the signature, it helps the court by deterring fraudulent signatures. The digital signature that is used by smart contracts for sealing is not sufficient for satisfying

[6] Aaron Wright & Primavera De Filippi, DECENTRALIZED BLOCKCHAIN TECHNOLOGY AND THE RISE OF LEX CRYPTOGRAPHİA, page 6

[7] For instance; in order to transfer the property legally and register is to land registry, people should go notaries, it costs 900-2,000 Euros to the concerned party.

[8] Notarial Act, https://www.knb.nl/english/the-notary/notarial-acts, accessed 4 April 2019

[9] Decree Having Force of Law No.680, Article 61, 6 January 2017

[10] Francisco Reyes, A new policy agenda for Latin American company law, 2011, page 31-32"…The necessary participation of a notary public in the process of incorporation is a good example of such widespread formalism…this formalistic approach represents a significant obstacle for the formalization of business enterprises…"

the requirements for verifying the identity yet, but certain companies are developing e-signatures for smart contracts.

Significance

Some of the crucial operations of companies and specific transactions between individuals are made or witnessed by the notaries. Companies or individuals shall struggle with bureaucracy. This issue harms speed and involves expenses. A solution is searched for this issue. Technological developments can provide efficiency and reduce the costs of transactions and some specific operations that are needed by business life. Several blockchain experts investigate whether smart contracts can be adopted in the notarial system. However, these researchs are not made in detail. In this research, the author moots that the smart contract can satisfy the necessities and legal obligations that are conducted by notaries within a more efficient and cheap way. According to this issue, business entities and individuals can have some concerns about proof ability of smart contracts. Documents or operations that are made or witnessed by notaries, are conclusive evidence. The courts do not investigate the trueness of these documents or operations. Legal status and proof ability of smart contracts is discussed in order to clarify these concerns.

Research Questions

Efficiency, speed, and savings are essential for business transactions. Notary system is becoming old fashioned and slow this system can be an obstacle for speed that is needed for business life. The other problem is notaries can be expensive. Smart contracts can be a solution to this issue; it can provide dynamism to business life and reduce the expenses of transactions. In this research, the central research question will focus on;

What will the impacts of smart contracts have on the notary system?

This thesis focus on determining the potential impacts of the smart contract on the notary system. In this paper, the author discusses whether smart contracts can replace the notaries and whether the notaries can use the blockchain and smart contracts. In order to find answers to this question, several sub-questions should be helpful;

(i) What are the basic elements of the notarial system?

(ii) How notarial systems are regulated in different jurisdictions?

(iii) What is the definition of smart contracts?

(iv) What are Ricardian smart contracts?

(v) What are the features of smart contracts?

(vi) Can the notarial system be more efficient with integration of the technology?

The author uses two additional research question in order to clarify the research;

How will the blockchain system and the smart contracts be adopted into the notarial system?

If features of the smart contracts are suitable for notary system, a new question arises. With this question; the author aims to find how to adopt the smart contracts in the notary system.

What should be the proof ability of the smart contracts?

These questions arise as a conclusion of this comparison. Notarial documents are conclusive evidence in most of the jurisdictions. The smart contracts and notarial documents are compared from the view of evidential status. These sub-questions are utilized;

(i) What is the proof ability of notarial documents in different jurisdictions?

(ii) What is the contract according to Principles of European Contract Law, Turkish jurisdiction and Dutch jurisdiction?

(iii) What is the legal status of smart contracts?

Research Methodology

The idea behind this research is to discuss the smart contracts and the blockchain and compare it with the features of the notary system. In order to reach this purpose, the author used the doctrinal method which is concerned with legal preposition and doctrines. In order to gain knowledge about smart contracts, blockchain and notary system, textbooks, articles, codes, websites, and blogs are utilized. In order to reach the answers of research questions, the comparison method is used; the notary system and smart contracts are compared in this paper.

Literature Review

The author starts this research with examining the notary system. In order to have knowledge about the notarial system, the author uses the following sources; codes of three different jurisdictions; Turkey, Netherlands and The U.S.A. (Arizona State Law) are examined. “Litigation in the Netherlands, Civil Procedure, Arbitration and Administrative Litigation” which is written by Mariake van Hooijdonk and Peter Eijsvoogel, and “Avukatlık ve Noterlik Hukuku (Law of Lawyers and Notaries)” which is published by Süleyman Çetin and Derya Ateş was referenced to provide an in-depth overview of the notary system.

For the purpose of determining the legal status of the smart contracts, the author uses several sources; “The Principles of European Contract Law and Dutch Law” is edited by Danny Busch, Ewoud Hondius, Hugo van Kooten, Harriet Shelhaas and Wendy Schrama and the Turkish Code of Obligations are utilized for determining the basic elements for concluding a contract.

The author uses several sources in order to understand the technological part of this research and answer the questions; “Research handbook data science and law” is written by Vanessa Mak, Eric Tjong Tjin Tai and Anna Berlee is used for having knowledge about the blockchain, smart contracts and connection these technologies with law. The author utilizes “The Law and Legality of Smart Contracts” is written by Max Raskin in order to determine legal issues about smart contracts. “Decentralized Blockchain Technology and The Rıse of Lex Cryptographia” is written by Aaron Wright and Primavera De Flippi is utilized for understanding, the blockchain. The article, “How to Create a Notary on the Ethereum Blockchain” by Nicole Zhu, is used for determining the issues which are related to this research.

Overview of Chapters

In the first chapter, the notary system is discussed. Historical background of the notaries is explained in order to find basic elements of the notaries. After that two major notarial disciplines and basic operations of the notaries are discussed. Notarial Codes of four different jurisdictions; Turkey, the Netherlands, The U.S.A., and The Arizona State are examined for being an example for the notarial system. Later on, the advantages and disadvantages of the notarial system are discussed. The proof ability of the notarial documents is analyzed in the last section of this chapter.

The second part involves contract law. The main purpose of this chapter is discussing the legal status of smart contracts by comparing it with traditional contracts. This chapter starts with Roman Law. In order to find basic elements of the contracts, the author makes this historical research. This chapter continues with the European Contract Law. After this section, Turkish and Dutch jurisdictions, and regulations of The U.S.A. and Arizona State are examined in contract law sense. This chapter ends with a comparison of the contract law in different jurisdictions.

The technological part of this research is analyzed in the third chapter. The blockchain and smart contracts constitute the first two section of this chapter. The legal status of smart contracts is discussed for clarifying the smart contracts from a legal perspective. Ricardian smart contracts are examined as the second generation of the smart contracts and the purpose of finding solutions for problems of smart contracts In order to compare with notary system, advantages, and disadvantages of the smart contracts are analyzed by comparing smart contracts with traditional contracts and Ricardian smart contracts.

The last chapter of this research, the author compares the notary system with smart contracts. Main features of the smart contracts and the notary system is compared in the first section. Comparison of the smart contracts and the notary system in different jurisdictions follows the first section. After that advantages and the disadvantages of the smart contracts and the notarial system is discussed. Later on this section, potential impacts of the smart contracts on the notary system are examined. The last section of this chapter is about what should be the proof ability of the smart contracts with comparing it with the notarial documents.

Chapter 1 – Discussion of The Notary System

I. History of The Notary System

The oldest notary can be traced to Ancient Egypt (2750-2250 B.C.)[11]. Kabbaneh, the public weigher and notary or scribe, were serving as an officer who has a right to give official certification of the transactions[12]. These scribes were recording documents like personal letters, tax records, etc. Notaries sealed these documents and stored them in order to aware all the important transactions in their region[13]. Storing and sealing features of the notary system were used in Ancient Egypt.

The Singraphos were true notaries in Ancient Greek (There was one more officer in Ancient Greek). The purposes of notaries in Ancient Greek were keeping the public registers and witnessing the transactions. Contracts that were not recording in public register were not granted. In Ancient Greek, they created accounts to loan money to the merchant. In order to prevent the borrower from denying that loan, notaries witness the transaction[14].

Comparison of smart contracts with notary system should be made step by step, the idea behind the notary system should be examined. This historical brief research is done in order to find the motive for why people needed the notary system and determine the basic elements of the notary system. In the light of this brief research about the history of the notary system, it can be said that notaries emerged to respond to the needs of the people who lived in Ancient Egypt and Ancient Greek about transactions. Business was really important for these people. These people needed records about their transactions and witnesses for their transactions in order to secure these transactions. It can be said that witnessing and storing are basic elements of the notary system. However, these elements could be changed with developments and alterations in transactions and business in time. This issue is discussed in the next parts of this chapter.

[11] Çetin, op. cit., page 187
[12] Moustafa Gadalla, The Ancient Egyptian Culture Revealed, (Tehuti Research Foundation, 2007), page 265
[13] Jerry Lucas, Notaries in Ancient Egypt, 2 May 2015, https://abclegaldocs.com/blog-Colorado-Notary/notaries-in-ancient-egypt/ , accessed 25 April 2019
[14] ibid

II. Models and Basic Operations of the Notaries

Two models of notaries are accepted in the world; civil law or Latin notary system and common law or public notary system. These two notarial disciplines are the follow-up of two different legal systems; Romanic Civil Law and English Common Law. Following this part, these two notary systems are examined and the most common types of notarization are explained.

The public notary is an authorized person by the government to authenticate the signings of the documents and administer oaths. Public notaries are responsible for identifying the signers, taking signer acknowledgments, administering oaths and affirmations and executing officers. On the contrary, of civil law notaries, public notaries are prohibited from drafting contracts, giving legal advice to parties of the contracts or assisting parties of the agreement about understanding the contract. The public notaries verify the identification of the signers by check the signer's ID with photo, his/her signature, and physical description. Notarization by public notaries do not mean the notarization document is accurate or notaries investigate the legality of the documents, the signers of the document are liable for the content of the document[15]. It can be interpreted that public notary's duty is witnessing the agreement, prevent the conflicts arise from misunderstandings about intentions of the parties and deter the frauds. The public notaries have no duty about giving legal advice about agreement or drafting a contract. A new element first two elements are determined in the first part "History of The Notary System" of this chapter" is added to duties of the notaries by examining the public notaries; notaries shall be sure about the parties of an agreement understand the terms and the conditions of the contract and this contract is drafted regarding to the parties will[16].

Latin notaries are agents that are authorized by governments about affirming the signing of the documents, recording these documents, be sure about the will of the parties and enforcing the deeds the parties already agreed with the notarial document. Distinguishing part of the Latin notaries from public notaries are; Latin notaries have training and duties similar to an attorney, Latin notaries are employed about giving legal advice about the document in a legal

[15] National Notary Association, What Is Public Notary, 2018, <https://www.nationalnotary.org/knowledge-center/about-notaries>, accessed 29 April 2019

[16] National Notary Association, What Is Public Notary Brochure, 2018, https://www.nationalnotary.org/knowledge-center/about-notaries, accessed 29 April 2019, "…The Notary also makes sure that signers have entered into agreements knowingly and willingly…",

sense and drafting a new contract[17]. In the jurisdictions that have civil law notaries, the notaries should act as a legal advisor for the parties of the notarial document. Legal advising can be another element of the duties of the notaries only for the civil law notaries.

Most common types of the notarization should be discussed in order to reach the purpose of this research, it can be counted as; acknowledgments, jurats, copy certification, recording, and signature witnessing. Acknowledgment is to be sure about identification and will of the signers. Notaries shall be sure about the intentions of the parties and identify and declare the signature on the document is belong to the concerning party. Jurat means to swear or affirm of the signer about the accuracy of the contest of the document. The signer must appear personally for the jurat. As discussed before, in public notarial systems, notaries are not liable about the contest of the document. The purpose of the copy certification is verifying the copy is accordance with the original text. Commonly these certificated copies have same legal status with the original text. Notaries can witness the signing process in order to verify the identification of the signer. This validation is made to prevent conflicts about signatures[18]. The records of the copies of the notarial documents are stored in the notaries, the purpose of this storage is to deter any dispute occurs about the claim of tampering the notarial document.

The research about the most common types of the notarization and notary models can be utilized for determining the can smart contracts satisfy the necessities that arise from the notary system.

III. The Notary System in Different Jurisdictions

i. Turkey

Turkey is a member of International Union of The Notaries[19]. Latin notarial system is used in Turkey; the features of the Latin notarial system is explained in Section 2 of this chapter.

