

Effectiveness of Electronic Contracts in Civil Law: Project Management

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Abstract

Digitalization has profoundly transformed legal relationships, and electronic contracts have established themselves as a key tool in contemporary contracting. This study analyzes the legal effectiveness of electronic contracts in the field of civil law, with special emphasis on the regulatory, technological, and practical challenges faced by parties when formalizing agreements in digital environments. Through a documentary review and comparative analysis of recent international regulations and doctrines, opportunities that strengthen legal certainty are identified, as well as gaps that require regulatory attention. The results suggest that, although there are significant regulatory advances, challenges remain around authenticity, informed consent and proof of contract.

Keywords: *Electronic Contracts, Civil Law, Digital Signature, Legal Validity, Digital Transformation.*

Introduction

In recent years, digital transformation has radically changed the way in which individuals and companies relate to each other legally. This technological revolution has had a particular impact on the contractual sphere, where the traditional figure of the contract written on paper has been replaced – or complemented – by electronic instruments that allow agreements to be entered into without the need for physical presence, handwritten signatures or traditional document exchanges (Rodríguez & Marín, 2021). This dynamic poses substantial challenges to civil law, the legal branch responsible for regulating relations between individuals, as it requires adapting its centuries-old principles to the new digital realities.

The effectiveness of electronic contracts, understood as their ability to produce legal effects equivalent to those of traditional contracts, has been recognized in various national laws and international instruments, such as the UNCITRAL Model Law on Electronic Commerce. However, this normative acceptance has not been uniform or without obstacles. Legal divergences, lack of technological standardization, and gaps in proof, consent, and authentication generate legal uncertainty that can undermine user trust and limit the potential of this tool in cross-border contexts (Díaz & Salcedo, 2022).

Likewise, the widespread use of digital platforms for contracting – especially in areas such as e-commerce, financial services or the collaborative economy – has led to a reconfiguration of the contractual balance. The ease of entering into contracts online has streamlined processes and reduced transaction costs, but it has also increased the exposure of parties to risks associated with lack of understanding of contractual terms, identity theft, or manipulation of consent (González, 2021). These phenomena have revived the doctrinal debate on the autonomy of the will, the protection of the digital consumer and the need for complementary technological guarantees, such as advanced electronic signatures or biometric verification systems (Pérez & Torres, 2023).

In this context, it is essential to study the effectiveness of electronic contracts from a critical legal perspective, considering not only the regulatory aspects, but also the technological challenges and practical implications for legal operators. This article aims to analyze the current conditions that allow —or hinder— the validity and execution of these contracts, as well as the opportunities that open up for the strengthening of legal certainty in the digital age. To this end, a documentary approach is adopted, based on recent academic literature, comparative legislation and relevant case studies in civil law systems.

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Theoretical Framework

1. Concept and legal nature of electronic contracts

The electronic contract is defined as an agreement of wills entered into through electronic means, usually through digital platforms, emails or automated systems, without the need for simultaneous physical presence of the parties (Rodríguez & Marín, 2021). In legal terms, these contracts retain the essential elements of the traditional contract: consent, object and lawful cause, although their formalisation and execution take a different form mediated by information technologies (Díaz & Salcedo, 2022).

Civil law doctrine has debated whether electronic contracts constitute an autonomous category or if they simply represent a modality of the traditional contract. Most recent literature agrees that it is a change in the form, but not in the substance of the contract, as long as the principles of contractual freedom and good faith are respected (González, 2021).

2. Functional equivalence and the principle of technological neutrality

Two fundamental principles guide the validity of electronic contracts:

- **Functional equivalence:** It argues that electronic documents can fulfill the same legal functions as paper documents, as long as they offer similar guarantees of integrity, legibility, and conservation (López & Herrera, 2020).
- **Technological neutrality:** It indicates that regulations must be flexible and not privilege a specific type of technology over others, allowing technical evolution without the need for constant legal reform (Pérez & Torres, 2023).

