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LEGAL REGALEMENTS OF E-SIGNATURE

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Abstract: The development of informative technologies, including that of the Internet, has significantly changed the human's life. The largest portion of civil turnover has been encompassed by e-commerce. This latter is being executed through e-contracts. The e-contract from the doctrinal point of view is considered as dealt and the existence of e-signature is an essential component of its authentication, which in its turn determines the issue of existence-absence of written form. The present article is related to the issues of legal status, technical safety and reliable environment of application of e-signature. The necessity of applying the legal instrument was conditioned by the necessity of gradual disappearance of paper-based operations' execution practice. The application of e-document turnover is justified only in case if the authentication of the document and the signature placed on it has been followed and all this has been acknowledged by the third party. Despite the various models of e-signature, for all of them, it is important to have a reliable and safe environment, for guaranteeing the safety and signer's identity. The article shows the issues related to legal governing of e-signature according to the legislation of Georgia, also Russian Federation, Continental Europe, Common Court member states, as well as directives and guidelines developed by international organizations.

Keywords: e-commerce, e-contract, e-signature, reliability, safety.

1. Introduction

Nowadays certain part of social communications through the way of using the computer and other e-means, takes place in a virtual universe (cyberspace), where the information is exchanged among people being in distance from one another, which may complicate the reliable identification of mentioned participants. Often in legal relations for one subject it is of utmost importance to determine the identity of the contact person and specifically and safely. The applicable law for the purpose of identifying the person is applied by a handwritten signature which is made by the

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signer on the document for the purpose of verifying its content and indicating its own identity. But applying such a signature is incompatible with the virtual world. Respectively, the law in cyberspace should use such technical means which are compatible with the virtual world and provides the relevant denotation of the subject's identity. Mentioned assignments are solved using e-signature [1].

The application of traditional (handwritten signature) is incompatible with the virtual world. Respectively, for the purpose of achieving the efficiency of the virtual field law has to become the waiver on many classic categories and replace them with other alternatives. E-signature and e-document may be considered as such an alternative [2].

Since the 90s of the last century, despite the existence of not a single international act in the field of e-commerce, there was no legal government of such relations in Georgia for a long-term period. The result of challenged of civil turnover conditioned by harmonization and information technologies with international legislation was the adoption of Georgian law "About e-signatures and e-document" in 2008, which has been replaced since May 2017 by Georgian law "About e-document and reliable e-service."

The applicable law targets at determining the legal mechanisms for using the e-signature and other reliable services and through them assisting e-management, e-business development and other directions, also providing compatibility of Georgian legislation with legal framework subject to European Union.

The idea of a new law is that it considers and interprets the notion of e-signature in an absolute different way. Considering new legislative changes, the qualified e-signature is given the legal power of the material signature. A person may have the possibility of using e-document in all the cases when the written form of a document is requested (if not otherwise is determined by law) [3].

According to law, the issue of qualified e-signature is organized into details, the preconditions of using it are determined and a high degree of its reliability is provided. The qualified e-signature clearly confirms the identity of the signer and protects the signed document. Also, through the way of developing e-management has significantly decreased the administrative expenses, the green cover and environment are saved [4].

It has to be noted, that Georgia constantly improves its own positions in the field of e-management and open management. Namely:

1. According to the UN e-management index, in 2014 Georgia occupied 56th place among 196 countries. With this figure, the country is on front positions and runs before such countries, as Turkey, Romania, Bulgaria, Ukraine, Armenia and Azerbaijan. For comparison, in 2008 Georgia's mentioned rating was on the 100th place. Index is being updated once every 2 years.

2. According to open management index which determines the openness of governments in the world, Georgia occupies first place in East Europe and Central Asia among 13 countries and generally, it occupies 29th place among 102 countries. In 2014 Georgia has been elected as Management Committee Member of "Open Management Partnership," and in 2017 the country occupied the position of deputy country of Chairman. In open management initiative, Georgia is exemplary for its legislative and judicial branches' active involvement and ambitious plans, democracy, reforms cast for elevating trust and business transparency [5].
The present article examines the issues of governing e-document turnover in Georgia, namely e-signature, social survey results and also the given analog organization in the acts adopted by some foreign countries and international organizations and certain references are given.

2. The notion of e-signature, content

Nowadays neither Civil Code of Georgia nor any other legislative act includes statements about remote contracts [6].
E-digital signature simultaneously terminates the author's identity and issues related to the document's integrity. Thus, placing e-digital signature on e-document gives document legal power and provides the usage of e-document when protecting own rights [7].
Article 69 of the Civil Code of Georgia (hereinafter: CC of Georgia) is related to simple as well as complex written forms of deeds. According to a third part of the same article, the reveal of willingness in written form requires having a signature. In civil turnover (like in, [8] as well as in judicial practice [9]) e-contract has been evaluated as the contract equalized with a simple written contract. The aim of equalizing e-form with written one is to establish the identity of the revealer, checking its authentication and with this avoid the possibility of falsification.
Compared with the Civil Code applicable in some countries (Germany, Russia), the Civil Code of Georgia does not include special norms in relation to the e-contracts. Though, considering general norms regulating the deed (contract) prohibits the signing of e-contract.
Signing the contract even in traditional legal relationships and e-commerce is the most important stage of signing it. B.D. Zavidov denotes, that "the placement of seal on the document signed by an unauthorized person does not give authenticity to this documents, whenever, signing by an authorized person apparently confirms signing the agreement, even in case of not having a seal on it“ [10]. Some lawyers actually consider that parties decide whether they should place a seal on the contract or not [11]. Whenever, the presence of signature according to the law is binding (Section 2 of Article 434 of Civil Code of the Russian Federation, Article 160).