Notarial Code No.1512 and Regulations of Notarial Code regulates the notarial system in Tukey. According to the Notarial Code, notaries are liable to be sure about identity, address,

[17] European Commission, Legal Professions, 21 January 2019, < https://e-justice.europa.eu/content_legal_professions-29--maximize-en.do> , accessed 29 April 2019

[18] Kelle Clark, The Most Common Types of The Notarization, Notary Bulletin (Notary News), 13 August 2015, < https://www.nationalnotary.org/notary-bulletin/blog/2015/08/most-common-types-of-notarizations> , accessed 29 April 2019

[19] Official Website of The International Union of The Notaries, 2017, < https://www.uinl.org/en_GB/member-notariats> , accessed 5 May 2019

intentions and the mental capacity of the signers[20]. Validation of the identities is a core element of the Turkish Notarial System. Between Article 60 and Article 71 of the Notarial Code, duties of the notaries are counted. Regarding to that Articles, these duties are;

- Drafting preliminary contract of real estate sale
- Approving the signatures, seals, or dates on the document that is not drafted by notaries
- Giving copies of the notarial documents
- Translation of the documents
- Sending the certificate of protest, warning and notice
- Registering the operations that shall be registered.
- Approving the commercial books
- Declaratory actions, being trustee, making notifications

Certain contracts shall be drafted or registered by notaries for the validity of the contract because of the importance of the contract. These contracts that shall be drafted or registered by the notaries are regulated by different codes. For instance, public tender contracts shall be registered by the notaries[21].

Notaries in Turkey shall clarify three issues to the parties about the document before the notarization; Type of the document, context of the document and legal effects of the document[22]. However, the Turkish Notarial Code does not regulate this issue clearly but it can be interpreted from the articles of this code. Article 72 of the Turkish Notarial Code say that notaries have the duty to understand the intentions of the parties. Also in Article 91, notaries shall provide an environment that parties can declare their wills clear and freely and ask necessary questions about the transaction and explain the consequences of the transaction.

Expenses arisen from notarial operations and notarial documents are regulated by varied codes and regulations. These codes and regulations are; Act of Fees No. 492, Stamp Tax Law

[20] Turkish Notarial Code No.1512, Article 72, 5 February 1972
[21] Turkish Public Bidding Code No.2886, Article 57, 8 August 1983
[22] Dr. Cenk Akil, The Burden Of Clarification Of Those Concerned BY THE NOTARY PUBLIC IN THE CIVIL PROCEDURE LAW, Journal of the Ankara Bar, 2012, page 221, "…notary is liable from clarification of the type, context and legal effects of the document…"

Code No. 488, Notarial Code No.1512, Traffic Code No. 2918. For instance, notaries get %0.113 from each signature of the notarized contracts[23].

ii. Netherlands

The Netherlands is one of the countries that use the Latin Notarial System and member of the International Union of The Notaries[24]. Notarial system of the Netherlands is similar to Turkey's notarial system. The notarial system is regulated by Act of 3 April 1999.

According to regulations in the Netherlands, notarial acts are agreements or declarations that are legally recorded; it is compulsory for certain type of agreements or declarations for validation of the agreement or the declaration. For instance; establishing a foundation or changing or making a will[25].

After the notary has signed the document, the date of the document is definite for all parties. It becomes also a fact that the persons mentioned are indeed the signers of the document[26]

Notaries can make changes before the signing of the notarial act[27], it can be understood that notaries act as attorneys, their liability is broader than the notaries in countries that use public notary system. Notaries have a duty to give advice about the notarial act[28].

Notaries have three main tasks in the Netherlands; drawing up notarial acts, updating registers and providing advice[29]. Drawing up notarial acts is the most important task of the notaries in the Netherlands. Notaries record the agreements in notarial acts and keep these acts. People who are concerned with a notarial act can get a copy of the notarial act. In the manner of "updating task", notaries are liable for the activities that occur directly or indirectly from the execution of the notarial acts. For instance, notaries should make arrangements to update the real estate's records. The last task is providing legal advice. As it discussed before, notaries

[23] Turkish Notarial Act General Communique 2019 Serial No.82
[24] Official Website of The International Union of The Notaries, 2017, < https://www.uinl.org/en_GB/member-notariats> , accessed 5 May 2019
[25] KNB Official Website, < https://www.knb.nl/english/the-notary/notarial-acts> , accessed 6 May 2019
[26] Nicole Kuijpers, Joelle Noailly, Ben Vollaard, Liberalisation of the Dutch notary profession, September 2015, CFB Document No.93, page 14
[27] Dutch Act of 3 April 1999, Section 45
[28] Denis Vermeulen, Dutch Notaries, 9 September 2015, https://www.lawyersnetherlands.com/dutch-notaries , accessed 9 May 2019
[29] KNB, Task of the Notary, < https://www.knb.nl/english/the-notary/task-of-the-notary> , accessed 29.05.2019

should act as an attorney, they have a duty of giving legal advice to concerned parties of a notarial act.

iii. The U.S.A.

a) Federal Law

On the contrary with Turkey and Netherlands, The U.S.A. has public notary system. In the United States, the term notary means a public officer qualified and bonded under the laws of a particular jurisdiction for the performance of notarial acts, usually in connection with the execution of some documents[30]. Public notaries are liable for verification of the identities of the parties, they do not responsible for the content of the concerned document[31]. Also, notaries shall record every notarial act in a bound journal or other secure recording device and safeguard it as an important public record[32]. The main purpose of notaries is detecting and deterring the fraud[33].

The main task of the notaries is to perform notarial acts, notarial can be defined as an act recognized by law or usage as pertaining to the office of a notary public[34]. In order to notarize a document following elements are required[35];

- The signer of the document shall be present at the notary
- The notary shall have a satisfactory presumption about the identity of the signer
- The original document shall be present and completed
- The date of the document shall be the same day as the notarization or earlier
- The intention of the notarization shall be indicated clearly
- The notary must feel assured that the signer comprehends the underlying transaction and is proceeding willingly.
- The notary shall record the notarial act into the record book
- The verbal ritual shall be performed

[30] Electronic Code of Federal Regulations, Title 22, Chapter 1, Subchapter J, Section 92.1
[31] National Notary Association, What Is Public Notary, 2018, <https://www.nationalnotary.org/knowledge-center/about-notaries>, accessed 6 June 2019
[32] National Notary Association, The Notary Public Code of Professional Responsibility, 2019
[33] ibid
[34] Electronic Code of Federal Regulations, Title 22, Chapter 1, Subchapter J, Section 92.1
[35] American Society of Notaries, Basic Notarial Duties, < https://www.asnnotary.org/?form=basicduties>, accessed 6 June 2019

- A completed notarial certificate.

b) Arizona State

Duties of the notaries are counted in Arizona Revised Statutes Chapter 2 Article 2 Section 41-313. According to this section, notaries perform following notarial act; Take acknowledgments and give certificates of the acknowledgments, administer oaths and affirmations, perform jurats, perform copy certifications[36] and keep, protect and maintain the records of the notarial act by chronological[37]. In order to notarization, signer shall be the presence of the notary and the language of the document that concern notarization shall be understood by a notary[38]. The notaries in Arizona State do not act as attorneys, the signers of the document responsible for the content of the notarial act[39].

In Chapter 2, Article 3 of the Arizona Revised Statutes, electronic notarization is regulated. Electronic notary means a public notary who is permissioned to notarizing the documents electronically[40]. The Arizona Statutes allow creating an electronic notarial act only if the signer presence of the electronic notary at the time electronic notarization. Regarding to Arizona Revised Statutes, notarized electronic documents consists of four elements; A complete electronic document, sign or mark that is affixed to the document by the signer, a time and date statement that is affixed to the document in a manner that is approved by the secretary of state, and an electronic notary token that is affixed to the document in a manner that is approved by the secretary of state[41]. The electronic notarial acts are recorded in the website of American Notary U.S.A. and these acts are kept confidential and protected from tampering[42]. The parties of an electronic notarial act can access the electronic notarial act from this website. This feature of the electronic notaries provides efficiency; parties do not have to go any notary in order to get an electronic notarial act. This electronic notarization is used the several American States[43].

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[36] Arizona Revised Statutes Tiltle 41 Chapter 2 Article 2 Section 41-313/A
[37] ibid, Section 41-319/A
[38] ibid, Section 41-313/B
[39] National Notary Association, op. cit.
[40] Arizona Revised Statutes Title 41 Chapter 2 Article 3 Section 41-352/A
[41] ibid, 41-354/A
[42] American Notary U.S.A., Electronic Notary Services, 2019, < https://americannotaryusa.com/electronic-notary-services> , accessed 8 May 2019
[43] For Instance; Arizona, Arkansas, California, Colorado, Delaware, Florida, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Montana, Nebraska, Nevada, Ohio, Oregon, New Jersey,

The author thinks that; the electronic notaries are a good example to adopting technology to the law but people still need to go to the notary for enjoying the benefits of the notarial documents and need third-party for the transactions.

IV. Proof Ability of the Notarial Documents

i. Turkey

According to the Turkish Civil Procedure Code, if the amount of the case is higher than the threshold that is determined by the regulations, the claim that concerned the case shall be proved by authenticated documents[44]. This rule named as "rule of proving by conclusive evidence" by some of the doctrines[45]. In Turkish jurisdiction, there is a distinction between documents and authenticated documents. Regarding to Article 199 of Turkish Civil Procedure Code, the document can be written or printed text, promissory notes, drawings, plans, sketches, photographs, films, images, sound recordings, the data carriers in the electronic environment or similar information carriers. Authenticated documents are the documents that approved or drafted by public authorities or public officers; for instance, notarial documents[46]. Article 82 of the Turkish Notarial Code says "Transactions certificated according to this provisions are authorized."

Notarial documents can be seen in two forms; drafted notarial documents and approved notarial documents according to Turkish Notarial Code. Drafting concept can be defined as drafting, regularizing and generating. Approving concept means approving the signatures of the document by notaries[47]. These type of notarial documents are "conclusive evidence". According to Turkish jurisdiction, conclusive evidence is accepted as true by the judges until proven otherwise.

ii. Netherland

There is no definition about the document in Dutch Code of Civil Procedure. There are three types of documents; ordinary documents, private evidentiary documents, public evidentiary

New Mexico, New York, North Carolina, Pennsylvania, Rhode Island, Texas, Utah, Virginia, Washington, West Virginia, and Wisconsin

[44] Turkish Civil Procedure Code No.6100, Article 200, 12 January 2011

[45] Baki Kuru, Medeni Usul Hukuku, Yetkin Yayınları, 2nd Edition, 2018

[46] Serdar Nart, Alman ve Türk Hukukunda Senetle İspat Zorunluluğu, Dokuz Eylül Üniversitesi Hukuk Fakültesi Dergisi, 2007, page 221

[47] Seyithan Deliduman, Medeni Usul ve İcra İflas Hukukunda Noter Senetleri Phd Thesis, Ankara University, 1999, page 39

documents. Ordinary documents are documents that have not specific evidentiary value, the court considers the proof ability of the ordinary documents[48]. Public evidentiary documents are documents that drafted by an official who is authorized by the law and recording what the official has understood and what the official has executed[49]. Difference between the public evidentiary documents and private evidentiary documents is; private evidentiary documents are not public in nature[50].

The notarial acts are an example of the public evidentiary documents[51]. One of the benefits of the notarial acts is; notarial acts are conclusive evidence. The Dutch Courts are free to assess the evidence. However, the conclusive evidence are the exception of this rule[52]. Notarial acts are presumed to be correct unless sufficient counter-evidence is presented [53] such as authentic deeds and judgments by the criminal court.

iii. The U.S.A.

In the U.S.A. notarization does not occur a presumption the content of the document; it is only about the validity of the signature. As explained before public notaries in The U.S.A. and Arizona State is not liable from the content of the document, notaries only witness the signing process. Notarization protects people from the fraud about the signatures. If any dispute occurs, the court presumes that the signature is genuine[54]. Rule 902(8) of the Federal Rules of Evidence in a U.S. says;

> *The following items of evidence are self-authenticating; they require no extrinsic evidence of authenticity in order to be admitted;*
>
> > *… (8) Acknowledged Documents. A document accompanied by a certificate of acknowledgment that is lawfully executed by a notary public or another officer who is authorized to take acknowledgments[55].*

[48] Dutch Code of Civil Procedure Article 152
[49] C.H. van Rhee, Evidence in Civil Law – Netherlands, 2015, page 16
[50] ibid, page 16
[51] Loyens Loeff, Litigation in the Netherlands A Practitioner's Guide, 2013 Edition, page 56
[52] AMS Advoocaten, Evidence in Dutch Law, < https://www.amsadvocaten.com/litigation/rules-of-evidence-in-dutch-law-on-civil-proceedings/> , accessed 10 May 2019
[53] Mariake van Hooijdonk and Peter Eijsvoogel, Litigation in the Netherlands, Civil Procedure, Arbitration and Administrative Litigation, Second Edition, page 23
[54] Chris Keller, Avoiding Contract Disputes, < https://www.entrepreneur.com/article/73458> , accessed 6 June 2019
[55] Rule 902(8) of the Federal Rules of Evidence in a U.S.

