

DEVELOPMENTS IN TECHNICAL APPLICATIONS TO PROTECT ELECTRONIC TRANSACTIONS



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Abstract:

The world is witnessing an information revolution, that included various fields of life, and this is due to the emergence of the Internet, and its association with computers, which developed rapidly through modern electronic media thanks to digitization.

Perhaps, the most important area, affected by this digital technology is represented in the field of legal transactions of all kinds, whether civil, commercial or otherwise, given that it helps to speed up the transmission of information with tremendous technicality, as well as the possibility of communication, direct dealing and providing electronic services, in all its forms, but in return it was necessary to ensure an electronic environment, It is safe when dealing via the Internet, and this is by following some of the various technical applications, represented in certification, encryption and preservation electronic.

Key words: Electronic documents - legal transactions - electronic signature - electronic media - information systems - technical applications.

تطوير التطبيقات التقنية لحماية المعاملات الإلكترونية

ملخص: يشهد العالم ثورة معلوماتية شملت مختلف ميادين الحياة، وهذا راجع لظهور شبكة الأنترنت وارتباطها بالحاسبات الآلية، التي تطورت بشكل متسارع عن طريق الوسائط الإلكترونية الحديثة بفضل الرقمنة، ولعل أهم مجال تأثر بهذه التكنولوجيا الرقمية، تمثل في مجال المعاملات القانونية بكل أنواعها، مدنية كانت أو تجارية أو غيرها، نظرا لكونها تساعد على سرعة انتقال المعلومات بفعالية هائلة، وكذا إمكانية الاتصال والتعامل المباشر وتقديم الخدمات الإلكترونية بجميع صورها، لكن بالمقابل كان من الضروري ضمان بيئة إلكترونية آمنة عند التعامل عبر الأنترنت وهذا باتباع بعض التطبيقات التقنية المتعددة والممثلة في التصديق والتشفير والحفظ الإلكتروني.



الكلمات المفتاحية: المحررات الإلكترونية – المعاملات القانونية – التوقيع الإلكتروني – الوسائط الإلكترونية – الأنظمة المعلوماتية – التطبيقات التقنية.

Développement des applications techniques pour protéger les transactions électroniques

Résumé : Le monde assiste à une révolution de l'innovation, qui a inclus divers domaines de la vie, en raison de l'émergence d'internet et de connexion aux ordinateurs, qui se sont développés rapidement à travers les médias électroniques modernes, grâce à la numérisation, le domaine le plus important touché par cette technologie numérique est peut-être représenter dans le domaine des transactions juridiques de toutes sortes, qu'elles soient civiles, commerciales, ou autres, car elle permet d'accélérer la transaction de l'information avec une technicité énorme, ainsi que la capacité de communiquer, de traiter directement, et de fournir des services électroniques dans toutes ses formes, mais en contrepartie, il était nécessaire d'assurer un environnement électronique sécurisé, de traiter via internet, et cela en suivant certaines des divers applications techniques représentées dans l'authentification, le cryptage, et conservation électronique.

Mots clés : Documents électroniques -opérations juridiques -signature électronique – supports électroniques- systèmes d'information -applications techniques.



Introduction:

The world has recently witnessed a huge informational explosion thanks to the development of information technology and systems, which led to an accelerated change in the nature of relationships through changing the forms of writing. Civil, commercial and other transactions, especially in light of the spread of the Corona pandemic, where the field of communication between dealers has expanded through the global Internet¹ of information, the purpose of which is to use, transfer and exchange information electronically and at a tremendous technical speed², it is considered as an important tool for expressing the will for the various electronic³ transactions, which in turn contributed to the emergence of documents of another kind called by the name of electronic documents whose authority is reliable in proof of electronic signature.

On this basis, international legislation and national laws intervened to recognize and organize these new documents and include them as a tool of evidence in line with their specificity and keeping pace with all digital developments for the purpose of consecrating evidentiary power just like paper writing to embody the strategy of e-Algeria⁴ and providing wide-ranging protection in the field of informational⁵ environment through the application of electronic authentication, which is considered as one of the most important factors in achieving economic and social security for these transactions, in addition to systems of encryption, preservation and data hiding, which represent one of the most important advanced technical applications in national

¹ **Internet:** a compound and abbreviated term consisting of:

- Inter which means "**between**".
- Net means "**network**".
- Which in the general sense means: "a network between networks"

² Sami Ali HAMED AYAD, Informational Crime and Internet Crime, Dar Al-Fikr Al-Jami'i, Cairo, 2007, p67.

³ Electronic transaction is many and varied, including:

- Electronic contracts.
- Electronic service contracts.
- Electronic advertisements.
- Electronic deals.

⁴ Article 02, paragraph 5, of Executive Decree No. 12-12 of January 9, 2012 specifying the powers of the Minister of Post and Information Technology and Communication, C, R, No. 06, dated February 12, 2012. "He proposes to the government the strategy of Algeria, "Electronic Algeria," and he watches to coordinate its implementation.

Article 5, paragraph 5 of the same decree stipulates: "It guarantees strategic vigilance for the development of the information society."

⁵ Article 25 of Ordinance No. 03-05 of July 19, 2003, related to copyright and related rights, c, t, No. 44 issued in 2003.

The following: "The author has the right to stipulate that the integrity of his work be respected and to object to any modification, distortion or corruption of it, if that would prejudice his reputation as an author, his honor or his legitimate interests."



security for the purpose of maintaining the confidentiality of data and information circulated between dealers in the virtual world.¹

From which the problem arises about **the control of technical development in electronic transactions? And how was this dedication of technical applications able to the protection of electronic transactions?**

From it, it was necessary to address the technical development of electronic transactions (the first topic), as well as the need to provide a guarantee for technical applications for the purpose of protecting electronic transactions in (the second topic).