The legal power of e-document may not be guaranteed only by legal norms. To give legal power to the e-document it is necessary to have technologic mechanisms. Exactly such a mechanism is represented the e-signature (the digital one).

The e-signature [12] really exists in law and as a rule, is actually equalized with signature. E-signature is the data created by e-means (information containing the identity of the subject) which is related logically to other electronic information (e-document) and aims at the determination of the identity of the creator of this document (revealer of will). Similar to the handwritten signature, e-signature is used with the purpose of identifying the author of the document. In contrast with the ordinary signature, the e-signature has not been made in handwritten form, but it is made through e-instrument and relevant software. Due to the mentioned, it is possible to use e-signature only in e-relations (for example, communication through software or Internet).

The typical and most widespread types of e-signature are: signature on the letter composed in e-mail, or PIN which has been logged in by the holder or classic faxsimile [13].

According to par. "e" of Article 2 of Georgian law "About e-document and reliable e-service" adopted in 2008 (which has been abolished currently), e-signature used to be interpreted as the union of data created through any e-means, which is used by the signer for denoting its union with e-document [14].

E-document – this is the union of textual, voice, visual or audio-visual information kept in e-form, and e-signature is the union of e-data which is attached to or logically related to this document and is used for signing it [15].

On the basis of interpretation indicated it is possible to conclude, that due to the fact that when signing electronically the contact of signer with e-document is being determined, and not those technical means are determinants, through which it is possible to make a signature, but the determination of signer's will. Though, in its turn, this does not mean the mismanagement of technical means. It is obvious, that e-signature has to be made following all the technical safety norms [16].

The digital signature is made through special technology. In contrast with other signatures, digital signature relies upon so-called assymteric cryptography technology, which uses two different but mathematically related keys: open (public) and closed (private) keys (s-called "pair of keys"). The closed key is used for creating digital signature and for encrypting the content of e-document. From a legal point of view, with this key the information sender signs the revealing of will electronically. The closed key is subordinated to strict regime. Open key is used for checking the identity of digitally signed document sender. Such key is public. It is important that the addressee is aware of it to reliably examine the identity of sender. Open and closed keys represent the union of mathematic digits. The digits used in keys are

assymteric. This means that digits which are given in keys are different from one another. Respectively, no combination of digits of closed key is not rising from open key digits, which provides the protection of this latter [17].

Certain requirements have been developed in international practice about using e-means in the field of civil law, according to which e-document is equalized with a paper-based document.

1) Electronic (digital) signature is used by following those data, which are indicated in the document.
2) The authentication of electronic (digital) signature is established through the key of signing;
3) Holding the keys for signature is made on legal basis, justifiably;
4) Documents, which evidence the authenticity of signature, have legal power.
5) When using electronic (digital) signature, its holder should not break the imperative norms of applicable regulations and other party's rights. He should act honestly [18].

The notion of electronic digital signature is met in many international and various countries' national legislations. Unfortunately, almost each country or international organization tries to make corrections in the notion of electronic digital signature, describe its additional signs, otherwise realize its purpose and distinguish characteristics signs. In international practice there is no common notion of electronic digital signature and partially such synomyms are applied, which e-signature, digital signature [19].

For the purpose of assisting the development of electronic business UNCITRAL has developed Model Law on Electronic Commerce 1996-1998) [20]. UNCITRAL team working on e-commercial issues has examined all the legal aspects of these complex relations. Its 31st and 38th sessions were dedicated to the development of Model Law on Electronic Signatures, the aim of which was to create such means, which would assist the application of electronic signatures through the way of creating criteria for technical reliability, which would make possible to have the equivalence of handwritten signature and e-signature. Respectively, the Model Law on E-signatures may assist governments in establishing modern, harmonized and fair legislation, which will play a significant role in solving the mentioned issue [21]. The Convention project "About signing the contract in an electronic way has been submitted at the 40th session of UNCITRAL (October 2002)" [22].

It is important to face the issue of unification of e-commerce in EU member states. Directives "About E-Commerce" [23] also Directive "About E-signatures" [24] have been adopted. On the basis of basic statements of Model law and indicated Directives, many countries of the world have adopted legislative acts governing e-commerce and e-signatures.

UNCITRAL Model Law on E-signatures, Chapter 2 interprets e-signature, as the e-data available in the notification of data, which are attached to or logically related to and in which it may be used for the purpose of determining contact with the signer's data notification, for identifying the signer and indicates at signer's consent on the information which is included in the data notification [25].

In relation to the establishment of e-signature status, various attitudes have been distinguished by a team working on e-commerce when developing the project of the Convention about e-notifications in international contracts. Commission refused the proposal to determine the authentication of the contract through e-signature, because in the majority of legal systems there are no common requirements related to the signature, in terms of the authentication of all types of contract [26].