V. Advantages and Disadvantages of the Notary System

Notary system has certain advantages and disadvantages. The purpose of examining these issues is getting easier the comparison between the smart contract and the notary system.

Notaries provide some benefits to signers of the document. It should not be forgotten that these benefits can show alterations from jurisdiction to jurisdiction. The most significant advantage of the notarization is; to prevent any disputes arise from identification of the signer[56]. Notaries are officers of the states; the states provide guarantee about signatures of the notarial documents by witnessing of the notaries. Furthermore, notaries shall be sure about the will of the parties and ensure that parties understand the terms and the conditions of the contract[57] . These issues are explained in the last part of this chapter in detail but briefly notarial documents are considered as "conclusive evidence" in certain jurisdictions so parties can ensure the contract on the court.

As for the disadvantages of the notary system, expenses of this system and loss of time can be counted. Notaries make money from the operations, for instance, notarization. The notarization can be expensive; this amount is an extra cost for the transactions. Some transactions shall be made at notaries. For instance, car sales in Turkey[58]. This issue can be an obstacle to the efficiency of the transactions. The parties who want to make a deal about car sale shall go to the notary, they have to spend money and time for completing the contract. It harms the efficiency of business life. Also, fraud can be counted as a disadvantage of the notary system. Notaries are human beings; humans can be tricked.

Chapter 2- Law of Contracts

I. Contracts in Roman Law

Contracts in Roman Law can be broadly defined as a legal procedure that establishes *obligatio* and it occurred with the consensus of the parties[59]. There were four categories of contracts in

[56] Chris Kelleher, Avoiding Contract Disputes, https://www.entrepreneur.com/article/73458 , accessed 30 April 2019
[57] National Notary Association, op.cit.
[58] Turkish Decree Having Force of Law No.680, Article 61, 6 January 2017
[59] Prof. Dr. Bülent Tahiroğlu, Roma Borçlar Hukuku, 2nd Edition, page 121

Roman Law. These categories are; Consensual contracts, verbal contracts, contracts *re* and contracts *litteris*[60].

Consensual contracts established by *solo consensu*, it did not need any form requirement. Most essential example of consensual contracts was *emptio venditio* (sale agreement)[61]. Three primary requirements should be in the *emptio venditio*; consensus, the thing sold and the price[62]. Will of the parties was a crucial point for establishing *emptio venditio*.

Verbal contracts unilateral and *stricti iuris. Stipulatio* is most important type of the verbal contracts. This type of verbal contracts had form requirement. This form consisted of a formal question (*spondesne*) and a formal answer(*spondeo*)[63]. This type of contract was established with disclosure of the parties in formal requirements.

In order to establish a *contract re,* the consensus was not enough, the thing that subject of the agreement should be given or a service that subject of the agreement should be done. *Mutuum* can be an example of *contract re*[64].

Contracts litteris has form requirement, it shall be written. This type of contracts used for proving the transactions[65].

As it can be understood from this brief research, the essential point for establishing the contract in Roman Law is the meeting of minds. Certain specific contracts in Roman Law have its own form requirements, but the common point of all types of contracts is the consensus. This historical brief examination is made in order to determine the elements of the contracts. These elements are utilized for examining the legal status of smart contracts. The author thinks that defining the smart contracts in the legal sense is the first step of the comparison smart contracts with notary system.

II. Principles of European Contract Law

The Principles of European Contract Law (PECL) is regulated the general rules of contract law in the European Union[66]. According to Article 1:102/1 of PECL, parties are free to enter into a

[60] Paul Du Plessis, Borkowski's Textbook on Roman Law, 4th Edition, page 251
[61] Tahiroğlu, op. cit, page 126
[62] Plessis, op. Cit.page 261
[63] ibid, page 290
[64] Tahiroğlu, op. cit. , page 125
[65] Plessis, op. cit., page 304
[66] Principles of European Contract Law, Chapter 1, Section 1, Art.1:101

contract and determine its contents, subject to the requirements of good faith and fair dealing and the mandatory rules established by the principles[67]. Principle of freedom of contract is accepted with the first paragraph and restrictions of this principle is regulated at the continue of this paragraph. Freedom of contract can be restricted by the requirements of good faith and fair dealing or the mandatory rules in PECL[68].

Formation of contracts is regulated in Chapter 2 of PECL. The first article of this chapter determines the requirements for concluding the contract. These requirements are the intention of the parties for legally binding to the contract and reaching a sufficient agreement without any further requirement[69]. According to the second paragraph of this article, no formal requirements are needed for concluding or proving a contract[70].

III. Turkish Law

Article 1 of the Turkish Code of Obligations defines the concluding a contract. The contract is concluded by declarations of the intentions of the parties and meeting of minds of the parties. Parties declare their intentions with offer and acceptance. Turkish law accepted the freedom of contracts, individuals are free to make a contract with whomever they want about whatever they want in a legal framework[71]. The restrictions about freedom of contract are counted in the Turkish Code of Obligations.

There is no formal requirement about contract regarding to general rule of Turkish Law[72]. However, several contracts have a formal requirement. If a contract is not made by the formal requirements which are mandatory for this contract, the contract is void.

Article 14 says if a contract is written, parties signatures shall be present in the contract. E-signatures have the same legal status as handwritten signatures[73].

[67] ibid, Art.1:102
[68] F.W. Grosheide, The Principles of European Contract Law and Dutch Law, Kluwer Law International, 2002, page 32
[69] Principles of European Contract Law, Chapter 2, Section 1, Art.2:201
[70] ibid, Art.2:201
[71] Asst. Prof. Dr. H. Kübra Ercoşkun Şenol, FREEDOM TO DETERMINE THE CONTENT OF THE AGREEMENT AND GENERAL LIMITATIONS TO THIS: TURKISH CODE OF OBLIGATIONS ARTICLE 27, İÜHFM C. LXXIV, S. 2, 2016
[72] Turkish Code of Obligations No. 6098, 11 January 2011, Article 12
[73] ibid, Article 15

IV. Dutch Law

In the Netherlands, parties are free to choose the terms and the conditions of the contract[74]. It is the general rule, but there are certain exceptions of this rule. Contracts should be made in the framework of good faith and fair dealing and contracts cannot be contrary to mandatory rules.

W.M. Schrama defined the contracts in Dutch Law as;

> *"a juridical act, established by the corresponding and mutually interdependent expressions of intent by two or more parties, aiming to create a juridical effect for the benefit of one of the parties and at the cost of the other party, or for the benefit and account of all the parties"[75].*

However, this definition is criticized because it excludes unilateral acts. The parties can show their intentions by "offer" and "acceptance". The other requirement for concluding a contract is "sufficient agreement". The terms and conditions of the contract should be determinable.

Dutch Law does not oblige any formal requirements to the parties. Parties can enter into a contract any form, and the parties can utilize from any evidence in order to prove the existence of a contract[76].

V. The U.S.A.

i. Federal Law

Contract law in the U.S. is generally o matter of state, not federal[77]. Each state of The U.S. has its own contractual regulations. The principles which are discussed below are general, these principles can be changes state by state.

There are three main elements of concluding a contract[78], intention of the parties, reaching sufficient agreement and consideration. Parties can show their intentions by a valid offer and

[74] Grosheide, op. cit., page 33
[75] W.M. Shrama, , The Principles of European Contract Law and Dutch Law, Kluwer Law International, 2002, page 77
[76] ibid, page 79
[77] Samuel D. Brickley 2nd and Brian M. Gottesman, Business Law Basic, 2017, Chapter 18
[78] ibid

acceptance[79]. "Reaching sufficient agreements" means parties should show their intentions by the contract clearly. These two terms are familiar from Turkish and Dutch jurisdictions.

A valid, enforceable contract should be formed after a negotiation process[80]. According to this element, every party should receive something valuable, this thing can be tangible or intangible or a service[81]. Therefore the donative promises, such as charity pledges, are not an enforceable contract[82].

As a general rule, "freedom of contract" principle is adopted into the U.S. legislation[83]. As discussed before, this principle reference to parties can enter into a contract in any form, there are no formal requirements for concluding a contract.

ii. Arizona State Law

As mentioned above, the elements can be changed state by state. In this section, Arizona Contract Law and regulations about smart contracts in Arizona State is examined.

There are three basic elements of concluding a valid contract in Arizona State[84]; offer, acceptance, and consideration. Offer and acceptance occur by offeree show his/her intention to enter a contract with acceptor and acceptor accepts the offeree's offer[85]. There is no formal requirement for offer and acceptance. As defined in the previous section, consideration is a basic element which means both of the parties should gain something valuable as a result of the contract[86].

The smart contract is defined as *" event-driven program, with the 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 HB 2417-Arizona State Legislature. Arizona State

[79] Arthur L. Corbin, Yale Law Journal 26(3), Offer and Acceptance, and Some of the Resulting Legal Relations, 1917
[80] Brickley and Gottesman, op.cit.
[81] ibid
[82] ibid
[83] Julie M. Philippe,French and American Approaches to Contract Formation and Enforceability: A Comparative Perspective, 12 TulsaJ. Comp. & Int'lL. 357 (2005)
[84] Denton Peterson, How Do I Know If I Have A Binding Contract, < https://arizonabusinesslawyeraz.com/business/how-do-i-know-have-binding-contract/> , accessed 6 June 2019
[85] ibid
[86] Harper Law, Arizona Contract Law, < http://www.harperlawaz.com/arizona-contract-law> , accessed 6 June 2019

recognizes the smart contracts with signature as a legal document[87]. Signing the smart contract with a private key and stored this smart contract in distributed ledger constitutes a valid offer and acceptance according to The U.S.A. legislation[88]. It should be mentioned that smart contracts are not defined as contract, they are defined as legal documents. It can be interpreted as smart contracts do not meet with the criteria of being a contract. However, the intentions of the parties can be understood so in order to solve this problem and to prevent potential disputes which arise from smart contracts, the lawmakers defined it as a legal document. It can be understood from the literal of the Article which regulates the smart contract, a smart contract can be legally binding if requirements are fulfilled.

VI. Analyses of Contract Law in Different Jurisdictions

The author gives brief information about concluding a contract in different jurisdictions. In this section, the author compares the contract law in these jurisdictions.

Turkey's and The Netherland's regulations about the concluding a contract have similarities. Regulations of both of the jurisdictions have similar principles with PECL. Also, it can be said that both of the disciplines are influenced by Roman Law. Because of this impact, "*causa"* is needed in order to conclude a contract[89]. *Causa* mentions that a contract cannot exist without a lawful causa[90]. Expressing the intentions of the parties by offer and acceptance and reaching a sufficient agreement are requirements for concluding a contract, the same as PECL.

In the U.S. and Arizona state, two elements are similar with elements of civil law systems; expressing the intentions and reaching a sufficient degree agreement. The U.S. and Arizona State do not adopt "*causa"* into their law system. As different from the civil law system, they adopt consideration.

The distinguishing part of the contract law in civil law and common law is; the terms of "*causa"* and "consideration". In common law, both of the parties should gain something in order to

[87] State of Arizona House of Representatives Fifty-third Legislature First Regular Session, HB247, Article 5 (C), 2017

[88] SMART CONTRACTS ALLIANCE AN INITIATIVE OF THE CHAMBER OF DIGITAL COMMERCE, SMART CONTRACTS: Is the Law Ready, Chamber of Digital Commerce, September 2018, page 17

[89] Çağdaş Evrim Ergün, AÜHF 2004, ÖZLEŞMELER HUKUKUNDA CONSIDERATION/SÖZLEŞMEYLE BAĞLANMA NİYETİ KAVRAMI VE CAUSA/HUKUKİ NEDEN İLE İŞLEVSEL DENKLİĞİ MESELESİ, 2004

[90] Caslav Pejovic, Civil Law and Common Law; Two Different Paths to Leading to Same Goal, July 2001, < https://www.researchgate.net/publication/265244573_Civil_law_and_common_law_Two_different_paths_leading_to_the_same_goal> , accessed 6 June 2019

conclude a valid contract. *Causa* is different from the consideration; a party can enter into a binding contract without receiving any benefit[91]. For instance, a party can enter into a binding gratuitous contract in civil law systems[92].

Chapter 3 – Smart Contracts

I. Blockchain

Stuart Haber and W. Scott Stornetta described the idea of behind the blockchain technology in 1991[93]. Blockchain is defined as a shared, distributed ledger of records or transactions that are open to inspection by every participant but not subject to any form of central control[94]. Blockchain is not a database, it is a time-stamped immutable record series[95]. Electronic records in the blockchain cannot be changed or deleted.