The first topic: the control of technical development in electronic transactions

Technological development has helped in the spread of electronic transactions between dealers, and thanks to this technical development in the method of communication and correspondence, electronic media has been used, which in turn led to the emergence of a modern form of writing and signature of documents with the so-called computer extracts and electronic programs that have become fertile areas for investment and the promotion of international trade. Therefore, electronic documents have become one of the new concepts with distinctive privacy, and are considered as means of proof in various transactions (the first requirement), which include electronic elements consisting of writing as well as a signature, specialized in a virtual environment (the second requirement).

first requirement: the inevitability of relying on the electronic pattern in transactions

Electronic transactions have become the most widely used means for exchanging economic and commercial transactions that were produced by the necessity of life and became imperative to the increasing development of technology and its dominance in all civil, commercial and penal aspects, which allowed this type of editor an electronic pattern in the virtual world that is completely different from paper editors, in which the form of writing has changed. To algorithms consisting of symbols, letters and numbers formed in electronic writing in its various forms, which in turn opened wide horizons for many aspects of electronic transactions.

On this basis, international conventions intervened to recognize the existence of these modern documents and the need to organize them in order to include them as evidence in line with their specificity (Part One). National legislation, including

¹ Electronic correspondence differs from electronic message in that the latter expresses the content or content that both parties to the message wish to know about from both, while correspondence is sending and receiving electronic messages such as one of the parties broadcasting the message via e-mail or to the other party's website on the Internet, or one of the two parties to send the message with content by fax or telex to the other party, see: Abdel Fattah BAYOUMI HIJAZI, Introduction to Arab Trade, Book Two, The Legal System of Electronic Commerce in the United Arab Emirates, Dar Al-Fikr University, Cairo, 2003, pp 81-82.



Algerian law, kept pace with emerging global trends in light of the development of electronic commerce (Part Two).

First Section: International and national endorsement of the idea of electronic documents

The world has witnessed tremendous transformations and developments at the economic level, and this rapid technical development has had a major role in the emergence of new models in the economy¹, for this reason, for the purpose of keeping pace with this scientific and technological development in the field of exchanging specialized data and information in light of the electronic economy to the inevitability of using electronic contracts and the emergence of what is known as the digital² economy based on communication networks through which commercial and economic business takes place, including electronic commerce and electronic transactions between information technology and Communications on the one hand and the economy on the other hand, and this has been recognized in many international agreements thanks to the international efforts to consolidate the status of electronic documents as electronic means of proof (first) and this is enshrined in comparative European, Arab and national legislation (second).

1- Improved status of electronic documents in international conventions

The more information is immaterial, the more legal proof of writing is required, which necessitates the search for alternative³ solutions, and accordingly these digital developments for writing were produced by moving to electronic writing, provided that they keep pace with the development of transactions in their various forms⁴ that

¹ Muhammad Al-SAEED RUSHDI, Contracting by Modern Means of Communication (The Extent of Its Authenticity in Evidence), Manshaat Al-Ma'arif, Cairo, 2008, p15.

² There are many labels for the digital economy:

- International Economy.
- Internet economy.
- The new economy.
- Web economy.

This reflects the importance of the Internet's role in the digital economy based on several components, the most important of which are:

- Technological infrastructure.
- Electronic hardware and software.
- Virtual networks.

Where the Internet, mobile applications, and other advanced services and devices constitute the cornerstone of the digital economy, and it can only be developed through the development of industries and services. See: JAAFAR HASSAN Jassim, Introduction to the Digital Economy, 1st Edition, Dar Al-Bidaya, Jordan, 2010, p93.

Farid El-NAGGAR, The Digital Economy: The Internet and Restructuring Investment, Stock Exchanges, and Electronic Banking, University House, Cairo, 2007, p145.

³ Muhammad Hossam MAHMOUD LOTFI, Using modern means of communication in negotiating and concluding contracts, Cairo, 1996, p6.

⁴ Pierre BEXESE, Gautier KAUNINE, Legal Guide to the Internet and Electronic Commerce, Vuibert, France, 2000, p 299.



have been ratified by many international agreements and have recognized this new style that has been known several different¹ terms.

The Rome Convention was issued in 1957 regarding the recognition of foreign arbitration awards. Article 11 of this agreement stipulates that the arbitration clause may be contained in a signed contract or agreement, or in an exchange of letters or telegrams.² Also, the New York Convention on Limitation in the International Sales of Goods of 1972, as it stipulated in its ninth article that writing can include all types of correspondence addressed in the form of telegram or telex, as confirmed by Article Thirteen of the United Nations Convention

Concerning contracts for the international sale of goods³, in addition to the United Nations Convention for the year 2005 on the use of electronic communications in the criminalization and proof of international contracts in the form of data messages stored by electronic⁴ means, and in which the concept of writing expanded to include all forms developed and comprehensive for all innovative technologies in the future.

In the same context, the United Nations issued the Unstrat Model Law on Electronic Commerce in the year 1996⁵, which was called the “data message” and which it defined in Article 02⁶, and the same law on electronic signatures for the year 2001, as well as the United Nations Convention on the Use of Electronic Communications in International Contracts for the year 2001. 2007, the Unified⁷ Model Arab Law for Combating the Misuse of Information and Communication Technology was also defined in Article 01 of Paragraph 18 as: **“The process of recording data on a medium for storage,”** as defined by the International Organization for Standardization and Metrology for the term editor⁸, it is like a statement recorded on a magnetic tape, or an Internet page. All of these means are

¹ RAYMOND Alexander, the electric signature a fundamental history of the law of evidence, university press, AIX, Marseille, 2002, p 158.

² The Rome Agreement of 1957 is considered the nucleus of the European economic bloc, according to which the European Economic Community (CEE) was established, which provided for the establishment of a common European market, which is now called the European Union. See: MUHAMMED Jamal, Khaled Rustom, The Legal Organization of Trade and Electronic Evidence in the World, Al-Halabi Human Rights Publications, Lebanon, 2006, p300.