The notion of e-signature was mentioned in Directive 1999.93.EC of EU Parliament and Council about legal principles of companies for e-signatures adopted in December 13th 1999 (hereinafter – EU Parliament Directive "About E-signatures"), [27] according to which e-signature – is data submitted in electronic form, which relates or logically associates with other electronic data and serves the establishment of its authentication. The indicated directive is not limited only by this determination of e-signature and offers also to use the qualified form of electronic digital signature – widened electronic signature, which means electronic signature, which meets the following requirements:

(a) Uniquely is related to signer;
(b) It is sufficient to make identification of signer;
(c) Is being created using those means, which signer may control;
(d) It is related to data which it belongs to, so that any following amendment will be found in data [28].

The term digital signature is used in regulations of certifying international commerce through digital means adopted in 1997 by the International Chamber of Commerce [29] which means the asymmetric cryptosystem of notification so, that person who holds the reliable notification and open key, may exactly determine the following:

(a) Whether the transformation was the result of closed key, which is relevant to the open key of signer and
(b) Whether the signed notification was changed after the moment of transformation [30].

The USA law "about electronic signatures in international and national commercial turnover" [31] adopted in 2007 includes the following determination for e-signature: "the electronic sound, symbol or process, joined or logically related to the contract or other document (record) and executed or adopted by the person, for the purpose of signing the document (record)" [32].

In the law "about electronic communications" adopted in May 25th 2000 by Great Britain, e-signature is interpreted as one of e-forms, which is executed or through other means logically associated with any e-data, for the purpose of determining the authentication, integrity or considering both aspects together [33].

Considering the various interpretations, some civilests associates terms "electronic digital signature" and "electronic signature" with one another [34].

The interpretation, that electronic digital signature represents the requisite for e-document, is common for all the laws about e-signatures of Commonwealth member states (except Kirgizstan) [35]. It is necessary to consider, that electronic digital signature is not included in the document itself, and the notification text is encrypted by the sender's closed key and the chain of symbols received is attached to the document. The receiver, through the way of sender's open key encrypts the signature and compares it to the text [36].

In international practice, there are two basic rules for e-document: technologically neutral and technologically oriented. First one is expressed in the absence of technology at united legislative level. Respectively, technologically oriented rule legally fixes only one technology, which is used in electronic document turnover. The mentioned rule is reflected in 2001 Model Law about electronic signature. For the purpose of realizing mentioned regulation term "electronic signature" is used about e-signatures" [37].

In Model Law two basic functions of electronic signature are emphasized:

1. It establishes the author of notification and 2. It verifies its will and expression of will. Technologically neutral principle is adopted by many countries, [38] according to which it is fairly considered to use any technology, which provides the exactness and reliability of the document. Technologically neutral regulation, only formulates basic requirements and give the possibility to use new opportunities without essential additional amendments.

It should be mentioned, that the absence of clearly determined technologies of its regime and e-signature itself may cause its evil application from the side of judicially dishonest subjects.

Technologically oriented attitude associates signature with one technology. Often such technology is digital. Such technology of signature has been developed in 90s of XX century (for example, State of Juta has adopted law "About Digital Signature" in 1995, Malaysia has adopted law "About Digital Signature" in March 26th, 1997 and Korea has adopted law "About Digital Signature" in February 5th, 1999" [39]). Federal law of Russia "About electronic digital signature" determines electronic digital signature as the requisite for e-document which is designed for protecting given e-document from falsification. It is obtained as a result of cryptography transformation of information, using the closed key of electronic digital signature

and identification of the holder of signature's key certificate and gives the possibility of the unchangeability of information in e-document (Article 3).

Basically, the technologically oriented principle in relevant regulations of Commonwealth member states is formulated [40].

The technologically oriented principle means only the application of technology determined by legislation, which decreases the possibility of developing e-commerce. The negative features of this principle are acknowledged by many lawyers [41].

Technologies of e-signature:

During many years not a single technology of e-signature has been developed. Each technology aims at meeting the various requirements and providing a different safety level. The e-authentication and signing methods may possibly be divided in three categories. These are: based on customer's or receiver's knowledge (for example, passport number, personal identification numbers), based on physical characteristics of the customer (for example, biometric) and owning certain object by customer (code or another kind of information, which is placed on the magnetic card). The fourth category includes various methods of authentification and signature, which are beyond all the above-listed categories and which may possibly be used for indicating the author of signer (for example, faxsimile, which reflects handwritten signature or full name indicated at the end of the electronic notification in printed form) [42].

There are 4 basic methods of signing and authentification: digital signatures, biometric methods, passwords and hybrid methods, scanned or printed signatures may be interpreted in the following way [43]:

1. The digital signature factually represents an application, which through the way of using asymmetric cryptography (so is called public key coding system) provides the authenticity of electronic notification and integrity. Nowadays, various kinds of digital signature like: file stop digital signature, blind signatures and undisputed signatures;
2. Biometric method encrypts through such essential conduct and characteristics of person, like: DNA, colored iris of the eye, omentum, hand and face appearance, facial thermogram, ear form, the smell of body, signing or walking manner;
3. Passwords and codes are used for controlling the access to information or service and for “signing” during e-communication. Nowadays, they are used more often, the most widely spread form is password and code. They are used during lots of types of transactions, including internet-banking or cash withdrawal from ATM and credit cards;
4. Scanned and printed signatures.