These principles have been adopted by bodies such as UNCITRAL and reflected in national legislation, although their practical application varies significantly between countries.

3. Electronic signature: types, validity and limits

The electronic signature is an essential component to guarantee the identity and will of the parties to an electronic contract. There are three main types:

Signature Type	Characteristics	Legal validity	Common Examples
Simple electronic signature	Any data associated with a document (e.g., written name)	Limited validity, context-dependent	Click on "I agree", signature scan
Advanced electronic signature	Identifies the signer and detects modifications	High evidentiary validity	Signatures with digital certificate
Qualified electronic signature	Requires secure device and recognized certificate authority	It is equivalent to a legally handwritten signature	Electronic DNI, bank tokens

Source: Adapted from Pérez & Torres (2023); López & Herrera (2020)

The validity of these signatures depends on their ability to authenticate the signing party, ensure the integrity of the document, and enable traceability. The legislation of countries such as Spain, Chile, and Colombia recognizes the use of qualified signatures as legal equivalents to the handwritten signature, while other countries still do not adequately regulate their use (Díaz & Salcedo, 2022).

4. Consent in digital environments

Consent, as a constituent element of the contract, poses particular challenges in digital environments. In many cases, consent is given through "clicks", acceptance of predetermined terms or interaction with automated interfaces. This can generate doubts about the existence of a free and informed will, especially in adhesion contracts or with complex legal language (González, 2021).

In addition, the use of algorithms, artificial intelligence and automatic contracting has given rise to the concept of smart contracts, which execute clauses automatically using computer code. Although they offer efficiency advantages, they raise questions about the understanding, retraction, and responsibility of the parties (Pérez & Torres, 2023).

5. Evidentiary challenges in the civil field

One of the most debated aspects of electronic contracts is their probative value. In the event of a dispute, it is necessary to prove that the contract was validly concluded and that it has not been altered. However, the absence of physical documents, the multiplicity of digital formats, and the ease of manipulation represent a risk to legal certainty (López & Herrera, 2020).

Evidentiary challenges	Possible solutions
Proof of consent	Use of electronic logs and activity logs
Authenticity of the signature	Application of time stamps and digital certificates
Content Integrity	Blockchain storage or immutable systems
Difficulty of interpretation	Metadata generation and technology audits

Source: Authors' elaboration based on López & Herrera (2020) and González (2021)

6. Digital Consumer Protection

In digital environments, consumers are often in a situation of informational inferiority compared to suppliers who impose standardised conditions. The lack of personal supervision, speed in contracting, and the use of automatic mechanisms can lead to abusive contracts, flawed consents, and obscure clauses (González, 2021). For this reason, it has been proposed to strengthen the mechanisms of transparency, accessibility and reversibility of contracts concluded electronically.

Methodology

1. Research Approach

This research adopts a qualitative approach, focused on the legal and doctrinal interpretation of electronic contracts in the field of civil law. The qualitative approach is appropriate for exploring complex phenomena that require contextual analysis, normative understanding, and evaluation of doctrinal interpretations (Creswell & Poth, 2018).

In addition, an exploratory and descriptive strategy was used, given that the objective is to analyze the current challenges, opportunities and regulatory status of electronic contracts, without looking for a quantifiable causal correlation, but to understand the phenomenon from a critical perspective.

2. Methodological design

The research design is based on the documentary-analytical method, which consists of the systematic review of secondary sources: current legislation, legal doctrine, recent jurisprudence and peer-reviewed academic publications between 2019 and 2024. Documents in Spanish and English were considered, from countries with legal systems of civil tradition and specific comparisons with the Anglo-Saxon system.

Stages of the methodological design	Description
Literature review	Recent Scholarly Literature Search (2019-2024)
Regulatory review	Analysis of national and international civil legislation
Comparative analysis	Contrast between regulatory frameworks of different jurisdictions
Systematization and thematic codification	Identification of categories: validity, electronic signature, consent, etc.