Blockchain is one of the forms of a distributed ledger. The distributed ledger is a ledger of records stored in decentralized form across different nodes on a peer-to-peer network[96]. The distinguishing feature of the blockchain against other types of the distributed ledger a chain of blocks utilized for providing protection to records and valid distributed consensus[97]. Full copies of a blockchain are maintained in each of these nodes on the peer-to-peer network. When a new block is added to the blockchain, this block is sent to every node. Each node verifies the block. After this verification process, if the block is approved, this block added to the blockchain. All the nodes in a peer-to-peer network create consensus. These nodes decide a block is added to the blockchain, or not. If a block has tampered, this block is rejected by

[91] ibid
[92] ibid
[93] Stuart Haber & W. Scott Stornetta, How to Time-Stamp a Digital Documents, 1991
[94] Nadia Hewett, Wolfgang Lehmacher, Yingli Wang & Contributers, World Economic Forum, Inclusive Deployment of Blockchain for Supply Chains: Part 1 – Introduction, March 2019
[95] What is Blockchain Technology? A Step-by-Step Guide For Beginners, 2016, updated 1 March 2019, < https://blockgeeks.com/guides/what-is-blockchain-technology/> , accessed 15 April 2019
[96] Markus Andersson, The Difference Between Blockchains & Distributed Ledger Technology, 1 November 2018, < https://medium.com/@markusandersson/the-difference-between-blockchains-distributed-ledger-technology-a0fe4ba3d316> , accessed 17 April 2019
[97] Shaan Ray, The Difference Between Blockchains & Distributed Ledger Technology, 19 February 2018, https://towardsdatascience.com/the-difference-between-blockchains-distributed-ledger-technology-42715a0fa92 , accessed 17 April 2019

other nodes[98]. Only security gap of blockchain is; if someone possesses the more than %50 of the peer-to-peer network, he/she can alter the blocks whatever he/she wants.

Blockchain consists of "blocks", these blocks encrypted and small datasets[99]. Data are recorded in blocks. Data that are recorded in a block cannot be changed after this block chained to other blocks and these records are publicly available[100]. The publication feature of blockchain allows tracking the records and provides transparency to transactions.

Blocks are chained each other with unique digital signatures; these unique digital signatures are generated by the cryptographic hash function. Hashing can be defined as a converting any string of inputs into unique 64-digit string output. Alteration of blocks is detected from mismatching of the hashes[101]. These hashes can be resembled to fingerprints. For instance, imagine a transaction between A and B and lets named this transaction as "Block 1", block 1 has a unique signature "Y12…". The "Block 2" is another transaction between the same parties. These two blocks linked with each other by the unique signature "Y12…". If something altered on "Block 1", the unique signature "Y12…" is changed too and signatures of the first two block do not match. This feature of blockchain provides itself immutable ability.

The connection between the smart contracts and blockchain is; smart contracts are stored and executed inside the blockchain[102]. This connection provides security to smart contracts by the reasons that are explained in this chapter.

i. Types of the Blockchain

There are three types of blockchains; public blockchain, private blockchain, and consortium or federated blockchain. A public blockchain is a type of blockchain that every internet user can access or add a new block to the blockchain. This type of blockchains has consensus

[98] Amer Kareem, Rejwan Bin Sulaiman, Muhammad Umer Faroo, Algorithms And Security Concern In Blockchain Technology: A Brief Review, 29 August 2018, page 4

[99] Aaron Wright & Primavera De Filippi, DECENTRALIZED BLOCKCHAIN TECHNOLOGY AND THE RISE OF LEX CRYPTOGRAPHİA, page 6

[100] Vanessa Mak, Eric Tjong Tjin Tai and Anna Berlee, Research Handbook Data Science And Law, Research Handbook in Information Law, 2018, page 158

[101] Marko Vidrih, What is A Block in Blockchain, 29 December 2018, < https://medium.com/datadriveninvestor/what-is-a-block-in-the-blockchain-c7a420270373> , accessed 16 April 2019

[102] Victor Osetskyi, What Is Smart Contracts Blockchain And Its Use Cases in Business, 13 June 2018, < https://medium.com/existek/what-is-smart-contracts-blockchain-and-its-use-cases-in-business-271a6a23cdda>, accessed 16 April 2019

mechanism for validation of the new blocks, nodes are used for consensus process and protect the blockchain[103]. Nodes can be any device which has an IP.

A private blockchain can be defined as a permissioned blockchain that permissioned networks can put restrictions on who is allowed to participate to network or which transactions can be made[104]. This feature makes private blockchains centralized again, but it continues to enjoy the other benefits of blockchain, for instance, cryptographical secured[105].

The third type of blockchain is a hybrid form of these two types of blockchains. In a consortium or federated blockchain, the consensus process is controlled by a group of pre-selected nodes, the right of the accessing to the records in the blockchain can be public, private or hybrid[106]. Both of these types of blockchain have its own advantages and disadvantages. These issues and sufficiency to notary system are discussed in Chapter 4.

II. Definition of Smart Contracts

In 1996, an American cryptographer and legal scholar, Nick Szabo defined smart contracts as

> *"New institutions, and new ways to formalize the relationships that make up these institutions, are now made possible by the digital revolution. I call these new contracts "smart", because they are far more functional than their inanimate paper-based ancestors. No use of artificial intelligence is implied. A smart contract is a set of promises, specified in digital form, including protocols within which the parties perform on these promises"* [107].

Some legal scholars criticize this definition because of the legal status of smart contract unclear and Szabo did not mention the enforcement ability of smart contracts; he just specified smart contracts as protocols[108]. The author agrees on these critics and defines smart

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[103] Prof. Mark Pilkington, Blockchain Technologies: Principles and Applications, 18 September 2015, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2662660 , accessed 25 April 2019

[104] Demiro Massessi, Public Vs Private Blockchain In A Nutshell, 12 December 2018, shttps://medium.com/coinmonks/public-vs-private-blockchain-in-a-nutshell-c9fe284fa39f , accessed 25 April 2019

[105] Sudhir Khatwa, Different Types Of Blockchains In The Market and Why We Need Them, 15 September 2018, https://coinsutra.com/different-types-blockchains/ , accessed 25 April 2019

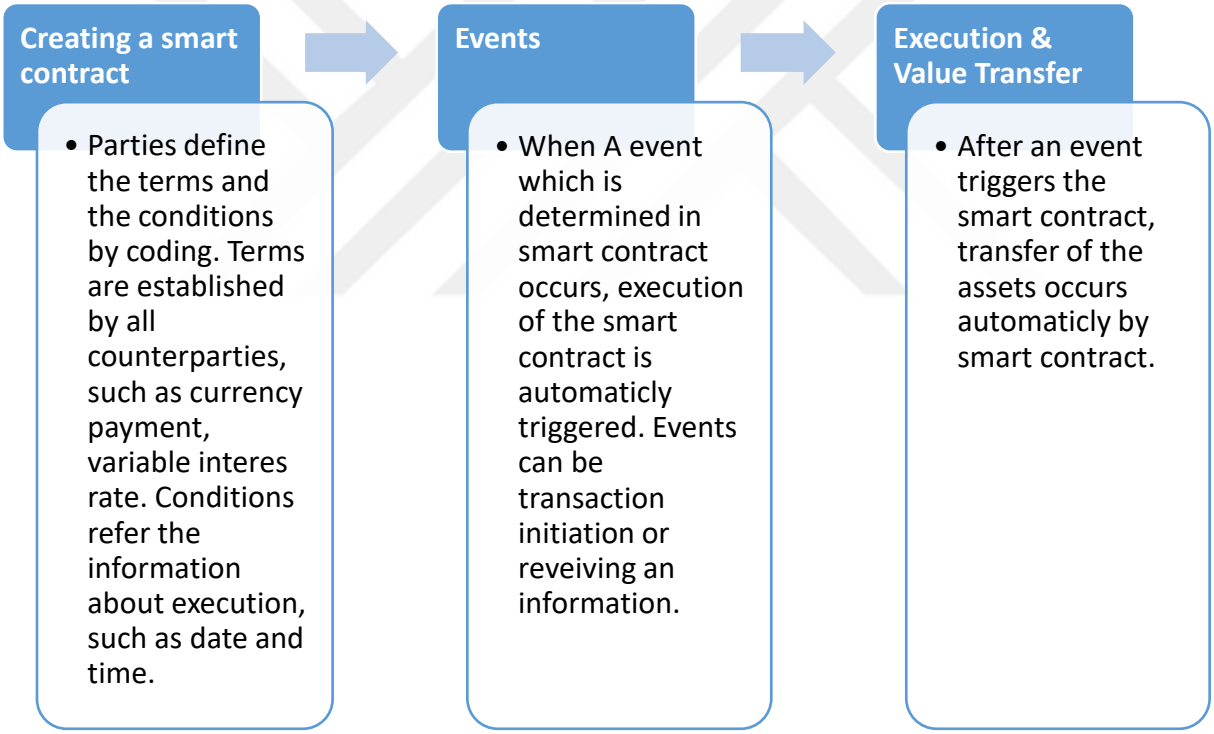
[106] Vitalik Buterin, On Public and Private Blockchain, 6 August 2015, https://blog.ethereum.org/2015/08/07/on-public-and-private-blockchains/ , accessed 25 April 2019

[107] Nick Szabo, Smart Contracts: Building Blocks for Digital Market, 1996

[108] Kevin Werbach & Nicolas Cornell, Contracts Ex Machina, 24 October 2017, https://ssrn.com/abstract=2936294, accessed 12 April 2019, page 107, *"…Szabo left open whether a smart contract was enforceable as a legal contract…Szabo's reference to "protocols within which" parties perform is*

contracts as “Smart contracts are computer protocol that has self-executing and self-enforcement ability.” Explanation of this definition part by part should be helpful to the reader for clarifying the definition.

Smart contracts have self-executing and self-enforcement ability[109]. This ability means when conditions and obligations are met, this computer protocol executes the conditions automatically. Smart contracts self-verify conditions are met or not[110]. For instances imagine an insurance agreement drafted in the form of smart contract between insurance company A and farmer B. Conditions are if farm of B is damaged because of the flood, A shall pay B’s loss. When the flood occurred, smart contract self-verifies this situation from national newspapers or weather forecast and self-executes the payment term. In order to understand smart contracts, the chart below can be helpful;



similarly coy. Smart contracts do not just specify these protocols; they actually implement them. Szabo’s definition has not been universally adopted…”

[109] Gareth W. Peters & Efstathios Panayi, Understanding Modern Banking Ledgers through Blockchain Technologies: Future of Transaction Processing and Smart Contracts on the Internet of Money, 18 November 2015, page 7, https://ssrn.com/abstract=2692487, accessed 12 April 2019

[110] Robert A. Küfner, Breaking Down the Smart Contract, https://medium.com/nakamo-to/breaking-down-the-smart-contract-45b249b8bc71, 11 April 2018, accessed 12 April 2019

Coding language[111] is used in smart contracts. However, this does not mean that the language of smart contracts is inapprehensible; this language is just difficult to read. Parties show their intentions with determining the conditions[112]. In a strict sense, the intention of the parties can be understood from the conditions. For instance, a transaction about car sale between A and B. These parties set a smart contract about this transaction. Conditions about this transaction are A shall deliver the car, and when the car is delivered, amount of the car will be transferred to A. These conditions are drafted in coding language but a person who knows read this language can understand the intention of the parties.

Smart contracts can be timestamped when they enter into the blockchain. Timestamp means that data has been stamped by electronic signature by the electronic certificate service provider in order to determine when an electronic data is generated, changed, sent, received and / or recorded. A timestamp shows that the blocks which constitute the same blockchain are linked with each other chronologically. Besides to timestamp provide immutable ability, it shows that a data existed before the specific time and status[113].

Smart contracts have certain limitations. Decentralized nature can be a problem with some issues. For instance, on 1 August 2017, raising each bitcoin size 1MB to 8 MB. Because of the decentralized nature of blockchain, the decision cannot be taken. At the end of these conflicts, a new cryptocurrency named "Bitcoin Cash" appeared[114]. This situation causes obscurity. There is no guarantee that such issues will not happen in the future. The other case is; if someone owns the more than %50 nodes in a peer-to-peer network, he/she can tamper the records that are stored in the blockchain. As discussed in the part of "Blockchain", new blocks need verification of more than %50 of the nodes for linking to the blockchain and protection

[111] Coding language or programming language is a grammar that is used to a computer or computing device perform the specific task. Solidity is the most popular coding language; solidity is used for creating a smart contract which are is stored in Ethereum Blockchain.