In private law sector the dispute was raised when legally governing e-commerce about what impact would be given to the enforcement of new technical regulations. Such attention towards technologies would be it voluntarily or not, was caused by the fact, that software has been refined, for offering higher scales of safety. It has to be considered also, that many business subjects do not use electronic signature yet, either a single form [44].

The legal and technology irrelevance are those two basic complexities, which are distinguished when using the inter-state e-signature and authentification methods, namely in the circumstance which aims at the replacement of the legally genuine signature. Technical incompatibility impacts on the functional compatibility achievement of authentification systems. The basic legal irrelevance appears when various country jurisprudence has different requirements and terms to e-signature authentification and legacy [45].

The circumstance is important when any electronic signature is not equal to private one. For example, in internet space lots of websites and applications, where it is possible to make electronic signature, which is used to affix to documents, though based on Georgian legislation only qualified electronic signature has equal legal power to private signature [46]. According to the same law, qualified electronic signature is made on signature's certificate. And this excludes such any other signature which is not made on the basis of special certificate [47]. In Georgia e-signature for executing the written document is used only in two cases: towards banking and ID card [48], through the way of using digital signature portal. In the banking sector, totally in several banks, the e-signature is implemented. Despites this, it functions with limits, namely: e-signature is used only for determining banking operations and subject to specific amount of money. Also, nowadays banks use e-signature only when providing direct service with customer. The website is remote space, thus, e-signature here cannot be used, because this latter is necessarily executed throughout bank territory, during the period of providing direct banking service with customer. As for second direction – application of digital signature portal with ID card, here it is possible to make signature without leaving home, through own computer or in remote way. In above mentioned portal customer uploads for signing the desirable document and shares to another party. For this, it is necessary that another party has in an analogous way registered at a digital signature portal. And this certainly is a problem, because for this process customer needs ID card special encrypter and necessary software [49]. Based on this principle, e-signature, certainly executes the functions of a written form of a deal but it has to be found out, how often the digital signature portal is applied for signing contracts. Undoubtedly, ID card has no functions in cases when another party is the citizen of a foreign country, also when the absolute majority of Georgian websites do not applies the function of identification with ID card for signing contracts, [50]

including either internet banks. Also in these terms, when signing deal through website is related to rapid and flexible process, the installation of software and special encoders for customer is at a certain level, complexity. At the same time, it is imposible to use the digital signature portal in mobile, when it is possible to sign contract on website through any hardware connected to the internet [51].

The federal law of 2000 about electronic signatures adopted in 2000 in international and inner state commercial relations intepretes term “electronic document” as contract or other document, which has been created, produced, sent, notified, adopted or kept through electroni means. Thus, the document is considered as electronic in which information has been submitted in electronic-digital form. Model law of UNCITRAL about "electronic commerce" is entirely based on so-called principle of functional equiavent. This means that according to national legislation, during the process of signing the deal and execution, relevant activities should be reflected in written form or through the way of using written document; this requirement is considered as executed when the indicated activities are enforced through one or several electronic notifications, following legislation.

It is obvious, that the decision regarding signing the electronic deal is taken by the parties themselves. Exactly for this reason, based on model laws have established the most important legal principles of e-commerce: parties having dealt, have no right to doubt its authenticity and binding only for the reason that it is signed and dealt through electronic means. The information cannot be bereft of legal power only for the reason that it has the form of electronic notification of data. The mentioned conditionally is called the technological non discrimination principle, the aim of which is the provision of equal regime towards electronic notification of data and paper-based documents. Due to all the mentioned, it may be said that the contract signed through electronic means is fully responding to the requirements raised towards simple written form of a deal. Namely: when making deal during electronic commerce as a result of exchanging documents through electronic means, which gives the possibility to really determine that the revealed will rises due to the contracting party; such documents are in the form of electronic record; e-document is signed by the contracting party or the person having relevant authority for this; for signing the deal in electronic commerce, the electronic digital signature or other analogoue of personal signature are applied [52].

3. Electronic signature as an instrument for personal identification

The e-form contracting parties use the information necessary to them through the way of electronic contact. In such a case the fact of belonging information to a certain person has to be verified.

When executing e-contract special importance is given to the determination of an authorized person. This is a binding term. When signing the traditional contract it is possible to determine the authorized person based on the identity evidencing documents, power of attorney, incorporation documents of legal entity [53].

The person expressing will through e-document has to indicate not only his own name, but also the qualified electronic signature has to be attached to the document [54].

Georgian legislation gives the possibility to have a document in electronic form for the purposes of a written one. In this case, it is necessary to have qualified electronic signature [55] in accordance with Georgian law "about electronic document and reliable electronic service." In any case, for written form the main moment is to have he signature, and this latter determines the issue of having – absence of written form. It is possible to use electronic communication only in case, when it is possible to determine that document rises from a contracting party. For achieving the relevance of will expressed in the contract and expression of will it is necessary that its requisites identify not only the content of the contract, but also the identity of its executor (holder, submitter) [56].