³ United Nations Convention on Contracts for the International Sale of Goods. United Nations Committee Publication, New York, 2011.

⁴ Al-ROHI Muhammad Amin, The Electronic Document, Dar Al-Fikr Al-Jami'i, Cairo, 2007, p37.

⁵ Unicitral: Unicitral is an abbreviated term in English
United Nations commission on international trade law

⁶ Article 02 of the UNCITRAL Law states: “Information that is generated, transmitted or stored by electronic, optical or similar means including, for example, by electronic data exchange, e-mail, telegram, telex or telecopy”.

⁷ Abdel Fattah BAYOUMI HIJAZI, Combating Computer and Internet Crimes in the Model Arab Law, Dar Al-Nahda, Cairo, 2009, p743.

⁸ POULLET Yves, Antoine MIREILLE, vers la confiance ou comment assurer le developpement de l'électronique commerce, France, 2001, p 453.



considered electronic documents from the point of view of the law¹ and can be used as evidence before the courts² as they are sent or received by electronic means, whatever the means of extraction³.

2- keeping pace with comparative legislation for information technology in transactions

Algerian legislation has kept pace with the developments in the field of evidence, as the provisions of evidence regulated in the civil law⁴ were amended, like other comparative legislation, especially when it was added to Article 323, paragraph 01 of the Civil Code. Thus, the Algerian legislator did not define the electronic document in the civil law, but rather stipulated evidence. And writing in the text of Article 323 bis that: "Proof in writing results from a sequence of letters, descriptions, numbers, or any signs or symbols with an understandable meaning, whatever the means that it includes, as well as the methods of sending it, "and from it writing can be used as a means of proof of legal actions in general and electronic actions in particular and any other form that may appear in the future, unlike the French legislator who was more explicit about the rules of evidence in writing in the electronic form, as he made several amendments in the scope of electronic documents Which has been recognized in various legal transactions and dispositions⁵, and Article 1365 of the French Civil Code was one of the axes of the amendment brought by Law No. 230/2000,⁶ as its ruling became accommodating to all types of writing, including the existing and current ones, and what is in the process of experimentation, or what may appear in the future⁷.

Law No. 575/2004 related to trust in the digital economy was also issued, as well as the Ministerial Resolution issued by the French Minister of Justice No. 674/2005 related to achieving some contractual formalities through electronic means stipulated in Article 1365 according to the new amendment to the French Civil Code No. 13/2016.⁸

¹ GAUTRAIS Vincent, GIN Gras Patrick, la preuve des documents technologiques, les cahiers de propriété intellectuelle, v°22, N°2, May 2010, p 272.

² FABIEN Claude, la preuve par document technologique, R.J.T, N°38, 2004, pp533-537.

³ MANSOUR Muhammad Hussein, Traditional and Electronic Evidence, Dar Al-Fikr Al-Jami'i, Cairo, 2006, p58.

⁴ Ordinance No. 75-58 of 26 September 1975, relating to the Civil Code amending and supplementing Law No. 05-10 of 20 June 2005.

⁵ PIETTE Caudal, Electronic exchanges, certifications and security, France, edition titec, 2000, p 185.

⁶ Law n°2000/230 of March 13, 2000 adapting the law of evidence to information technologies and relating to the French signature, n°62 of the electronic official, j of March 14, 2000.

⁷ Art1365: literal proof, or proof in writing, results from a series of letters, characters, numbers or any other signs or symbols with an intelligible meaning, whatever their medium and their methods of transmission.

⁸ Law No 16/131 relating to The French Civil Code amending and supplementing the law of February 13/ 2016.



The Egyptian Electronic Signature Law No. 15/2004¹ defined the electronic document accurately and clearly through the text of Article 04 in Paragraph B. In this definition, the scope of the electronic document expanded and was not limited to the Internet, but rather permitted it by other electronic means such as fax, telex, or any technical means available in the future².

second section: the distinctive privacy of electronic documents

The concept of writing has developed remarkably with the advent of modern electronic means of communication that resulted in electronic data interchange, which in turn has allowed those wishing to engage in electronic contracting to express their will by any means, as well as the influence of this method in determining the legal nature of these transactions and the possibility of giving them authoritative or force. Complete proof to keep pace with the technical and technological development in the method of dealing with various legal transactions of an electronic nature, and in front of the distinctive privacy of this type of documents at the international and national levels, attention has focused on consolidating some important characteristics to link them to technical systems to ensure trust and safety (first), and this is done by using a digital environment that has a role Prominent in the field of electronic transactions through its related parties (Second).

1- the characteristics of electronic editors

There is no doubt that electronic commerce plays an effective role in the field of transactions, as it contributes greatly to the development of commercial exchange operations at all levels, through which products and services are marketed using electronic means of communication, or what is known as the information processing system, which in turn led to the emergence of electronic editors Through which electronic transactions are proved, on this basis, they are characterized by many important characteristics, as follows:

- **The speed feature:** It appeared in the field of electronic commerce due to the tremendous technological progress through the use of electronic media for the purpose of saving time and effort.
- **The feature of effectiveness:** it is evident that it allows the delivery, conclusion of contracts or deals, or the performance of services in an immediate and continuous manner, with a virtual presence between dealers via the Internet³.
- **Confidentiality and security:** Electronic documents are extracted from advanced technologies, which make it important to maintain the confidentiality and security of the data and information contained in the documents, especially after signing them

¹ Egyptian Law No. 15/2004 Regulating the Electronic Signature and Establishing the Information Technology Industry Authority, C, R, No. 17, dated April 22, 2004.

² LAWRENCE Muhammad Obeidat, Proof of the Electronic, Editor, Dar Al Thaqafa, Jordan, 2005, p78.

³ Samir ABDEL SAMIE AL-ODEN, The Electronic Contract, Manshaat Al-Ma'arif for Publishing and Distribution, Cairo, 2005, p157.



and completing the authentication, so it is not possible to defraud and use fraud and forgery.