Source: Authors' elaboration based on Creswell & Poth (2018)

3. Sources and inclusion criteria

The selected sources come from academic databases such as Scopus, Google Scholar, Dialnet and SSRN, as well as from official publications of international organizations such as UNCITRAL and the European Union. The following inclusion criteria were applied:

Criterion	Specification
Rango temporal	Publications between 2019 and 2024
Language	Spanish or English
Thematic relevance	Electronic contracts, civil law, digital signature, consent
Document Type	Scientific articles, theses, laws, legal and doctrinal reports
Peer Review	Priority to validated academic literature

Source: Own elaboration

4. Content analysis technique

The technique of legal content analysis was used, through which normative and doctrinal texts are interpreted to identify thematic patterns, legal gaps and divergences between legal systems. According to Bardin (2020), content analysis allows documents to be classified and interpreted in a structured way, useful for legal research where key concepts are not always explicit.

The coding of the texts was done manually, segmenting the data into five main categories:

- Validity and effectiveness of the electronic contract
- Types of electronic signatures
- Digital consent and autonomy of will
- Evidence and legal certainty
- Consumer protection in digital environments

5. Limitations of the study

Among the main limitations are:

- Lack of quantifiable empirical data, due to the legal approach.

- Unequal legislative coverage between countries, which makes it difficult to make a perfectly homogeneous comparison.
- Constant evolution of technology, which may make some findings obsolete in the short term.

However, the methodology adopted is considered to provide a solid basis for critical and comparative analysis of the effectiveness of electronic contracts in contemporary civil law.

Results

1. Widespread but uneven normative recognition

One of the most relevant findings is that most civil law systems have incorporated rules that recognize the validity of electronic contracts. However, the degree of legislative development varies significantly. Some countries have reformed their civil and commercial codes to include the figure of the electronic contract explicitly, while others depend on special laws or jurisprudential interpretations.

Country	Legal recognition of the electronic contract	Main regulatory framework
Spain	Yes, equated to the traditional contract	Law 34/2002 on Information Society Services
Mexico	Yes, recognised since 2003 and reinforced in recent reforms	Commercial Code, 2018 and 2021 reforms
Argentina	Yes, with reforms in the Civil and Commercial Code	Civil and Commercial Code of the Nation, art. 288
Colombia	Yes, although with evidentiary challenges	Law 527 of 1999 and recent jurisprudence
Peru	Partially subject to judicial interpretation	Digital Signatures and Certificates Act (2000)

Source: Authors' elaboration based on Díaz & Salcedo (2022); López & Herrera (2020)

In general terms, progress has been made in regulatory recognition, but legislative gaps still persist in terms of secure signature mechanisms, reliable notification, and uniform evidentiary treatment.

2. Legal effectiveness conditioned by the type of signature

The effectiveness of electronic contracts also depends on the type of signature used. In countries where a hierarchical framework of signatures has been established (simple, advanced, qualified), greater legal certainty is observed. The qualified electronic signature is the one that offers the greatest protection in litigation, while the simple ones have limited effectiveness.

Signature Type	Cases in which she was admitted to civil courts (2019–2023)	Remarks
Simple electronic signature	57 %	Requires additional proof of identity and consent
Advanced electronic signature	85 %	Safer; validated by certifying bodies
Qualified electronic signature	98 %	Legally equivalent to a handwritten signature in several countries

Source: Authors' elaboration based on Pérez & Torres (2023); Latin American Digital Law Observatory (2023)

The data indicate that the more robust the signature system, the greater the evidentiary admissibility and the degree of acceptance in court (Pérez & Torres, 2023).

3. *Technological inequality and digital divides*

Another important finding is the technological gap between users who access secure e-procurement tools and those who use more rudimentary methods. In rural areas or contexts of low digital literacy, the use of simple signatures is still the norm, which puts the legal certainty of the contract at risk.

According to ECLAC's Digital Inclusion Report (2023), only 62% of rural households in Latin America have access to reliable internet, and less than 25% have ever used a digital signature platform. This limits access to the benefits of e-contracting, especially for small businesses or vulnerable consumers.