Practically, the ordinary contracting parties have either direct or indirect, but necessarily material contact. When signing e-contract, "parties have no material contact and are in distance from one another, in space as well as in time" [57].

Even according to judicial practice, "signature should be made on document (contract) specially executed for deal by own and indicated the signer's full name distinctly, in opposite case contract is not genuine" [58]. Exactly that's why, in practice (for example, banks), in often cases they request from parties to sign the document distinctly, for determining the identity of signer. As a rule, this time it is necessary to indicate the last name, only by signing the preconditions of signing form is not executed, except the case, when person uses pseudonym or is known with any specific name. It does not matter how it is signed, the main thing is that signature as a whole gives the possibility of identifying the signer [59].

When identifying the signer of the contract it should be found out whether he is authorized for acting on behalf of legal entity or citizen. Subject to electronic document turnover the analogous versions of personal signature undertake the function of ordinary signature and their execution is important for identifying the counteragent. In Russian doctrine, based on the existing idea, acknowledgment of electronic digital signature as equal item comparing to personal one is the legal function [60]. But based on A.V. Tkachov, electronic digital signature may not be examined as the analogous version of person's private signature [61].

As R.O. Khalikov denotes, "electronic digital signature may not exist independently from electronic document or electronic contract" [62]. As the analogous version of physical signature it has two basic features:

a. It can be re-processed only by one person, but authentication may be verified by many;
b. It integrally is related to only specific document [63].

These features provide the possibility of executing the function of a personal signature by an electronic (digital) signature. In such a case it is possible to use functional-equivalent principle – as analogous version for electronic document [64]. The procedure for identification is process, subject to which the identity of network customer or computer is being examined or which factually confirms, that customer is exactly the person, whom he represents himself [65]. A.P. Fillipov gives the determination of electronic digital signature as the possibility of verifying the authentification of electronic document, through open and closed keys [66]. UNCITRAL in 1987 interprets the authentication of an electronic transaction of monetary means as the identification through physical, electronic or other means, which gives the possibility for receiver to determine the fact, that notification rises from a given source [67].

The necessity for identifying the author of the document is strengthened in Russian law as well: the par. 2 of Article 434 of Civil Code of Russian Federation [68] requests the establishment of fact, that document comes from contracting party. According to par. 3 of Article 5 of federal law N24-ФЗ "About information, informatization and protection of information" adopted in February 20th, 1995 [69] (hereinafter – law "about information, informatization and protection of information," law "about information"), the legal power of electronic digital signature is acknowledged in terms of information system of software-technical means, which provide the identification of signature.

There are various principles for classifying identification [70]. They are official and informal. The first one is usually framed with law or legal act (for example, when signing real property deals, when taking permission / licenses by state authorities). During the informal identification, parties independently, determine the procedure of identifying author subject to contract relations. In most cases, the holder of key certificate is identified informally, though currently officially is identified in electronic digital signature (for example, when submitting tax declaration through e-mail, which has the electronic signature on it or from banks' side through the way of using electronic communications tax authorities are notified about legal entities regarding the issues of opening accounts).

The second feature of classification of identification – is author's material or private feature. During the personal mark, identification is made on the basis of author's biometric characteristics.

The identification through electronic digital signature belongs to identification with material sign, or through it any specific subject is distinguished, software, which belongs to the customer (signature's key, smart-card).

4. Electronic signature – confidentiality guarantee and for protecting from falsification

Electronic digital signature with its content represents the code, which is created through the way of cryptogtaphy means. Owing to the application of such means of electronic digital signature, document is rather well protected from falsification and provides the highest level of protecting electronic document without making any amendments and imperfections.

When generating electronic digital signature the mathematic algorithm of calculating hash-function of notification or electronic document is used. Hash function will transform any document into the final, ordinary sequence of symbols which is attached to the original. Currently, term electronic signature for the method of given authentification of documents' integrity is not applied. Rather often following terms are used: "modeled," "correction," "digest." Also the term "electronic seal" is compatible with this [71]. The importance of each document hashes is unique and when making least amendments to the document (even if we change one comma), the has meaning of it will be changed. So, the document receiver may encrypt the hash meaning through sender's open key, indicated by the sender and compare it to its factual hashes of the document received. If they will coincide with one another, then this will be the guarantee of signing document by exactly the holder of given closed key and that there were no amendments made in the process of sending the document [72].

The electronic digital signature is the result of cryptography transformation. According to Russian legislation, electronic digital signature is generated through asymmetric cryptography. During the creation of electronic signature and examination two keys are applied: open and closed. In accordance with the law "about electronic digital key" closed key is an unique sequence of symbols, which is known to the holder of signature key certificate and is designed for creating the electronic digital signature in electronic documents. Open key is relevant to the closed key of signature and is applied for approving the electronic digital signature authentication in electronic document. Open key before sending the electronic document fixed by electronic digital signature in advance is given to document receiver. Also, with open key it is impossible to create closed key or generate electronic digital signature.