- **The feature of accuracy and perfection:** considering the process of drafting electronic documents before sending them in order to be free of errors, and even if they exist, they can be corrected, and therefore the drafting is clear and allows obtaining information in an accurate and complete manner¹.

2- the parties to the electronic editor

Where there are two main parties, namely the sender and the addressee, but given that the electronic document is created, stored and processed in a medium with digital technology, the inevitability of the presence of a third party is imposed that gives it great importance in the field of electronic communications².

The sender (creator): It is the person who sends or creates the electronic document, whether it is done by himself or by another person on his behalf. The sender may be a natural person or a legal person through computers.

The addressee: It is the person whom the sender intends to receive the electronic document, ³ either a natural person or a legal person, and it may be from using the computer on their behalf.

Intermediary: It is that person who acts on behalf of another person by sending, receiving or storing the electronic document such as translation, recording, documentation, as well as archiving⁴.

second requirement: digital props for electronic editors

Recently, the virtual digital environment spread and penetrated barriers and borders, and as a result, the forms of transactions changed to the electronic form, and electronic writing appeared as a means of expressing this will on the one hand, as well as its recognition as evidence before the judiciary on the other hand.

For this reason, electronic writing was considered one of the most effective means in conducting transactions that take place via digital media, in a way that achieves trust and legal security for the contracting parties electronically ⁵ by adopting a new interpretation of the term electronic writing (Part One) as well as the electronic signature that a person uses to determine his identity and express his will. For the purpose of regulating electronic transactions and identifying areas of electronic commerce through the various functions it performs (Second Section).

¹ TONY Michel Issa, The Legal Regulation of the Internet, Dekwaneh, Lebanon, 2001, p344.

² Mohamed MOHAMED SADAT, The Authenticity of Electronically Signed Documents in Evidence, New University House, Cairo, 2015, p168.

³ Amer Mahmoud Al-KISWANI, Commerce via Computer, Dar Al-Thaqafa for Publishing and Distribution, Jordan, 2008, p136.

⁴ Ibid., p138.

⁵ Khaled MAMDOUH IBRAHIM, Concluding the Electronic contract, a comparative study, University House, Cairo, 2007, p201.



first section: a new interpretation of the form of writing

The world is witnessing a huge revolution in the field of information technology, which in turn contributed to the globalization of electronic transactions, which emerged as a new method for presenting goods and services and making deals electronically,

It had a significant impact on changing the idea of the written evidence¹ for regulating civil and commercial transactions in the virtual environment, with the need to provide a degree of technical and legal protection to create security and confidence for the parties to electronic transactions.

It was necessary to be in harmony with the informational digitization requirements in order to develop the concept of writing in the electronic form to give the evidentiary power to virtual transactions (First) and with the advent of the idea of electronic data exchange and its wide spread through open communication networks, it became necessary to subject electronic writing to specific conditions in the law (second).

1- the electronic form of the written evidence

Writing is considered the essential difference between the electronic editor and the traditional editor, given that the development of information technology has affected the form of writing electronically according to certain computational bases, so the letters are converted into electronic or magnetic signals that can be read on the screen of the device, which are stored, retrieved and translated into readable phrases for various languages on media They are called electronic stents².

The term electron is defined as: **“a spherical body, one of its components is an atom, and it carries a negative electric charge.”**³

So, electronic writing is attributed to writing as a codification of letters, signs, numbers, or signals with clear and understandable expressive significance, whatever the support used to create it, or the medium through which it is transmitted⁴ in the form of algorithmic equations used to enter data and information and output them from various electronic devices with reference to the UNCITRAL Model Law Regarding electronic commerce, he defined electronic writing in Article 06 thereof⁵

Similar to the directives of the European trend on the recognition of paperless media in proving various transactions and actions concluded at a distance with the

¹ Ibrahim ABU AL-LAYL AL-DASOUKI, Legal Aspects of Electronic Transactions, A Study of the Legal Aspects of Dealing Through Modern Communication Devices, Kuwait, 2003, p72.

² Muhammed AL-AISH AL-SALEHEEN, Digital writing is a way to express will and evidence for proof, Manshaat Al-Ma'arif, Cairo, 2008, p11.

³ MAS Florence, the conclusion of electronic commerce contracts, LGDJ, France, 2005, p 321.

⁴ Muhammed AL-AISH AL-SALIHIN, op.cit, p16.

⁵ Resolution of the United Nations Commission on Commercial Law No. 51/162, dated December 16, 1996.



aim of establishing the rules of proof by electronic writing¹ through amendments which affected the French Legislation² which gave a broader concept of writing to include traditional writing, electronic writing, and all conceivable types of writing, whether existing ones or what is in the process of experimentation or what may appear in the future³.

The important thing is to dedicate the pillar on which the writing is emptied with the aim of creating evidence, and the Algerian legislator has amended the provisions of evidence organized in Law No. 05/10 related to the civil law, through the text of Article 323 bis 1 to establish the principle of separation between writing and the tools used in its creation.

2- Conditions of reliance on electronic writing

The Algerian legislator stipulated, through the text of Articles 322 bis and 323 bis 1 of the Civil Code, the fulfillment of several basic conditions for the adoption of electronic writing, whether as a means of expressing the will, or as evidence of proof,⁴ which are as follows:

Readability condition: that the writing has a clear and understandable expressive significance through the explicit text of Article 323 bis of the Civil Code, given the emergence of writing in its modern forms and the difference in the support installed on it, which translates machine language and converts it into an understandable language⁵, The UNCITRAL Model Law on Electronic Commerce stipulated Achieving writing in its electronic form, as long as it is readable, to equate it with written writing⁶.