4. *Evidentiary challenges in civil proceedings*

E-contract testing continues to be one of the most critical challenges. Although many countries recognize the validity of digital documents, the burden of proof commonly falls on the party challenging authenticity, which can lead to disadvantages if there are no digital seals, activity logs, or certificates of integrity (López & Herrera, 2020).

Type of digital proof	Judicial acceptance (LatAm and Spain)	Doctrinal assessment
Simple PDF documents	Stocking	Unreliability without validated signature
Digital Certificates (CA)	Loud	Very high validity if issued by trusted entities
Blockchain as proof of authorship	In development	Promising, but without clear regulation

Source: Authors' elaboration based on Rodríguez & Marín (2021); Ibero-American Legal Observatory (2023)

5. *Opportunities in crowdsourcing and cross-border contexts*

Despite the challenges, the study highlights important opportunities in the use of electronic contracts, especially in mass contracting (digital services, e-commerce, online banking) and cross-border operations. Platforms such as DocuSign, Adobe Sign, and blockchain-based Smart Contracts have facilitated faster, more secure, and auditable contractual processes (González, 2021).

For example, according to a report by the Latin American Association of Digital Law (2022), the use of electronic contracts in international transactions increased by 67% between 2020 and 2023, especially in sectors such as logistics, imports, and the provision of digital services.

Conclusions

The research carried out confirms that electronic contracts have ceased to be an exception and have become a common and, in many cases, dominant practice within the contemporary legal and commercial field. Its effectiveness in civil law has been progressively recognized by legal systems, especially in countries with regulatory frameworks that integrate the principles of functional equivalence and technological neutrality. However, the legal effectiveness of these contracts is not absolute, but is conditioned by several regulatory, technical and socio-economic factors.

Firstly, it is found that the legal validity of electronic contracts is guaranteed as long as the essential elements of consent, object and cause are met, and reliable authentication mechanisms such as advanced or qualified electronic signatures are used (Pérez & Torres, 2023). However, there are still regulatory asymmetries

between jurisdictions, which hinders cross-border acceptance and generates legal uncertainty in international environments (Díaz & Salcedo, 2022).

Second, research shows that the evidentiary effectiveness of electronic contracts is one of the main challenges today. The burden of proof, the integrity of the digital document, and the identification of the parties require complementary technological mechanisms (such as digital certificates, metadata, or blockchain) that are not always available or standardized (López & Herrera, 2020). Consequently, its success depends to a large extent on the local regulatory context and the technological capacity of users.

Third, the study shows that the digital divide constitutes a structural obstacle to an equitable implementation of electronic contracting. In rural sectors, vulnerable populations, and small businesses, the lack of reliable internet access and technical training limits both the use and understanding of these contracts, which puts contractual autonomy and the principle of equality before the law at risk (ECLAC, 2023; González, 2021). However, important opportunities are also identified. Electronic contracting allows greater operational efficiency, cost reduction, document traceability, and innovative possibilities through the use of smart contracts and automated verification platforms. These tools have the potential to strengthen legal certainty if they are accompanied by updated regulatory frameworks, technological interoperability, and adequate digital consumer protection mechanisms (Rodríguez & Marín, 2021).

In this regard, it is recommended that legislators and regulatory authorities:

- Promote regulatory reforms that explicitly integrate electronic contracts into civil codes, guaranteeing their legal equivalence with traditional contracts.
- Establish minimum standards for advanced and qualified electronic signatures, promoting their use through accredited certifiers.
- To promote legal digital literacy through educational programs aimed at judges, lawyers, consumers and entrepreneurs.
- Promote the development of public technological infrastructure, especially in marginalized areas, to democratize access to digital justice.

In conclusion, although electronic contracting is already a consolidated reality in many jurisdictions, its full effectiveness in civil law requires a comprehensive approach that combines technological innovation, legal certainty, and social equity. Only in this way can it consolidate itself as a reliable and accessible instrument for all actors in the contemporary legal system.

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