[112] Mayank Pratap, Everything You Need to Know About Smart Contracts, <https://hackernoon.com/everything-you-need-to-know-about-smart-contracts-a-beginners-guide-c13cc138378a>, 29 August 2018, accessed 12 April 2019, *"Smart contracts are designed to work on condition-based principle (if this then that), which will resolve the ownership issue by transferring it to the buyer only when the monetary, as well as other conditions, are agreed upon."*

[113] Blockchain Expert, Blockchain Timestamp and Document Verification, 15 March 2019, < https://www.blockchainexpert.uk/blog/blockchain-timestamp-and-document-verification> , accessed 17 May 2019

[114] Neer Varshney, End of year crypto roundup: How did Bitcoin Cash perform in 2018, 24 December 2018, https://thenextweb.com/hardfork/2018/12/24/end-of-year-crypto-roundup-how-did-bitcoin-cash-perform-in-2018/ , accessed 17 April 2019

system based on this verification. Possibility of possession more than %50 of the nodes can be dangerous for the records[115]. For instance, %81 of the mining pools are concentrated in China[116]. This concentration can be a treat for the security of the system. The transparency can be a problem; the transaction between the parties is visible to all the others, this issue harms the confidentiality of the transactions. The most significant problem is about flexibility. Once a smart contract enters into the blockchain, it cannot be changed. If parties want to change or terminate a smart contract, the blockchain does not allow it. This nature of the smart contracts harms the flexibility of transactions. However, this issue has a solution. Adjusting a smart contract is possible with another intermediary contract. This intermediary contract will use the same address with the original smart contract but the execution is different. This issue is explained in detail in Chapter 2. These disadvantages of the smart contract could be disconcerting. However, these issues are not insurmountable.

There are several smart contract platforms. These platforms have their own benefits and the coding language can differ platform to platform. Ethereum (ETH) is the most popular smart contract platform. Ethereum is a decentralized blockchain platform for running smart contracts; Ethereum Virtual Machine (EVM) is used for executing the smart contract[117]. Solidity is used as a coding language in Ethereum[118]. However, solidity is criticized because solidity lacks coding flexibility[119]. "Gas" is the fuel of the Ethereum, users should buy "Gas" in order to make transactions, it is a way to pay the fees of Ethereum[120]. One of the popular smart contract platforms is EOS[121]. The advantages of EOS against the Ethereum can be counted as;

- C++ is used as a coding language in EOS. C++ is more flexible than Solidity. Low-level codes and high-level codes can be written with C++. Users can do only hardware-level operations if they want. This feature of C++ provides flexibility.

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[115] Amer Kareem, Rejwan Bin Sulaiman, Muhammad Umer Faroo, op. cit.
[116] Jordan Tuwiner, Bitcoin Mining Pools, 29 January 2019, https://www.buybitcoinworldwide.com/mining/pools/ , accessed 17 April 2019
[117] Tamer Sameeh, An Overview of the Most Reliable Cryptocurrency Smart Contract Platforms, 20 November 2018, < https://www.cointelligence.com/content/smart-contract-platforms-guide/> , accessed 7 June 2019
[118] Michiel Mulders, Comparison of Smart Contract Platforms, 5 March 2018, < https://hackernoon.com/comparison-of-smart-contract-platforms-2796e34673b7> , accessed 7 June 2019
[119] ibid
[120] ibid
[121] ibid

- Users should buy or mine gas in order to make transactions in Ethereum, in EOS there is nearly zero transaction fees.
- Execution program of EOS (Web Assembly) is faster than EVM[122]. In order to increase speed, EOS sacrifices its decentralized ability. Only limited number of nodes can participate the mining process. Thus, consensus process is faster than EVM.

Most significance example of usage of smart contracts is between Nestle and Walmart about global food safety in the supply chain. The giant companies, including Nestle and Walmart, which provides service to large masses around the world, initiated studies in 2017 to minimize health problems and deaths caused by food products according to World Health Organization (WHO) report. Nestle and Walmart have developed a smart contract project by taking the power of blockchain for safe food products from food suppliers. The Internet of Things technology also plays an important role in overseeing the provisions of smart contracts concluded between suppliers and manufacturers in the context of the Chain of Global Food Suppliers or, which co-develops with IBM. Nestle has instructed milk suppliers to integrate an Internet of Things device with a variety of sensors to vehicles used in transportation. The data obtained from these sensors serve to control the conditions of the smart contract provisions. For example, when the milk goes out of a certain temperature range during transport, it is foreseen that quality will drop and threaten health; According to the delay time, the agreed price in the contract is decreasing automatically. Nestle not only keeps the quality of the foods to a certain standard but also saves money and time lost in the control mechanisms[123].

AXA, the insurance giant established a platform called “Fizzy”. Fizzy is an insurance platform which utilizes the smart contract and the blockchain[124]. Fizzy is a fully automatic parametric flight delay insurance[125]. Any individual can insure his/her flight by Fizzy. An individual who wants to insure his/her flight, enter the flight details and get a quotation, if he/she accepts

[122] ibid
[123] Mustafa Alperen Gezer, Akıllı Sözleşmeler ile Bizi Ne Bekliyor, 13 June 2018,<https://medium.com/dönüm-noktası/akıllı-sözleşmeler-ile-bizi-neler-bekliyor-45429d21efc7>, accessed 20 May 2019
[124] Trustnodes, AXA Launches Ethereum Smart Contract Insurance Product for Flight Delays, 18 June 2018, https://www.trustnodes.com/2018/06/18/axa-launches-ethereum-smart-contract-insurance-product-flight-delays , accessed 7 June 2019
[125] Alexandre Clement, fizzy.axa Smart Contract Explained, 13 June 2018, https://medium.com/@humanGamepad/fizzy-axa-smart-contract-explaind-740df52894fd , accessed 7 June 2019

the quotation and subscribe the Fizzy, the flight is insured against the delays. If there is a delay more than two hours, the smart contract executes the conditions automatically.

In the digital art industry, the biggest challenge is the protection of the copyright of the works. "Ascribe" provides protection to the artist's works. With Ascribe, smart contracts allow the users to secure their authorship and protect the users against the frauds[126]. Users can track their artworks and if the user's artwork is used without permission, the user can claim the right publication fees.

III. Legal Status of Smart Contract

Before the compare smart contract with notarization, legal status should be discussed. Notarial documents are contract that are validated by notaries. The author thinks that the legal status of the smart contract should be the same or similar with contracts for comparing smart contracts with notarial documents.

As discussed in Chapter 2, contracts should have two basic elements; intention of the parties and sufficient agreement. Intention of the parties is appeared by the offer and the acceptance. In smart contracts, the acceptor takes an action in order to accept the offer, for instance sending a digital asset to the offeree, acceptance occurs[127]. In other words, acceptance comes with performance in smart contract transactions. The intention of making a deal of the parties can be understood in these transactions. This issue seems unproblematic. However, the intention of a party can be related to the counter-party. Identities of the parties is a problematic issue; this issue is discussed later on. Sufficient agreement means an agreement that the terms and the conditions have been sufficiently defined by the parties[128]. Right and obligations of the parties should be sufficiently determinable for satisfying this element. This determination should be understood in the strict sense; only content of the contract should be determinable. In order to execute a smart contract correctly and prevent undesirable outputs, the content of the agreement should be coded clearly. Natural language can be

[126] Angel Deforge, 5 Real-life Use Cases to Explain Smart Contract, 30 August 2018, < https://medium.com/blockstreethq/5-real-life-use-cases-to-explain-smart-contracts-1d0cad1c26be> , accessed 7 June 2019

[127] Max Raskin, The Law and Legality of Smart Contracts, GEORGETOWN LAW TECHNOLOGY REVIEW Vol 1:2, 2017, page 322

[128] Shrama, op. cit., page 83

vague, coding language is explicit. An element of “sufficient agreement” is not a problematic issue for a smart contract that coded consonant with the conditions of the agreement.

There is no formal requirement except several exceptions in PECL, Turkish Law and Dutch Law. Parties are free to draft the contract in any form or any language they want. Parties can enter any contract in orally or written. It is a clear issue that this freedom gives right about creating a contract in an electronic environment to the parties too. The contradictive issue is about the language of smart contracts. Parties have freedom of choice the language of a contract. Critics about the language of the smart contracts are coding language is not easily readable and understandable, this language could not be suited for specific agreements. However, this critic can be applied for the foreign languages that parties are not familiar with[129]. Parties can enter into a contract which language is not familiar to the parties legally. The concept of the freedom of choice the language should involve the coding language. Coding language should not be a problem for form requirements.

The main problem about determining the legal status of a smart contract is validation identities of the parties. Smart contracts are stored in the blockchain. Because of the decentralized nature of the blockchain [130], identity management is decentralized too. Everyone can join the public blockchain, individuals can create multiple identities in public blockchain, this situation causes uncertainty about identities of the parties. In some specific contracts, the identity of the party can be a crucial issue for counter-party and this issue can hurt the intention of the party. Also if any dispute occurs, parties do not know whom they should sue. Verification of the identity of the parties is a problem for the legal status of smart contracts. This problem can be solved with authentic electronic signatures. Electronic Identification, Authentication and trust Services “eIDAS” (in The European Union) and Electronic Signatures in Global and National Commerce Act “ESIGN Act” (in The U.S.A.) set rules electronic identification standards. Article 25 of eIDAS said an electronic document which has electronic signature has the legal effect of any document which has a handwritten signature[131]. Later on Section 4 of eIDAS, requirements of electronic signature are listed.

[129] Clifford Chance, SMART CONTRACTS: LEGAL FRAMEWORK AND PROPOSED GUIDELINES FOR LAWMAKERS, European Bank, October 2018, page 18
[130] Vanessa Mak, Eric Tjong Tjin Tai and Anna Berlee, op. cit.
[131] REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, 23 July 2014, Section 4, Article 25

Section 101 of the ESIGN Act regulates the legal status of documents that are signed with an electronic signature. According to this section, electronic forms with electronic signatures may not be denied legal effect, validity, or enforceability because of its form[132]. Both of these acts accept that documents that have electronic signature have legal ability same as documents that have a handwritten signature. E-signatures regarding to these acts for authenticating the smart contracts are developing by technology developer firms[133] . Adopting the e-signatures to smart contracts provides legal recognition to it according to the eIDAS and ESIGN Act. These developments will cease the conflicts about the identification problem of the smart contracts.

The other problematic issue is about modification of the smart contracts. Once in creating a smart contract in blockchain, it is immutable. In other words, the addresses and codes of a smart contract cannot be updated. This issue could harm the freedom of the contract principle. Parties should be free to modify the contract. Besides hurting the principle of freedom of contract, the law systems which are discussed in this paper recognize several excuses for acquitting a party from duties or modifying the contract, for instance, impossibility. However, there is a solution of this problem; creating an intermediary smart contract. The intermediary contract will hold the address of the active smart contract, thus all the calls and process will be forwarded to intermediary smart contract with *delegatecall* function. By this mean, the parties can continue to use the same address but execution will be different[134]. Theoretically, modification of a smart contract is not possible, but practically it is possible with using intermediary smart contract.

What if some conditions or subject of a smart contract is contrarian to the law? The legality of a smart contract could be harm because of this contrariety. Max Raskin offered a solution to this problem. According to his research[135], relevant jurisdiction with a smart contract can create a publicly available database about the terms and the conditions according to relevant

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[132] Public Law 106-229 106th Congress, Electronic Signatures in Global and National Commerce Act, 30 June 2000, Section 101.

[133] Krystle M, New E-Signature To Legally Authenticate Blockchain Smart Contracts Created By ZHAW And Swisscom, 29 January 2019, < https://bitcoinexchangeguide.com/new-e-signature-to-legally-authenticate-blockchain-smart-contracts-created-by-zhaw-and-swisscom/> , accessed 14 April 2019, "…the developers created a foundation for the e-signature service with a new interface that would replace the need to physically sign documents…on the way that the signature will handle the current legal requirements…"

[134] Merunas Grincalaitis, Can a Smart Contract be upgraded/modified? Is CPU mining even worth the Ether? The Top questions answered here…, 6 February 2018, Section 6< https://medium.com/ethereum-developers/can-a-smart-contract-be-upgraded-modified-1393e9b507a> , accessed 17 May 2019

[135]Raskin, op. cit., page 327

jurisdiction's legal provisions and a smart contract can use this terms and conditions in order to update its content before the finalization.