Affiliation condition: enabling the writing to identify the identity of the person who issued it⁷ for this necessitated the fulfillment of the affiliation condition and resorting to the idea of the mediating person in the contractual relationship or the so-called e-authentication authorities, using various techniques to identify the person's identity to prevent exposure to forgery or manipulation by e-mail for example, or IP protocol⁸.

¹ LE TOURNEAU, Philippe, Computing and electronic contracts, 6th edition Dalloz, France, 2010, p 210.

² French civil law, N°13/2016.

³ Osama Abu Al-HASSAN MUJAHID, The privacy of contracting via the Internet, Dar Al-Nahda Al-Arabiya, Cairo, 2003, p98.

⁴ DEVEZE, Jean, the formation of the electronic contract, works of French culture, LGDJ, France, 2002, pp 59-68.

⁵ Ibid, p 72.

⁶ Article 6 of the UNCITRAL Model Law on Electronic Commerce.

⁷ Article 323 bis 1 of the Civil Code: "...provided that the identity of the person issuing it can be ascertained..."

⁸ Internet Protocol: The Internet Protocol is called "IP" and it is the basic communication protocol in the Internet Protocol service on which the process of routing packets within the network depends. This is the essence of the Internet. Transferred from: <https://ar.wikipedia.org>.



Safety condition: The electronic writing must be prepared and preserved in conditions that guarantee its safety, and this is what is stipulated in Article 323 bis 1. The legislator specified, according to Article 02 of Executive Decree No. 16-142 related to determining the methods of saving the electronically signed document, what is meant by preservation, and defined it as: **“The set of technical measures that allow the electronically signed document to be stored in a storage medium”**.¹

However, with the continuous development of informatics technologies, it has become difficult to ensure the stable existence of electronic media that guarantee the reading of electronic writing, regardless of the technology through which it was preserved, because electronic supports are subject to damage quickly even if they are preserved in appropriate conditions².

second section: the scope of the electronic signature

The signature in its traditional form is considered the most important element for the ordinary document, as it is what gives it legal authority. However, the rapid development of modern means of communication and information technology has in turn reflected the idea of the traditional signature, and another type has been developed in line with the technical development and is called the electronic signature and has become an alternative to the traditional signature. As a result, new concepts appeared that had a great resonance on the provisions of proof, identifying the signer and expressing his satisfaction with the content of the electronically signed editor, which was recognized by international model laws as well as comparative legislation (first), in addition to the need to define its multiple forms and basic functions (second).

1- International and national framing of the electronic signature

An electronic signature was defined for the first time by European Directive No. 93/1999 on Electronic Signatures issued by the Council on December 13, 1999,³ as: **“information or data in electronic form, linked to electronic data and used as a means of endorsement”**,⁴ but with reference to The UNCITRAL Model Law on Electronic Commerce did not define the electronic signature, but only referred to the signature functions stipulated in Article 07 in its paragraph 1, which approved the necessity of specifying the identity of the signer, and the approval of the document

¹ Executive Decree No. 16-142 of May 5, 2016, establishing the modalities for storing the electronically signed document, c, t, No. 28, dated May 8, 2016.

² Muhammad SAMI SHAWA, The Information Revolution and its Implications, Dar Al-Nahda Al-Arabiya, Cairo, 1998, p56.

³ Directive 1999/93/EC of the European Parliament and of the Council of December 13, 1999, on a community framework for electronic signatures J.O.C.E.L, 13/12/2020 of January 19, 2000.

⁴ Muhammad MUHAMMAD SADAT, op.cit, pp. 23-25.



editor on its content,¹ and according to the text of Article 02 of the UNCITRAL Model Law on Electronic Signatures, It defines the scope of the electronic signature.

The Algerian legislator also recognized the electronic signature through the text of Article 327, paragraph 2 of the Civil Code, as follows: "...the electronic signature is considered in accordance with the conditions mentioned in Article 323 bis 1 of the Civil Code².

Article 3 bis of Executive Decree No. 07-162 related to the exploitation system applicable to each type of auction of types of networks, including electrical wireless, and for various telecommunication services,³ defines the electronic signature as: "a data⁴ that results from the use of a work method that responds to the conditions specified in Articles 323 bis and 323 bis 1 of the Civil Code.

This definition was supported by the text of Article 2, Paragraph 1, of Law No. 15-04 specifying the general rules related to electronic signature and certification⁵ that an electronic signature is data⁶ in electronic form, attached or logically linked to other electronic data, used as a means of authentication..."

2- Multiple copies of the electronic signature

There are many different forms of an electronic signature, and this difference is due to the multiplicity of technology used in its creation, there is a technique that relies on a system of numbers or letters, and another that relies on signs, and some on the natural characteristics of the persons for whom the signature is intended to be created,⁷ and among the most important forms of signature used in electronic transactions are the following:

¹ Issa GHASSAN RABTI, Rules for Electronic Signature, House of Culture, Jordan, 2009, p50.

² Article 323 bis 1 state the following:

Evidence by book in electronic form is considered as evidence by writing on paper, provided that the identity of the person issuing it can be ascertained and that it is prepared and kept in conditions that ensure its safety.

³ Executive Decree No. 07-162 of May 30, 2007 amended and supplemented by Executive Decree No. 01-123 of May 9, 2001 relating to the exploitation regime applicable to each type of network, including wireless electric and to various telecommunications services, c, r, p 37 issued on June 7, 2007.

⁴ Data for the creation of an electronic signature, represented in the elements of the site such as the technical methods used by the site itself to create an electronic signature, see: Muhammad MUHAMMAD SADAT, op.cit, p28.

⁵ Law No. 15-04 of February 01, 2015, defining the general rules relating to electronic signature and authentication, c, r, p. 06, of February 10, 2015.

⁶ Article 02 Paragraph 3 of Law 15-04 mentioned above defines electronic signature creation data: "unique data, such as codes or private encryption keys used by the signatory to create the electronic signature".

⁷ Issa GHASSAN RABADI, op.cit, p56.