The determination of cryptography is based on the meaning of word – "cryptography." The determination of cryptography is given in regulation for adopting Model Law of UNCITRAL: Cryptography represents the field of applied

mathematic which gives possibility to transform notifications into uncertain forms and return to original form. Term "Assymetric cryptosystem" is interpreted in common skills and abilities, for evidencing through digital means: "Assymetric Cryptosystem"): Assymetric cryptosystem, also often determined as "Cryptosystem with open key" os information system, which uses algorithms or whole range of algorithms, which provide the pair of cryptographic keys, which constitute from open key and relevant open one. The pair of keys has following features:
With the open key the correctness of digital signature is approved, which is created through closed key, and physically it is impossible to distinguish or create closed key from open one with the exceptional ways. Thus, open key may be opened without serious risk of key publication."

5. Electronic signature in other countries' legislation and international acts

International law and other countries' legislation in the field of regulating the application of electronic digital signature were actively developing from the mid-period of the 90s of the last century.
In March 1995, the Bar Association of America has developed model contract about electronic exchange of data among the commercial partners [73].
In the agreement "about exchanging data electronically" there are three basic legal reasons, namely:
(a) To simplify, interpret and modernize the legal mechanism for regulating commercial deal;
(b) The legal power of electronic deals shall be acknowledged. Their legal acknowledgment shall be provided, including at court.
(c) The post-commercial practice should be assisted on the basis of agreement between the parties [74].
The authors of international acts indicate, that as for electronic contract governing, for the development of legal base it is not necessary to make corrections to applicable conventions, which are applied not only on traditionally dealt contracts, but also on electronic contracts (for example, UN Convention about international contracts of sale and purchase of goods, Vienna, April 11th 1980) [75].
For the purposes of convention "in written form" according to the Article 13 of International Contracts of Sale and Purchase of Goods, the notifications are considered through telegraph and tele type. It has to be considered, that this indication of Convention carries terminology interpretation through electronic or other communication means, for the other types of written notifications, which give possibility to establish that document comes from contracting party. There are two reasons for such attitude. First one is that – specific requirements are determined not subject to the Convention, but National Law in relation to written form of deal, when

its adoption is conditioned by imperative norms of national law. Second, the application of the word "also" in Article 13 may not evidence the imperative intention for the list [76].

The famous N.I. Solovyanenko fairly denotes, that in foreign legal doctrine, there is view regarding the issue of regulating the application of electronic digital signature, according to which related to the global character of legal comprehension of electronic digital signature and considering the international development aspects of electronic commerce, national should be compatible to the unified laws at some extent, for this latter becomes international and transparent. The given principle is reflected in EU Parliament directive "about electronic signatures." According to the directive the following requirements should be related to the member state legislations:

- The submission of service related to the issuance of certificates for electronic signature key should be based on advance decision;
- National legislation should acknowledge the electronic signature means published in official magazine of EU, which is relevant to widely acknowledged standards (EU Parliament Directive "about electronic signatures, Chapter 3);
- Free circulation of relevant electronic signature means should be relevant to the requirements considered in Directives at inner market;
- The fact that electronic signatures which are created through reliable means of electronic digital signature and who hold relevant certificates should be guaranteed that mentioned meets the legal requirements in relation to the data submitted in electronic format, as personal signature meets such requirements;
- It is necessary that the legal power of electronic signatures and the allowance of these latter as evidences should not be refused for the reason that signatures are electronic, or there is no assistance through reliable means of electronic digital signature, or they have no relevant certificate (Directive, Chapter 5) [77].
- The first law in the world about digital signature has been adopted by American State Juta in March 9th 1995 [78].

The first state in Europe, which has adopted the law about electronic signature, was Germany. German requirement in relation to giving legal power to electronic contracts, namely in requesting the handwritten signature, meets the requirements of strict regime.

In 1997 law about digital signature was adopted, which represents the Article 3 of law "about regulating basic terms for providing information and communication service." In Germany the process of regulating the application of cryptography through open/closed key is related to the technical requirements of certification authorities, which completely have to be relevant to law for obtaining the permission on handling relevanty activity. The main accent has been casted in law to the creation

of infrastructure for electronic digital signature, bit not for the acknowledgement of their legal power [79].

The Civil Cide of Germany on 13.07.2001 the electronic (§126a) and text form s (§126b) were added for simplifying the civil turnover, which throughout the whole worl, create the possibility for transferring without factual loss and revealing the will sooner through the way of using modern information and telecommunication means [80]. The aim for amendment is the compatibility of German private law with the modern civil turnover challenges [81]. According to legal interpretation, modern civil turnover where the mobility of commerce is developed and briader masses are involved, should be prevented by written form determined by statutory regulations, it should be possible to send electronic contract through electronic means, during which the personal signature of document is excluded [82]. According to the amendment the replacement of personal signature with electronic one has taken place (§126a) and the form as well was respectively called the electronic form a deal, which instead of written form is used in cases foreseen only by law [83]. It means the placement of qualified electronic signature and own name on the electronic document by person expressing will, in accordance with law (გსკ §126a, I) [84]. Also, the other party should agree on the application of electronic form, the consent on the mentioned should be used at elast concludingly, it is not enough to have only the participation of it in electronic turnover [85].