A legal contract cannot be generated in order to the illegal purpose. These illegal agreements cannot be enforced by the legal system. However, the legal system as a third-party cannot interfere with a smart contract which is created for illegal purpose because of the nature of smart contracts. For instance, imagine an illegal drug transaction made by a smart contract. The legal system can determine its illegality. However, the smart contract will continue the execution of this transaction. This nature hurts the legality of smart contracts. The legal system should intervene in the transactions between the parties, it is the natural conclusion of "Contracts should exist in the legal world" principle[136].

The author thinks that the legal system should not be an obstacle, it should be a problem solver. Smart contracts contain the basic elements of traditional contracts. However, it cannot be said that smart contracts are contracts. There are a few obstacles which are discussed above for defining smart contracts as a contract. Some of these obstacles have solutions but these solutions are not made actual yet. Also, the nature of the smart contract which prevents the intervention of the third-parties is the most significant obstacle for determining the legal status of smart contracts. Furthermore, the regulations can be entangling. From the point of the author's view, smart contracts are enforcement tools of the agreements between the parties. The intentions of the parties can be expressed by the smart contract. It cannot be said that smart contracts are contracts but the legal status of the smart contract should be similar to traditional contracts. Smart contracts can be drafted compatible with real contracts or an agreement. At least the smart contracts can be evidence for existing the real contract or an agreement. Excluding smart contracts from the legal world does not solve anything. Prior to lawmakers make regulations about the smart contract, its legal status should be considered similar to traditional contracts.

According to code HB 2417-Arizona State Legislature, if the requirements which are mentioned in HB 2417-Arizona State Legislature are fulfilled, a smart contract constitutes valid offer and acceptance. It should be mentioned that smart contract defined as a legal document,

[136] Kevin Werbach & Nicolas Cornell, Contracts Ex Machina, Duke Law Journal Vol.67, 24 October 2017, page 160-161

not a contract in this regulation, it means a smart contract which is created according to HB 2417-Arizona State Legislature is legally binding.

The essential point for concluding a contract in Turkey and Netherland is the intention of the parties. According to the regulation of Arizona State, a smart contract which meets with the criteria, constitutes valid offer and acceptance, in other words, a smart contract can express the intention of the parties. However, in the related section of HB 2417-Arizona State Legislature, "reaching a sufficient agreement" is not mentioned. In the Turkish and Dutch jurisdictions, lawmakers can use the same solution, smart contracts cannot be defined as contract but it can be defined as a "document", because smart contracts can express the intentions of the parties, but it lacks the element of "sufficient agreement".

IV. Ricardian Smart Contracts

Ricardian smart contracts should be particularly mentioned for this research. Smart contracts are criticized because of their current form and legal status of them is not clear. Ricardian contracts can be a solution to this issue.

Ian Grigg defined Ricardian smart contracts as[137];

> *"In the simplest possible terms, a Ricardian Contract is a document defining a type of value for issuance over the Internet. It identifies the Issuer, being the signatory, and any terms and clauses the Issuer sees fit to add in to make the document stand as a contract."*

Ricardian smart contracts are legally binding agreements that readable by humans and coded for self-execution automatically at the same time[138], also records all the details about the agreement in the blockchain[139]. It can be defined as the next generation of smart contracts. The self-execution ability of the Ricardian smart contracts is not mandatory, parties have initiative about this ability of the Ricardian smart contracts. The Ricardian smart contracts are drafted in coding language and readable language.

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[137] Ian Grigg, The Ricardian Contract, 6 July 2004

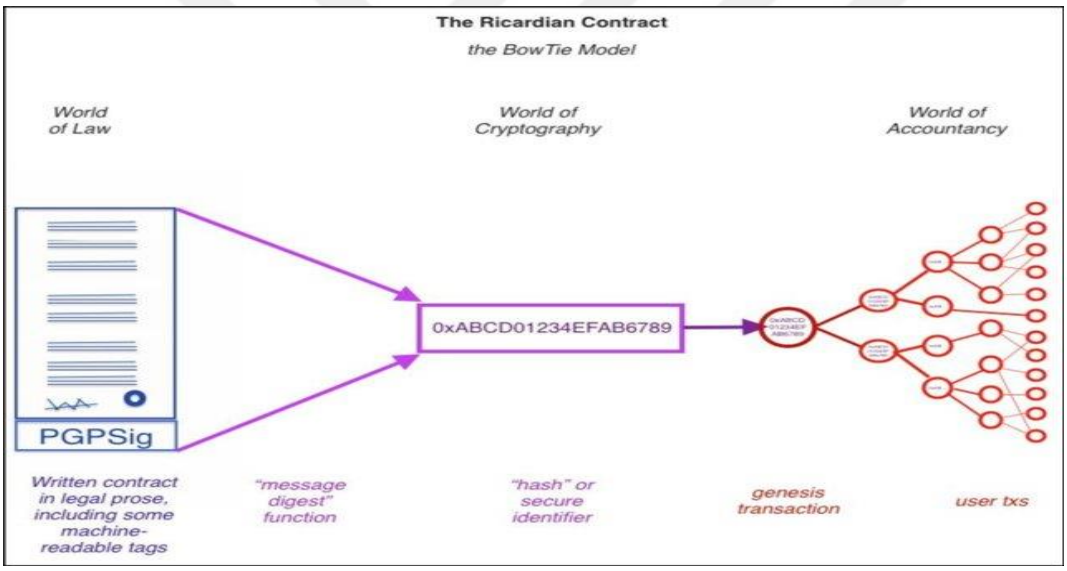
[138] Sarah Rothrie, How Ricardian Smart Contracts Enable Blockchain Adoption, 30 August 2018, https://coincentral.com/ricardian-smart-contracts/ , accessed 14 April 2019

[139] Faisal Kahn, Ricardian Contracts can become the next generation of Smart Contracts, 20 November 2018, https://medium.com/datadriveninvestor/ricardian-contracts-can-become-the-next-generation-of-smart-contracts-b77b605d9dda , accessed 14 April 2019

The issue of the transaction and its execution are strictly separated in Ricardian smart contracts. It provides a link between legislation and the digital world. All the terms and the conditions of an agreement is converted into a coding language so the program can control the execution[140].

Ricardian smart contracts have advantages against smart contracts; documentation, legality and readability, also have similar features; self-execution, security and efficiency. Most significance advantage of Ricardian smart contracts against smart contracts is legality; Ricardian smart contracts are already acceptable according to existing legislation[141]. It includes all the terms and the conditions of an agreement between the parties. The role of Ricardian smart contracts for this research is explained in Chapter 4.

Ian Grigg used the figure below in order to clarify the Ricardian smart contracts[142];



Diederick Cardon explained the Bowtie Model as[143];

> *"A Ricardian contract divides the agreement between parties over time and domain and uses a so-called "BowTie diagram". This diagram visualizes certain risks in a clear*

[140] Diederick Cardon, Ricardian contracts — legally binding agreements on the blockchain, 30 November 2017,< https://medium.com/ltonetwork/ricardian-contracts-legally-binding-agreements-on-the-blockchain-4c103f120707> , accessed 17 May 2019
[141]Ibid, accessed 14 April 2019
[142] Ian Grigg, Guide to Ricardian Contracts, WebFunds project.
[143] Diederick Cardon, Ricardian contracts — legally binding agreements on the blockchain, 30 November 2017, https://medium.com/ltonetwork/ricardian-contracts-legally-binding-agreements-on-the-blockchain-4c103f120707 , accessed 12 June 2019

schedule. A BowTie diagram relates to negotiations and the drafting of a legally binding contract and makes clear all the objectives of the contract."

An example of using Ricardian smart contracts is transactions in OpenBazaar. OpenBazaar is an online platform which people can buy or sell things. Implementation of Ricardian smart contracts in OpenBazaar provides secure and legality to e-commerce transactions. In every transaction, this platform creates a Ricardian smart contract which is signed by digital signature; digital signature provides legitimacy to the transactions. Ricardian smart contracts can be used in every e-commerce transaction since it acts as an electronic form of a legal agreement[144].

V. Advantages and Disadvantages of Smart Contracts

Smart contracts provide lots of advantages to users. However, the disadvantages of smart contracts cannot be denied. The following are the benefits of smart contacts;

	Traditional Contracts	Smart Contracts	Ricardian Smart Contracts
Transparency	Relevant parties access the contract only if the party has the original contract or copy of the contract.	All the terms and the conditions are visible and accessible to all the relevant parties[145]. I There is no way to dispute them once	Ricardian smart contracts have the same advantage with smart contracts.

[144] Faisal Khan, Ricardian Contracts can become the next generation of Smart Contracts, 20 November 2018, https://www.datadriveninvestor.com/2018/11/20/ricardian-contracts-can-become-the-next-generation-of-smart-contracts/ , accessed 20 May 2019

[145] ChainTrade, 10 Advantages of Using Smart Contracts, 27 December 2017, https://medium.com/@ChainTrade/10-advantages-of-using-smart-contracts-bc29c508691a , accessed 17 April 2019

		the contract is established.	
Security	Traditional contracts can be tampered or damaged or lost.	Smart contracts are stored in the blockchain system. This feature provides protection to smart contracts. Once a smart contract is established on the blockchain, it cannot be tampered[146].	Ricardian smart contracts have same the advantage with smart contracts.
Accuracy	Natural language is used in traditional contracts, the meaning of a term or a condition can be interpreted differently human by human.	Coding language is definite. Smart contracts execute the terms and the conditions accurately.	Ricardian smart contracts are drafted coding language and natural language. It uses codes like smart contracts.
Speed	Parties lost their time during the execution and enforcement of the contracts.	Self-execution and self-enforcement abilities of smart contracts contribute rapidness to transactions[147].	Ricardian smart contracts have the same benefit with smart contracts.
Savings	Parties can need third-party for	Smart contracts do not need any third-	Ricardian smart contracts have the

[146] Vanessa Mak, Eric Tjong Tjin Tai and Anna Berlee, op. cit.
[147] Gareth W. Peters & Efstathios Panayi, op. cit.

	escrow or execute the contract. This issue burden with debts to the parties.	party for escrow or execution of the contract. There is no need to escrow agencies, lawyers or witnesses. These third-parties come up with expenses. Parties do not have to pay expenses to these third-parties by using smart contracts[148].	same benefit with smart contracts.
Nature Conscious	Traditional contracts use paper, it harms nature.	Smart contracts stored in the digital world, the paper is not needed for smart contracts, usage of paper will reduce with using the smart contracts.	Ricardian smart contracts have the same benefit with smart contracts.
Trust	Traditional contracts can be tampered.	Features of smart contract like; transparency and security, eliminates any possibility of manipulation or tampering.	Ricardian smart contracts have the same benefit with smart contracts.

[148] Lukas K, The Unspoken Side of The Blockchain. Can We Live Without The Third Parties, 2 October 2017, https://hackernoon.com/the-unspoken-side-of-the-blockchain-can-we-live-without-the-third-party-2ffd0b02014c , accessed 17 April 2019

Language	Traditional contracts are written in natural language, it is understandable.	Smart contracts are drafted in coding language, it is not expected that an ordinary individual can understand the smart contract.	Ricardian smart contracts are written in natural language and coding language. An ordinary individual can understand the content of the Ricardian smart contract.
Legality	There is no problem with the legality of traditional contracts.	The legal status of smart contracts is not certain.	Ricardian smart contracts have legality because of its "natural language" form.

These benefits of smart contracts can be practical for business life, especially when compared it with bureaucratic obstacles. The world is changing. There are no borders anymore; it is simple to do business all around the world. Business entities need efficiency, savings and speed in their transaction. These benefits can be useful for comparing smart contracts with the notary system.

Chapter 4 – Comparison of Smart Contracts and The Notary System

I. Comparison of Smart Contracts and Notary System

Too many years passed since Nick Szabo used the term of "Smart Contract"[149]; technology improves and enters every field of our life. With the rising trend of the cryptocurrencies, usage of smart contract, and popularity of blockchain raise. The smart contract has begun to be an

[149] Szabo, op. cit., accessed 20 May 2019

alternative for different entities. In this chapter smart contracts are compared with the notary system.

People use notarization in order to secure their transactions or notarization can be mandatory for specific transactions. As discussed in Chapter 1, notaries existed since Ancient Egypt. Their most significant feature is preventing the conflicts between the parties of an agreement before the conflict occurs. Notaries prevent conflicts by witnessing and recording an agreement. These are basic elements of notaries. The question which is discussed in this section is can smart contracts satisfy these basic elements. However, it should not be forgotten that Latin Notarial System has one more element apart from these; acting as an attorney.

Notaries witness the signing process of the parties or approve the signature which is not signed at the notaries; both of the signatory parties should be at the notaries[150]. Notaries have to be sure certain information about the party. How can smart contracts provide this feature? As discussed in Chapter 3, parties who make transaction by smart contract use the digital identities and sign the smart contracts with digital signatures. Individuals can have more than one digital identity in a blockchain system[151]. This issue harms the trustworthiness of the identities of the parties. Before the continue this issue, the author thinks that discussing the remote notary system can be useful for this discussion.