- **Biometric signature:** It is a contemporary form, and it depends on the eye, finger, or voice print, as it enjoys a high efficiency of trust and security in dealing, and therefore it is difficult to imitate it¹.
- **Digital signature:** It is one of the most important forms of the electronic signature, and it enjoys a high speed in working with it, and it is characterized by confidence and security in use and application that is based on converting the data of the electronic document into an unreadable format.
- **Electronic pen signature:** This signature is done by using an electronic pen that can write on the computer screen through a special program that is installed on its database and is in control of the whole process. ²Article 06 of Law No. 15-04 mentioned above stipulates several functions for the electronic signature, including documenting the identity of the signatory³ is identifying his identity and proving the acceptance of the site by the content of the electronic writing.

The second topic: Dedication of technical applications to the protection of electronic transactions

The protection of the means of proof in the electronic field is an imperative to ensure the safety of the electronic environment, whether in terms of the parties, or in terms of the content, and this is done after following some advanced technical and technological procedures aimed at fixing the content of the document to avoid change in it, for this reason it requires accuracy in what it bears in terms of signature and validity Its attribution to the one from whom it was issued, and it is the basis and strength of the electronic document and the secret of its existence, ⁴which is done through electronic certification by the certification authorities and how these transactions are documented by the providers of electronic certification services.⁵ Despite the different names and functions, they are consistent in one task, which is to secure and protect electronic transactions for customers (the first requirement), in addition to encryption and data hiding systems, as one of the most important technical applications in the field of legal security, and the most important means to achieve the guarantee of transactions that use digital means of communication in order to preserve on the private lives of dealers (second requirement).

¹ Saeed El-SAYED QANDIL, The Electronic Signature, New University House, Cairo, 2006, p24.

² Issa GHASSAN RABTI, op.cit, p86.

³ Article 02, paragraph 2 of Law No. 15/04 specifying the general rules related to electronic signature and certification, defined that the signatory is: "a natural person who possesses the data of creating the electronic signature and acts for his own account or for the account of the natural or legal person he represents."

⁴ Wassim Shafiq Al-HAJJAR, Electronic Evidence, Al-Halabi Human Rights Publications, Lebanon, 2011, p144.

⁵ Munir MAMDOUH Al-JANABIHI, Forging the Electronic Signature, Dar Al-Fikr Al-Arabi, Cairo, 2006, p54.



first requirement: electronic certification is a means of guaranteeing the safety of transactions

The electronic certification process is supervised by a third party, neutral and independent of the parties, in order to document the electronic transactions of persons to ensure the validity of the legal actions of the person assigned to the public service, who was named by several different names ¹ (Part One). As for the nature of the certification process, it is granted to a third person who has the authority to document the signature to verify from the person of the contracting party and the representative in the electronic notary ² who enjoys the powers of electronic certification (Section Two).

first section: the authorities authorized to have the authority of electronic certification

Online transactions are guaranteed through electronic certification processes carried out by specialized entities established by the electronic signature. Its mission is to secure the integrity of digital transactions by applying advanced technical rules and technology, in the age of globalization and speed, ³ which has become necessary due to its effective role by issuing an electronic certification certificate that confirms the identity of Dealers and their legal capacity (first) by the third party (second).

1- The electronic certification service provider

Article 05 of Law No. 15-04 specifying the general rules for electronic signature and certification provides for electronic certification bodies that are considered a public or private body or institution that issues electronic certificates. These certificates serve as an electronic record that secures the electronic signature ⁴ through the certification certificate, which is like an electronic identity card extracted to document the identity of the customers using this electronic signature. So, the phrase "electronic certification service provider" was used to distinguish it from traditional certification bodies, as it is that natural or legal person that issues electronic certificates and provides other services related to electronic signatures⁵ to secure the

¹ There were many designations according to the legislation of different countries:

- Providers of signature services in French legislation.
- Providers of electronic authentication services in Tunisian legislation.
- Observers of documentation services in the law of electronic transactions and commerce in the Emirate of Dubai.
- Authorities of authentication in the Egyptian electronic signature law.
- Authorities issuing certificates of authentication in the Jordanian Electronic Transactions Law.

Providers of electronic certification services in Algerian legislation.

² ABED FAYED Abdel-Fattah, Electronic writing in civil law between legal development and technical Security, New University House, Cairo, 2014, p71.

³ HAMOUDI Nasser, E-commerce is an introduction to a new global economy, the digital economy, Maarif Journal of the University Center in Bouira, issue 8, April 2017, pp190-204.

⁴ ABED FAYED Abdel Fattah, op.cit, p75.

⁵ Issa GHASSAN RABTI, op.cit, p182.



validity of the signer, the authoritativeness of his signature, and verify the identity of the signer.

Also, Article 3, Paragraph 10, of Decree 162/07 defined the electronic certification service provider with the same definition mentioned above, and the same for Article 02 of Law No. 09-04, which includes special rules for preventing and combating crimes related to information and communication technology¹.

2- The authorities of granting the electronic certification certificate

Article 02, Paragraph 11 of Law No. 15-04 specifying the general rules related to electronic signature and authentication, has been defined as: “A trusted third party is a legal person who grants electronic authentication certificates described, and may provide other services related to electronic authentication for the benefit of those involved in the government branch.”² It includes the national electronic certification³ authority represented in a set of tasks authorized to it⁴.

In addition to defining the government authority for electronic certification, which has the authority to follow up, monitor, and provide services for the benefit of those involved in the government branch,⁵ with the help of the economic authority for this electronic certification, specified under to Article 10 of Law No. 2000-03 specifying the general rules related to post and telecommunications,⁶ it is mandated to follow up and monitor the performer of electronic signature and certification services for the benefit of the public by submitting the electronic certificate specified in Executive Decree 07-162 mentioned above in Article 3 bis paragraph 8 described electronic⁷, The legislator added Article 2, paragraph 7 from the aforementioned Law 15-04 on the same definition with regard to the electronic certificate with the identification of what is also described⁸ in order to prove the electronic document with its source as well as to prove the electronic signature issued by the one to whom it is attributed, and this is according to the classification and the difference in the

¹ Law No. 09-04 of August 5, 2009, containing the special rules for the prevention and combating of crimes related to information and communication technology, C, R, Art 47 of August 16, 2009.