Electronic signature creates the possibility of signing the contract through electronic communication, this is possible when parties sign document (documents) having one and the same content electronically, [86] also, if when signing the contract, one party will use written form as well electronic form [87].

On March 31st, 2000 France adopted law N2000-230 "about giving evidencing power to electronic signature and information technologies“ [88]. The given law has made amendments and modifications in Civil Code of France and determined the notion, basic characteristics, also criteria during which electronic digital signature will be acknowledged as legal. With the electronic signature the identity of that person will be identified, who has carried out it and should be made through reliable means, which give us the guarantee of its contact with the document. The reliability of such means are presumed in case of not having any evidence about contradictory, if an electronic signature is placed, the identity of signer is established, and the integrity of legal document is guaranteed in accordance with the terms determined by State Council Decree. Also, it should be mentioned, that the judge at court process independently determines rather reliable document, independent from its form. So, legal power of electronic document, where the electronic digital signature is made, may be found out as rather weighted, than made on paper.

In USA Federal law "about electronic signatures in global and national commerce" has been adopted in June the 30th 2000. According to the notes made by „Kahn Consulting Inc "considering the fact, that the given law, despites the fact that is first federal law of USA, represents common law without any strict imperative norms. The liberal definition of electronic signature is also interpreted by law "about electronic transaction of monetary means" in November 10th 1978. The electronic signature according to USA law is electronic sound, symbol or process, which is attached to or logically associated with the contract or other record and is executing by the person who wishes to sign the document. The determination is technologically neutral, it does not determine the strict technologic procedures of generating the electronic digital signature and it aims at the widening of notion of electronic signature with its technological development.

In USA there are three categories of electronic signature: simple, protected and digital. The given division is not strict; it does not reflect the qualified differences between affirmative signature, technologic signs and creation procedures [89].

The simple electronic signature is determined as any method of signing without using any special technology. Such signature is the electronic address of signer; digital form of handwritten signature; "click-wrap" which it its turn represents the clicking on buttin in software through which signer agrees to fulfill certain activities (this method is spread in electronic shops).

In terms of protected electronic signature, in difference with simple signature, whole range of technologies are used for increasing the level of identification and legal power, like: "dynamic signature," which is expressed through sensor screen; human's biometric features (sound, text printing signs), namely cryptography methods.

The electronic digital signature is based on the generation of electronic digital signature and cryptography method of confirmation. The legal status of electronic digital signature, which is used in Russia, is relevant to the given type of electronic signature. But considering the fact that federal law of USA is technologically neutral, the requirements of USA states and other governments are unacceptable about using electronic digital signature in case of using electronic digital signature [90].

According to Article 301 of USA law, parties independently determine the acceptable technologies verifying the authenticity and application models in own deals with the guarantee that such models and technologies are subordinated under forced provision. But considering the high legal power of electronic digital signature, which is received on the basis of cryptography, USA lawyers recommend the application of cryptography method.

Three types of electronic signature "about qualified electronic signatures" in law N832 of 2000 adopted by Sweden: simple, widened and qualified [91]. The type of applied electronic digital signature depends on the homogeneous meaning of

identification of electronic digital signature and notification, on technical means of creating electronic signature.
The Commonwealth countries are at the same level of development from judicial point of view comparing to world countries. In January 2000 The Republic of Belarus adopted law “about electronic document” where the legal principle of using electronic digital signature is determined, in relation to the electronic documents. In the Republic of Tajikistan adopted law “about electronic document” since May 10th 2002. The law acts with analogous title throughout the territory of Turkmenistan since December 19th 2000 [92].
Based on the legislation of the Russian Federation in electronic document turnover three kinds of signature are applied: simple, strengthened none qualified and strengthened qualified. The paper-based document has legal power if it contains binding requisites, the signature made personally and in some cases seal [93].
Simple signature – everyone knows the codes which are available through SMS, SMS codes, pair "log in – password," on websites in personal cabinet and e-mails. A simple signature is created through an information system and certifies that electronic signature has been created by specific people. A simple electronic signature mostly is used in banking operations, also in information systems for getting state services for authentification.
Legal and physical entities may without visiting state authorities solve daily problems at special portal gosuslugi.ru, as a result of registration. All the services on the mentioned website are available through qualified electronic signature. Physical and legal entities may get many state services with registering at portal and activating personal cabinet. Namely, it is possible to change the passport of citizen of Russian Federation, register at residential address, register vehicle or register if off, obtain information about tax arrears at Pension Fund, obtain permission for driving and so on.
The simple electronic signature is equal to the handwritten one, if mentioned is regalamented in separate normative-legal act or the agreement between the parties about electronic document turnover foresees regulations with which signer is determined by simple electronic signature, also with this agreement beneficiary is obliged to follow the confidentiality of closed part of simple electronic signature key (for example, password of pair “log in-passwprd or sms code) [94].
The strengthened non qualified electronic signature through cryptoscrypt software is made by using closed key of electronic signature. With the non qualified electronic signature the holder is identified, also it is possible to check the amendments in file, after sending it.
The person gets closed and open key of electronic signature at certification center. The closed key is kept on special key carrier with relevant PIN code or is kept at

user's computer. It is known only for the holder and is secret. Through the closed key the holder generates the electronic signature, with which signature is affixed to document.