A remote notary is a type of notary which is authorized for notarizing the documents via online. Live video audio calls and digital tools, such as e-signatures are used in this type of notaries. In 2012, Virginia State allows remote notary system[152].

Digital identities do not satisfy the identification process of the parties. However, some technology and innovation companies are developing an e-signature for smart contracts[153]. According to regulations mentioned in Chapter 3, eIDAS and ESIGN Act, allows to parties sign the documents by e-signatures; a document which is signed by e-signature has same legal status with handwritten documents, its legal status cannot be denied because of its electronic form. E-signatures are safe signing tools. It cannot be accepted that a smart contract with

[150] National Notary Association, op. cit.
[151] Vanessa Mak, Eric Tjong Tjin Tai and Anna Berlee, op. cit.
[152] Notarize, What is a Remote Notary, < https://www.notarize.com/knowledge-center/what-is-a-remote-notary> , accessed 20 May 2019
[153] Krystle M, op. cit.

current technology can provide authentication to the documents as notaries do. However, after developing e-signatures for smart contracts, it can verify the identities of the parties. Question is; do electronic signatures sufficient for validating the identities like notaries? The author thinks that it is not sufficient. Because e-signatures and information about e-signatures can be stolen. The documents that signed by e-signatures can constitute a presumption about the identity of the signer, but claiming that it constitutes presumption like witnessing of the notaries cannot be true. The author thinks that a verification system supported by a facial recognition system or a video record which is recorded in order to prove identity if any conflict occurs. In remote notary system, notaries use live video audio calls in order to notarization process. A human (notary) investigates the identity of the parties via online by seeing the parties. Humans can be tricked. A robot or a computer system can make verification of the identification of the parties more accurate than humans; developing a robot or a system in order to verify identities of the parties is not a big challenge in this era. Apple developed a face recognition system, Face ID[154]. Face ID is the most advanced hardware and software that is created by Apple. This system captures accurate face data by projecting and analyzing over 30,000 invisible dots to create a depth map of your face and also captures an infrared image of your face[155]. It can also recognize the user even the user has cosmetic makeup or growing facial hair. If the system can adapt to e-signature technology, it can be sufficient for validating the identities of the parties. This is an *ex ante* solution for this issue. The other solution is *ex post*; recording the offers and acceptance of the parties by video record. Parties can record their intentions and store it in blockchain, but parties should be sure about the storage capacity is enough for this process. If it is not, parties can store reference data to the video file. After any dispute occurs, parties can prove the identities by this video record. Also, another potential benefit of using video record can be proving the intentions of the parties. In Roman Law, people use *stipulatio* method for concluding a contract[156]. As explained in Chapter 3, *stipulation* has formal requirements in order to show the intentions of the parties. Formal requirements similar with *stipulatio* can be regulated for this solution. However, *ex post* solution is contrary to notarization logic. Notaries should prevent the disputes before it

[154] Apple, About Face ID Advanced Technology, 7 November 2018, < https://support.apple.com/en-us/HT208108> , accessed 20 May 2019
[155] Apple, About Face ID Advanced Technology, 7 November 2018, < https://support.apple.com/en-us/HT208108> , accessed 20 May 2019
[156] Plessis, op. cit., page 290

occurs. This solution can be used after legal procedures. This two solution should be sufficient in order to verify the identities of the parties.

Smart contracts are stored in the blockchain system[157]. The blockchain is immutable series of block. Data in the blockchain are secured by the hash system and timestamp. This features of the blockchain are explained Chapter 2. These abilities of the blockchain provide protection to the smart contracts which are recorded in the blockchain. Notaries record the notarial documents in order to prevent tampering. Once a smart contract is recorded in the blockchain it cannot be tampered[158]. Records which are stored in notaries can be lost or burn, but data in the blockchain cannot be deleted. The author thinks that the protection that is provided by blockchain is sufficient. However, a new question is arising for this conclusion, which type of blockchain is suitable for recording. As discussed in Chapter 2, there are three types of the blockchain; private blockchain, public blockchain, and consortium or federated blockchain. There are two major notarial systems existing. These two different disciplines have their own features. This issue is discussed in the following sections.

The challenging issue is the uncertainty of the legal status of smart contracts. This issue is discussed in Chapter 2. Some of the notarial documents are considered as contracts. Smart contracts should be contract or at least legal status should be similar to contracts. According to Arizona State Law, there is no problem with the legal status of the smart contracts[159], but what about Turkey and Netherlands. As mentioned before, smart contracts are not contract, they are enforcement tools for agreements. The legal status of smart contracts should be similar with the traditional contracts, and smart contracts can be evidence for existing of an agreement. Until the lawmakers adopt the smart contracts into their law systems, this argument will continue. Stephan Meyer and Martin Eckert –blockchain legal experts- points out that if a smart contract contains all the terms and the conditions of a legally binding contract and these terms and conditions written into it or if the parties of a contract make an agreement about executing the terms and the conditions in a smart contract, the smart contract can be legally enforceable[160]. In other words, if the existence of a smart contract

[157] Vanessa Mak, Eric Tjong Tjin Tai and Anna Berlee, op. cit.
[158] ibid
[159] HB 2417-Arizona State Legislature
[160] Simon Chandler, Smart Contracts Are No Problem for the World's Legal Systems, so Long as They Behave Like Legal Contracts, 8 February 2019, < https://cointelegraph.com/news/smart-contracts-are-no-problem-for-the-worlds-legal-systems-so-long-as-they-behave-like-legal-contracts> , accessed 21 May 2019

bears a legally binding contract, the legal status of a smart contract is unproblematic. For now, the legal status of smart contracts should be sufficient for comparing it with notarial documents only if the conditions which are explained in this paragraph occur.

The author wants to mention Ricardian smart contracts. Ricardian smart contracts are legally binding agreements that readable by humans and coded for self-execution automatically at the same time[161], also records all the details about the agreement in the blockchain. These second generation smart contracts contain all the terms and the conditions of an agreement, this feature provides legally binding agreement status of them. A Ricardian smart contract can satisfy the contractual issue of this discussion. Also, Ricardian smart contracts are stored in the blockchain system, and after developing an e-signature which is discussed above, Ricardian smart contracts can be sufficient for all the elements of the notarization process.

II. Comparison of Smart Contracts and The Notary System in Different Jurisdictions

i. Turkey and the Netherlands

The Turkish and Dutch jurisdictions are discussed together in this section. Both of these jurisdictions use the same notarial discipline; Latin Notarial System[162]. As a mentioned previous section, Latin Notarial Systems have one more element; giving legal advice.

In the countries which adopt Latin Notarial System, notaries should act as an attorney[163]. The notaries which are a notary in a country that uses Latin Notarial System should give advice and investigate the document in the legal sense. Their liability is broader than the countries which use Public Notarial System. They are responsible for the context of the notarial documents. That is why notaries in Latin Notarial System shall study as lawyers in this system. The notarial document should not be contrary to the relevant law; these documents should be investigated in the legal sense in order to get the title of "notarial". Third parties cannot intervene into a smart contract. Question is; is it possible to satisfy this element of the Latin Notarial System by a smart contract. If the answer is yes, a new question arises, how can smart contracts satisfy this element?

[161] Sarah Rothrie, How Ricardian Smart Contracts Enable Blockchain Adoption, 30 August 2018, https://coincentral.com/ricardian-smart-contracts/ , accessed 14 April 2019
[162] National Notary Association, op. cit.
[163] ibid

In order to answer these questions, this issue should be discussed; which type of blockchain system should be suitable for the Latin notarial system? As explained in Chapter 3, there is three types of blockchain; private blockchain, public blockchain, and consortium or federated blockchain. A private blockchain is a type of blockchain that that permissioned networks can put restrictions on who is allowed to participate to network or which transactions can be made[164]. In the jurisdictions which use Latin Notary System, the government can establish a private blockchain/s, and authorized the notaries for giving permission to individuals to enter into this blockchain and validating the smart contracts which are created by individuals. It is similar to the remote notaries, distinguishing part is verification of the identities will be done by the computer protocol. In this system, individuals create a smart contract and waiting for approval for recording it into the private blockchain system. Notaries investigate the smart contract or an agreement which a smart contract is created coherent with, and decide whether this smart contract can be recorded in the blockchain system. This permission system can satisfy the element of "acting as an attorney" in Latin Notarial system.

There are certain contracts which are drafted by notaries in order to be a legally binding contract. For instance, sale contracts about vehicles shall be made in notaries in Turkey. There are a few problems with these contracts. Let's continue with vehicles transactions for clarifying the issue. The issues about this type transaction are parties can show the amount of the transaction lower than the real amount of the transaction in order to escape tax or swindlers can cheat the people[165]. For this type of contracts should continue to draft in notaries, for the execution of these contracts, parties can create a smart contract in the supervision of notaries. Notaries can record it into the blockchain and transfer of the assets can execute automatically when the obligations are met. This suggestion can prevent frauds in the transactions.

[164] Vitalik Buterin, On Public and Private Blockchain, 6 August 2015, https://blog.ethereum.org/2015/08/07/on-public-and-private-blockchains/ , accessed 21 May 2019

[165] The swindler party sent the amount of the transaction to the counter party before the notarization process by bank, he/she has a bank document which is an evidence about he/she has already sent the money. Before the notarization process the swindler party calls the counter party and said that he/she cannot come to the notary, his/her friend will come behalf of the swindler party, and give a permission to counter party about transferring the vehicles to his/her friend by orally. Counter party do the exactly same. After that the swindler party sue the counter party about counter party breach their agreement and counter party shall payback the swindler party's payment.

Notaries should use record the transactions in blockchain at least. Traditional recording methods are old fashioned. They store the documents by paper copies. The paper copies can be burned or demolished. The data in a blockchain cannot be changed or removed. The notaries can record the transactions in the blockchain system. Another benefit of using this system is transparency. When a contract enters into a blockchain system, notaries can authorize the parties for accessing the contract. Parties can access the notarial document whenever or wherever they want, like in the electronic notarial system.

ii. The U.S.A.

In Arizona State, the legal status of smart contracts is determined. Public Notarial System is used in The U.S.A. jurisdiction. In this notarial principle, notaries have no liability about the context of a document, they do not have an educational background as an attorney. Notaries are responsible for the identification of the parties in this system[166].

The notaries in the Arizona State witness the signing process or approve the signatures and record the notarial documents[167]. As discussed in before, smart contracts can provide the features of the notary system if necessity developments are adopted into smart contracts. Because of the public notaries have no concern about the context of the contract, the public blockchain system can be used in this notarial system. Individuals can sign the smart contracts by electronic signature, it should occur a presumption about identities of the parties, and records this smart contract into a blockchain system, it provides the immutable ability to the contracts and occurs a presumption about the smart contract has not been changed. The smart contract which is stored in the blockchain system can be sufficient for the elements of the Public Notarial System.

Some states of The U.S.A. have already accepted the remote notary system[168]. As discussed previous section of this chapter, notaries verify the identities of the parties by doing a live audio video call, and other technologic tools. If identity verification via online is allowed according to regulations of certain states, smart contracts could be sufficient. Also as

[166] National Notary Association, op. cit.
[167] National Notary Association, op. cit
[168] Notarize, What is a Remote Notary, < https://www.notarize.com/knowledge-center/what-is-a-remote-notary> , accessed 7 June 2019

mentioned before, robots or computer protocols can be more consistent about the validation of the identities of the parties than human beings.

Besides satisfying the elements of the public notarial system, smart contracts can help to improve the trustworthiness of the notarial documents. Max Raskin suggests a control mechanism for the smart contracts; relevant jurisdiction with a smart contract can create a publicly available database about the terms and the conditions according to relevant jurisdiction's legal provisions and a smart contract can use this terms and conditions in order to update its content before the finalization[169]. The notaries in the Arizona State do not investigate the context of the notarial document, this document could have the terms and the conditions contrary to law. With this system, the terms and the conditions of the notarial documents can be controlled by the computer protocol in a strict sense and notarial documents trustworthiness will be stronger.

III. Comparison of Advantages and Disadvantages of the Smart Contracts and The Notary System

The advantages and disadvantages of the smart contracts and the notary system are discussed separately in Chapter 1 and Chapter 3. In this section, these benefits and handicaps are compared.

A most significant benefit of the notary system is preventing potential disputes about a contract. Signatures of the notarial documents occur presumption about identities of the signers. This presumption arises from witnessing or approving the signatures feature of the notaries. If suggestions about electronic signature technology are developed, smart contracts can provide the same benefit with notarial documents. However, it should not be forgotten that regulations should be made in order to clarify the issue and enjoy the benefits.