² Article 2, paragraph 13 of Law No. 15-04 stipulates that the intervenors are the public institutions and administrations and the bodies specified in the legislation, in addition to the independent national institutions and control authorities, and those involved in interbank exchanges, as well as every person belonging to the government branch entity.

³ Article 16 of the aforementioned Law 15-04 regarding the definition of the National Authority for Electronic Certification.

⁴ Article 18 of the same law, related to tasks.

⁵ Article 26 of Law No. 15/04 mentioned above.

⁶ Law No. 2000-03 of August 5, 2000 laying down the general rules relating to post and telecommunications, C, R, Art 48 of August 6, 2000.

⁷ Article 09 of the aforementioned Executive Decree No. 07-162.

⁸ Article 15 of the aforementioned Law No. 15-04.



subject of the electronic certification certificate according to the request and the purpose¹.

second section: the role of the certification certificate in proving electronic transactions

There are temporary electronic certificates that are used in the markets in a regular way, used to conclude certain types of contracts such as consumer loan contracts electronically in order to pay wages or to register insurance contracts² that are granted to natural persons without legal entities. As for the electronic certification certificate, it is issued by private parties represented in The economic authority for electronic certification, whose functions include the link between the website and the electronic signature, which is an electronic record consisting of electronic data and information created and processed by an electronic medium,³and accordingly different definitions have differed regarding this type of certificate and its names have multiplied by the multiplicity of legislation that regulated electronic commerce (First) or the electronic signature because of its effective role in concluding actions through electronic media, especially in the field of evidence (Second).

1- the need to rely on the electronic certification certificate

The electronic certification certificate is the subject of a digital signature issued by an accredited and licensed authority based on certain authentication procedures in which the identity of the person⁴ is determined for the purpose of preserving the confidentiality of data and information upon each use of this electronic signature⁵ by resorting to the public key contained in this certificate directly or by accessing the data bank of the authority Electronic certification via the Internet, where the electronic certification certificate is recognized in the INCTRL Model Law on Electronic Signatures 2001 as a data message or record through which the

¹ A personal certificate or authorization certificate: It links the identity of a physical person with its public key, enabling it to electronically sign and encrypt checks.

- Reseller certificate or canonical certificate: binds a reseller's identity to a public key that enables the security of all exchanges.

- Virtual Private Network Certificate: Who associates the identity of sites on the network with a public key to ensure the safety of exchanges.

- Software Certification: Enables you to sign a program to ensure protection against piracy risks.

- See: Issa GHASSAN RABTI, op.cit, p132.

² The European approach followed the principle of freedom to practice the activity of issuing electronic certification certificates, as anybody has the right to practice this activity without the need to obtain a prior license.

³ Article 9 of the Model Electronic Commerce Law issued by the United Nations Committee dealt with the fact that the electronic certification certificate is based on the existing relationship between users and certification service providers.

⁴ The identity of the person is represented in: the name of the owner of the certification certificate, its public key, the name of the certification authority that issued it, the validity period of the certificate, and the maximum value of the transactions in which it is used.

⁵ Article 41 of the aforementioned Law No. 14-04.



relationship between the signatory and the signature creation data is confirmed.¹ As for European Directive No. 93-1999, it defined it as the certificate that links the data of the examination of the electronic signature and a specific person to confirm his identity.² It is the same definition that the Algerian legislator appreciated in Article 03, Paragraph 08 of the aforementioned Executive Decree No. 07-162, as well as Article 02, Paragraph 07 of Law No. 15-04, and that all laws contrary to this law are considered repealed³.

2- The technical role of the electronic certification certificate

The electronic certification certificate plays an effective role by the official authorities to link the public key that you used to decrypt the encryption with a specific person, thus transforming the sender from a virtual person to an identified person, with confirmation that the signature has met all the required conditions and controls, as evidence that provides complete security for messages Mutual⁴ not only in terms of its content, but also in terms of the identity of its parties.

So, its role is represented in being the trusted mediator between the dealers in the electronic transactions and correspondence, by documenting this type of transactions and certifying the signatures of the stakeholders on them, for the sake of the integrity of the data and information contained in the electronic document⁵.

second requirement: developments in electronic encryption and preservation applications

The encryption system is one of the most advanced technologies to provide the security and safety of electronic documents, and it has become one of the systems to protect the confidentiality of electronic messages sent via the Internet, as well as mutual deals in the field of electronic commerce contracts. The electronic filing system, which is of great importance with regard to protecting electronic documents of all kinds, in conditions that guarantee their safety in order to retrieve them (section two).

first section: the novelty of the electronic encryption system

The encryption process is a set of means aimed at protecting the confidentiality of data and information, as only the sender and recipient can understand it, using special symbols known as the key⁶.

In the event that the user enters a site to engage in electronic commerce activities on the Internet, he is concerned with the request and the health of the person he addresses, and in the face of the procedures of penetration and misuse of the

¹ Article 02, Paragraph B of the UNCITRAL Model Law on Electronic Signatures 2000.

² Article 02 Paragraphs 09 and 10 of European Directive No. 93-1999.

³ Article 81 of Law No. 15-04 mentioned.

⁴ Article 63 of the same law.

⁵ Article 15 of the same law.

⁶ Abbas AL-ABOUDI, op.cit, p98.



names of others in criminal activities on a network, the placement of this encryption confirms the validity of the issuance of the information, and with this it developed until it reached techniques in The utmost importance (first) is governed by certain controls according to various legislations, through multimedia (second).