The open key of electronic signature is available for everyone, with whom the holder handles the electronic turnover. It is related to the closed key and all the receivers of signed document have possibility of checking the authentification of electronic signature. The certificate of electronic signature includes the record about the fact, that open key elongs to the holder of closed key. Certificate also is issued by certification center, though when making non qualified electronic signature it may be not created. Non qualified electronic signature is applied in inner and external electronic turnover, if parties agree about this in advance [95]. The qualified electronic signature is the most regalemented by the government. This latter, like non qualified one is created by cryptographic algorithms and based on the open key infrastructure. The qualified electronic signature, in difference from non qualified one, has normatively determined structure's qualified certificate in the form of paper or electronic, the work program with qualified electronic signatures is certified by Federal Security Service and its issuance is possible by the Accredited Certification Center by Special Ministry [96].

The qualified electronic signature gives legal power to the document automatically, without any additional terms on the basis of special federal law "about electronic signatures. The authenticity of signature may be checked independently.

The Georgian legislation regulates two kinds of electronic signatures: developed and qaulifie [97]. The difference between them is that the developed signature is created through those data of creating electronic signature, the application of which may be controlled by signer and the developed electronic signature – by using qualified electronic signature creation means, has been made on the basis of qualified electronic signature;

The certificate of qualified electronic signature / electronic stamp is issued by the qualified reliable service provider, who is authorized in accordance with law at LEPL Agency of Data Exchange pf the Ministry of Justice of Georgia [98].

Based on Georgian legislation only qualified electronic signature has legal power equal to personal signature, also if physical entities and/or LEPL entities will make agreement, electronic document and electronic signature for those people will respectively have the legal power equal to material document and private signature [99].

6. Social survey

For the purpose of determining the implementation of electronic contract and electronic signature in Georgia by the author of article the social survey was made, which involved 338 applicants.

More than half of inquired people were lawyers, economists or financists and the age of majority is 31-45.

Almost 90% of respondents gave positive response to the question whether what is electronic signature, less – 57.7% know about the types of electronic signature (simple, qualified) and even less 59.5% have applied it.

Particularly careful are the data, where 89% of respondents have negative response to the question where the process of signing electronic document is acceptable for them, and 59.2% of surveyed people do not trust electronic signature. Relevantly, according to 64.8% of respondents, the indicator of electronic documents in civil turnover in Georgia has been assessed as average. Though, 91.4% of respondents consider that in future civil turn basically was developed on the basis of electronic documents.

7. Conclusions

The comparative analysis of legal regulations of Institute of Electronic Signature has shown that the legal system of many countries in the workd and International Institute develop the electronic communications in parallel with the legal principles of electronic document turnover, for creating stable guarantee for civil turnover stability and safety.

While passing these traces, it is important to create the legal guidelines and activities of electronic signature. The survey has shown that at international level the joint unified notion of electronic signature and system do not exist, but basically in national legislation of various countries the electronic signature is divided into simple, developed and qualified signatures. The authors solemnly agree that basic function of electronic signature is the identification of signer on electronic document (electronic contract) and protection of document from confidentiality and falsification.

In June 2014, by signing the Association Agreement with EU, the government of Georgia has undertaken to make its legislation come closer to EU legislation and International legal instruments. The agreement targets at creation of overwhelming free commerce between Georgia and EU. The sub-session 1 of Article 6 of the Agreement is related to the electronic commerce. According to Article 127 of Agreement, parties having acknowledged that electronic commerce in many sectors increases the commercial possibilities, agree to assist the development of electronic commerce. According to Article 128, Georgia undertook to handle dialogue about various issues of regulations raised from electronic commerce, including those ones related to the protection of customers subject to electronic commerce. For the execution of liabilities foreseen under this and agreement, 5 year term was given to Georgia after it signed the agreement and it entered into legal force [100].

In 2017 Georgian government has adopted law "about electronic document and reliable electronic service" which replaced the law about electronic signature and electronic document adopted in 2008, conditioned exactly by the necessity-liability of harmonization and approachment of above mentioned Association Agreement and other international documnts.

With the applicable law only qualified electronic signature is given the legal power of material signature. Person is given possibility to use electronic document in all the cases when the written form of a document is requested (if any other is requested by law).

By new law, electronic signature is not the system of any graphic signs, this is the system consisting of binary marks, zeros and one – in combination.

According to law, the issue of making qualified electronic signature is organized, the preconditions of using it are determined and completely the high level of its reliability is provided. The qualified electronic signature certifies the identity of signer and protects the signed document.

Though it has to be noted that new law does not determine the list of those deals, which may not be submitted in electronic form. It carries the blanket character in difference from its predecessor. It is desirable in future to regulate the mentioned issue from statutory points.

Despites the fact, Georgia constantly improves own positions n electronic management and open management issues, sociology survey has shown that for 89% of respondents the signing electronic document is not acceptable, and 59.2% of surveyed people do not trust electronic signature.

Due to the mentioned, it is desirable and necessary at legislative level to adopt amendments and new acts (for example, law about electronic commerce or commerce), which will assist the maximal electronization of civil turnover I the country, during which primarily important is to create the legal mechanism which will be safe and stable.

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