Notarization can be an obstacle for the parties, they lost money and time with notarization. In order to this process, parties shall be presence at the notary, and they shall pay the expenses of notarization. Smart contracts can provide efficiency, creating a smart contract is much cheaper than notarization and parties can save their time. Also, with execution ability

[169] Raskin, op. cit., page 327

of smart contracts can help parties to saving their time. Parties do not need any third party for executing their transactions if they enter into a smart contract. Notaries can be an entry barrier for entrepreneurs. Francisco Reyes mentioned this issue in his article[170]. Expenses of the notaries cannot be affordable for small entrepreneurs. With using the smart contracts, expenses will be reduced.

Copies of the notarial documents can be accessed from notaries. If a party need a copy of a notarial document, this party should go to a notary, and pay the expenses. Smart contracts provide accessibility to the documents and agreements. A document which is stored in the blockchain can be accessed from everywhere. This advantage of smart contracts against the notary system provides speed to the transactions.

Frauds and corruption are critical problems of the notary system. As discussed before, notaries are humans and humans can be tricked or humans can accept a bribe. Robots or computer protocols cannot be convinced by bribes and fooling a robot or a computer protocol is more difficult than trick a human. Smart contracts which are recorded in the blockchain system can prevent these problematic issues.

The notarial documents are paper-based, it harms nature. Governments and business entities care the nature; they realize the potential danger of global warming and take precaution for preventing it. Smart contracts are nature-friendly, papers are not used for creating a smart contract. This eco-friendly nature of the smart contract is an advantage against the notarial system.

A most significant disadvantage of the smart contracts against the notarial system is the legal status of the smart contracts is not clear. Notarial documents have legal status and legal enforceability. This uncertainty is the biggest obstacle for smart contracts.

[170] Francisco Reyes, A New Policy Agenda for Latin American Company Law: Reshaping the Closely-Held Entity Landscape, 29 April 2011, page 32 33 https://research.tilburguniversity.edu/en/publications/a-new-policy-agenda-for-latin-american-company-law-reshaping-the- , accessed 21 May 2019, "Legal formalities for incorporation constitute one of the most significant entry barriers for entrepreneurs in Latin America…The necessary participation of a notary public in the process of incorporation is a good example of such widespread formalism. Notaries are well-paid bureaucratic officers whose income is mainly associated with the so-called 'public faith' that is given to contracts and other instruments once their authorized stamp and signature have been opposed onto a document…."

Flexibility can be counted as a disadvantage of smart contracts. Once a smart contract enters into a blockchain, it cannot be modified in theory[171]. Parties should create an intermediary smart contract in order to change the smart contract. However, notarial documents have the same disadvantage, these documents lack flexibility. If the parties want some changes in their notarial documents, they should go to a notary, and be presence at the same time. Both of them harm the flexibility that is needed for business life and transactions.

People have habits, and it is hard to change those habits. Notaries are in our life for almost 5000 years. Notaries are trusted mechanism of society. The biggest obstacle of usage of the smart contract is breaking the habits of people. Individuals do not trust computers or codes. Also, they want documents which they can read and understand. The language of the smart contract is a disadvantage of the smart contracts against the notaries. Because of the coding language of the smart contracts, it is really hard to read. It harms the trust of the people.

There are certain disadvantages of the smart contracts against the notary system; legality and readability. Ricardian smart contracts can prevail in the handicaps. The legality of Ricardian smart contracts is an undisputable issue, and it can be read because of the using natural language in Ricardian smart contracts. It can be said that Ricardian smart contracts as the second generation of smart contracts can solve many problems about smart contracts.

IV. What is the Impact of Smart Contracts on the Notary System?

Comparison of smart contracts and the notary system is made in previous sections. As a conclusion of these comparisons, the potential influences of smart contracts on the notary system is discussed in this section.

Notaries are the guardian of the seal of the states, they represent the force of government[172]. It is one of the ancient entity of the governments. An ordinary document becomes a notarial document by affixing a document by the notarial seal, it comes from the power of the public authority. Also, notaries have other tasks than notarization in certain jurisdictions. For

[171] Blockchain Expert, op. cit.
[172] Aashish Sharma, Blockchain: Impacts on Notarial Professions, 10 September 2018, https://hackernoon.com/blockchain-impacts-on-notarial-professions-a58245030a3f, accessed 22 May 2019

instance, notification in Turkish jurisdictions[173]. Several duties of the notaries are not suitable for smart contracts.

It cannot be said that smart contracts can replace the notaries. Legal frameworks are biggest obstacle. Also, notarization process gets its legal power from the public and government. It is a guarantee of the public against several disputes arise from a notarized document. Third parties cannot intervene in the smart contracts. It cannot be expected that the government gives a guarantee to a transaction which the government does not involve in. Notarization process is the sovereign right of the government. This right of the public cannot be restricted. Also, notaries are not prepared for this technologic revolution. Notaries should be educated about coding language, they should know how to read the smart contracts and they should understand it. However, smart contracts can be used in the notary system as discussed in the previous sections. Notarization process can be supported by the blockchain technology and smart contracts. People could use smart contracts which is created according to a notarial document. These smart contracts should be drafted by supervision of the notaries. It will provide a lot of practical benefits to individuals, such as the execution process will be easier and reaching a notarial document will be more accessible.

What about the notarial documents? Can smart contracts replace the notarial documents? The author thinks that it will not come true in the near future. Notarial documents get its evidential power from the public, they are marked by the seal of the public. As discussed before, regulations, the uncertainty of the legal status of the smart contracts, difficulties about coding language of the smart contracts and the sovereign right of the states are most significance obstructions. However, the issue of the proof ability of the smart contracts could be interpreted differently from these views. It is discussed in the next section.

V. Proof Ability of Smart Contracts

As discussed before, smart contracts are not contract, they are enforcement tools of agreements. However, the legal status of the smart contracts should be similar with the traditional contracts. If any dispute occurs because of a smart contract, can parties submit the smart contract as an evidence? If the answer is yes, what should be the proof ability of the

[173] Turkish Notarial Code No.1512, Article 8, 5 February 1972

smart contract? The last question is tried to be answered by compare the smart contracts with notarial documents.

The Article 2:101/2 of the Principles of European Contract Law says "*A contract need not be concluded or evidenced in writing, nor is it subject to any other requirement as to form. The contract may be proved by any means, including witnesses*". According to this article, parties are free to proof of the existence of a contract. They can prove it with any evidence. As discussed before, smart contracts can be a reflection in the electronic environment of a contract, parties can use smart contracts for executing the terms and the conditions of a traditional contract. As mentioned before, the intentions of the parties can be understood from a smart contract. The problem can be the coding language of the smart contracts. If a court faces with a contract which is drafted in a natural language that is not familiar to court, the court wants the translation with approval of a notary of this contract. In other words, courts can consider and give a decision about the contracts which's language is not understood by the court. The same process can be applied to smart contracts. The court can want the translation of the smart contract from the parties. Literal of the article which is mentioned at the beginning of this paragraph, is clear. Parties can use any evidence in order to prove the existence of a contract. The author thinks that there are no legal obstacles for using smart contracts as an evidence for proving the existence of a contract.

Smart contracts can be submitted as an evidence to the courts if any dispute occurs because of the existence of a contract or an agreement. But what should be the proof ability of a smart contract? As examined in Chapter 1, notarial documents are conclusive evidence in several jurisdictions, at least the court does not investigate whether the signatures in the document are signed by the parties or identities of the parties. There is a presumption about the signers who have the signs in the notarial document are signed the notarial document personally. In order to notarize a document, signers shall be presence at the notary. Also, there is a presumption about the notarial documents are not tampered. The copies of the notarial documents are stored by the notaries, if any dispute occurs, these copies can be called by the court. This feature comes from notaries witness or approves the signatures or notary drafts the document.

The blockchain system provides the immutable ability to smart contracts. It can be accepted by the courts that data is not tampered. In other words, the immutable ability of the smart

contract which is provided by the blockchain should occur a presumption about the smart contract in a blockchain system is not tampered. Based on the presumption about the notarial documents are not tampered, the same presumption can be accepted for the smart contracts.

It cannot be accepted the same presumption about the identities of the parties with recent technology of the smart contract. Smart contracts are signed with a digital signature by digital identities, a person can have more than one digital identity. There is no control over the identification on the blockchain system; it is came from its decentralized nature[174]. However, some solutions for validating the identities are suggested before. If an electronic signature will be developed and supported by face recognition software, it will be useful for verifying the identities of the parties more than sufficient degree. Presumption about the identities of the parties of notarial documents come from witnessing or approving the signatures by notaries. With developing an electronic signature with face recognition software should be sufficient for occurring a presumption about the identities of the parties.

It cannot be said that smart contracts should be considered as conclusive evidence. However, immutable ability and potential electronic signature can be sufficient for occurring a presumption about the identities of the parties and the smart contract is not tampered.

In the beginning of the section, it said that smart contracts can be evidence for the existence of a contract. What about Ricardian smart contracts? There is no legal obstacle about the legal status of Ricardian smart contracts, they involve all the terms and the conditions in human language. They can be considered as contract in the legal sense. The proof ability of a Ricardian contract should be more powerful than regular smart contracts. Ricardian smart contracts have the same features with smart contracts; such as immutable ability and determination of the identities of the parties. Because of the immutable ability of Ricardian smart contracts, the same presumption should be applied to Ricardian smart contracts. Also, as mentioned before, if the electronic signature which is explained before will be developed, it should occur a presumption about identities of the parties. Most significance advantage of Ricardian smart contracts against the smart contracts about their proof ability is Ricardian smart contracts can be considered as contract, it means they can prove more than the existence of the contract or agreement. They are contracts by itself. The author thinks that if necessary developments

[174] Vanessa Mak, Eric Tjong Tjin Tai and Anna Berlee, op. cit

about the validation of the identities, proof ability of Ricardian smart contracts should be similar with notarial documents. There is a point that must be discussed. In Latin Notarial Systems, notaries investigate the document in legal sense. Ricardian smart contracts and also smart contracts lack of this feature of the notarial document. In conclusion about Ricardian smart contracts, there should be a presumption about trueness of the signature and not being tampered.

Conclusion

The world has already entered into a technologic era, everything is getting faster and easier. Business life needs speed and efficiency more than ever. In order to get this purpose, technology should be adopted into law systems. Business entities and also individuals should face fewer obstacles which are occurred because of the bureaucracy.

Notaries are one of the ancient entity which is established in order to secure the transactions and prevent potential disputes which arise from the agreement or the contract between the parties. Notaries provide the features by witnessing or approving the contractual process and recording the copy of the notarial document. In Latin Notarial System, notaries also act as an attorney and giving legal advice to the parties about the related contract. These are benefits of the notaries. However, notarization can be an obstacle or process that harms the speed. Also, the notarization process imposes expenses on the related parties.

Smart contracts are computer protocols which have self-enforcement ability. In other words, they are enforcement tools of an agreement. Smart contracts are stored in the blockchain; this feature provides the immutable ability to them. There are concerns about verifying the identities and the legal status of smart contracts.

In this research, smart contracts and the notary system are compared. Smart contracts can satisfy some elements of the notarization, such as protection. However, the identification system is not sufficient yet. Several technology companies are working on it; they are developing an electronic signature for smart contracts. This electronic signature can be sufficient for determining the identity, but it is not sufficient when it is compared with the notarization. However, some suggestions are made in the related part of this research in order to solve this issue.

The most significant obstacle in this research is the place of the smart contracts in the legal framework. They are not contracts in the legal sense; they are enforcement tools. Regulations are necessary for clarifying the issue. However, second-generation smart contracts, Ricardian smart contracts have legality. There is no conflict about it. Ricardian smart contracts are more suitable than the smart contracts for using it in the notary system.

After these discussions, notarial documents are conclusive evidence; the court does not investigate the signatures of notarial documents. A new question arises from this comparison. What should be the proof ability of smart contracts? Smart contracts can be evidence for existing of an agreement or a contract, and it should occur a presumption about not being tampered because of its immutable nature which is provided by recording it in the blockchain. If developments about the validation of the identities are actualized, it can be said that there should be a presumption about the trueness of the signatures. Ricardian smart contracts can be classified as a contract, so they are more than evidence of the existence of an agreement or a contract.

In conclusion, smart contracts cannot replace with the notary system. Notaries are the guardian of the seal of the states, it is sovereign right of the governments. However, smart contracts can be used in the notarization process. Also smart contracts should occur presumptions about the identities of the signers and the data is not tampered which are told above.

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