1- What is meant by the electronic encryption process

The electronic encryption system is called the focus process to express the encrypted message, and it is a means to maintain the security of information by means of computational techniques used to process and convert data and electronically readable information, ¹which makes the information unbreakable by anyone who does not have the appropriate decryption key, and ordinary information is converted into Incomprehensible encrypted information, using the appropriate key to decode the code ² using algorithms ³ that depend on the strength of the encryption and the extent of its effectiveness through the bit-estimated key⁴.

The Algerian legislator has only defined the private and public encryption keys through the text of Article 02, Paragraph 18 of the decision issued by the Post and Transport Control Authority on 11/06/2012 that specifies the protection of encryption keys, ⁵and that the control authority is responsible for maintaining the confidentiality of the encryption keys that it manages from by linking the encryption to the electronic signature and the electronic certification certificate ⁶.

2- Respecting the legal controls for electronic encryption

The legislator considered the attack on the data transmitted between the two parties to the contract via the Internet, an attack on the privacy of the two parties to the relationship,⁷For this reason, the legislator emphasized respect for the confidentiality of encrypted data and the need to use encryption as a means adopted by the law by the competent authorities to prove actions and considered it from electronic documents that result from electronic devices, although they are not public concept.

second section: the application of electronic preservation of documents

Electronic archiving is also called electronic archiving, which is part of the electronic document management system which includes a set of techniques that can access the saved or stored documents as quickly as possible and according to specific

¹ Issa GHASSAN RABADI, op.cit, p79.

² Code: It is a symbol with specific meanings used in wired and wireless communication devices to maintain the confidentiality of the messages sent through it, and whoever uses it is only those who obtain the decoding of this code.

³ Algorithms are defined as a specific set of ordered and computational steps that define approaches to solving a particular problem.

⁴ Byte: The unit of measurement used in computers to store information.

⁵ May GHASSAN RABADI, op.cit, p 95.

⁶ Munir MAMDOUH AL-JUHAINI, op.cit, p63.

⁷ TONY MICHEL Issa, op.cit, p197.



goals,¹ There is no doubt that saving electronic transactions seems to be of great importance as it enables detecting any modification or alteration in the data of electronic documents and electronic signatures, no matter how long it takes. In a way that guarantees its health and maintains its safety, and this is by preserving the electronic means that keep pace with the changing technology specifically for this purpose,² and from it, it is necessary to address its technical and legal concept (First) for all types of documents, whether produced in electronic form or those that have been converted into digitized documents in a technical manner that is appropriate³ to the conditions of electronic preservation in terms of communication and delivery of special information in a timely manner and in the fastest time (Second).

1- the definition of electronic preservation

In order for the electronic document to be considered complete evidence of evidence, it is necessary to be able to keep it and retrieve it at any time, provided that it preserves its original form in which it was created and agreed upon between the two parties to the contract⁴.

It was stipulated by the Algerian legislator in Article 01 of Executive Decree 16-142 that specifies the methods of saving the electronically signed document,⁵ in application of the provisions of Article 04 of Law No. 15-04 that specifies the general rules related to electronic signature and authentication, where the term preservation was defined in Article 02, Paragraph 4 of the decree. The aforementioned, and therefore electronic preservation preserves the electronic signature and electronic documents and places them on a fixed support so that they cannot be changed except by the custodian and are not subject to reproduction and are protected by a secret number⁶ from the time of the creation of the electronic writing⁷, independent and not subject to the control of the creator of this writing.

2- Terms of electronic storage

In order to save the electronic document from the moment of its creation until the moment of its ratification, this document must be preserved in its original form. It is agreed upon between the two parties to the relationship⁸ that the information contained in the electronic document must be safe without causing any change in the original form in which it was created.

¹ BANAT BERGER, Françoise, Electronic archive in France, the new context of administration, culture and recherche, n°103, oct., dec, 2004, p14.

² Alaa Hussein Al-TAMIMI, The Electronic Archive, How to Preserve the Electronic Document Over Time, a comparative study, Dar Al-Nahda Al-Arabiya, Cairo, p150.

³ Ibid, p152.

⁴ Article 08 of the UNSTROL Model Law.

⁵ Executive Decree No. 16-142 of May 5, 2016 specifying the modalities of saving the electronically signed document, C, R, Art 28, issued on May 8, 2016.

⁶ Alaa Hussein AL-TAMIMI, op.cit, p163.

⁷ BANAT BERGER, Françoise, op.cit, p 172.

⁸ Article 08 of the above-mentioned UNCITRAL Model Law.



As for the Algerian legislator, he dealt with electronic preservation in Article 323 bis 1 of Law No. 05-10 related to the Civil Code, stating that: **“Evidence is considered in writing in the electronic form... provided that it is prepared and preserved in conditions that guarantee its safety.”** Also, a text Article 04 of Law No. 15-04 specifying the general rules related to electronic signature and certification that: **“The electronically signed document is preserved in its original form”, provided that it contains the electronic document, its electronic signature, the signer’s electronic certification certificate, the list of electronic certificates, as well as the date of signing the document when appropriate¹.**

Conclusion:

The countries of the world have hastened to keep pace with digital information technology by enacting a set of legal texts and protective measures of a technical nature. Creating electronic services from an electronic signature and ratification, encryption and preservation to achieve the objectives of electronic commerce and this by facilitating transactions between suppliers and importers and protecting the rights of consumers in the easiest and fastest way, despite the penalties that resulted in many electronic disputes, and accordingly some recommendations were reached for effective protection for dealers in the field of electronic commerce, which has become a continuous and rapid development , of between it:

- The need to keep pace with the Algerian legislator by amending the legal system related to electronic evidence in light of the globalization system, the validity of the GATT agreement, and the international nature of electronic transactions.
- Creating awareness programs for customers from all sides in order to pay attention to the need to use legal and technical means of protection for electronic transactions, which are rapidly developing, and this is to ensure the safety of employing emerging technology.

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