Contractual paradigms and technology: Reflections on smartcontract, contractual freedom, neutrality and autonomy in the face of technological disruption*

Paradigmas contractuales y tecnología: reflexiones del smartcontract, libertad contractual, neutralidad y autonomía ante la disrupción tecnológica

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Abstract

The purpose of this research is to analyze contractual paradigms in the face of emerging forms of algorithmic contract, as well as the influence of the principles of contractual freedom and technological neutrality on the expression of will, to outline current positions that explain the notion of contract in digital environments. Through a qualitative methodology and an explanatory dogmatic-legal approach, to study seeks to establish guidelines for the protection of the contractual rights of the parties, emphasizing the central role of contractual freedom and the autonomy of will in the context of algorithmic contracts. By analyzing specialized literature, the conceptual evolution of the smart or algorithmic contract is presented, and the most relevant epistemological positions are identified, with particular attention to the tension this figure generates within the contemporary legal framework.

Keywords: contract, blockchain, technology neutrality, freedom of contract, disruptive technology.

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Resumen

El propósito de la investigación es analizar los paradigmas contractuales frente a las nuevas formas del contrato algorítmico, así como la influencia de los principios de libertad contractual y neutralidad tecnológica en la expresión de la voluntad, con el fin de delinear posturas actuales que expliquen la noción del contrato en entornos digitales. A través de la metodología cualitativa y el enfoque dogmático-jurídico explicativo, se busca establecer lineamientos para la protección de los derechos contractuales de las partes, destacando el papel central de la libertad contractual y la autonomía de la voluntad en el contexto de los contratos algorítmicos. Mediante el análisis de bibliografía especializada, se expone la evolución conceptual del contrato inteligente o algorítmico, y se identifican las posturas epistemológicas más relevantes, prestando especial atención a la tensión que esta figura genera dentro del ordenamiento jurídico contemporáneo.

Keywords: contrato, blockchain, neutralidad tecnológica, libertad contractual, tecnología disruptiva.

1. Introducción

Technological innovations have become deeply embedded in people's daily lives, influencing most of their decisions. This growing influence has placed individuals sensitive and relevant data in digital environments—such as cloud services or IT ecosystems—which, in turn, are subject to constant legal scrutiny. A clear example of this is financial operations, now managed through technological platforms provided by banking institutions, allowing users to carry out transactions from their homes or offices using electronic devices. However, the final destination of the data provided to these platforms, as well as the legal implications that may arise from such contractual interactions, is often not precisely known.

During the 18th century and the early 19th century, society was primarily concentrated in rural areas, dedicated to the exploitation of natural resources to supply urban centers. With the emergence of industrial enterprises, the population began to concentrate in urban centers, which demanded new administrative and legal measures. These were based on the materiality of community expressions, and transactions—such as the supply of primary goods, commercialization of manufactured products, or the acquisition of resources, goods, and services—took place in physical spaces, through paper contracts and interpersonal relationships, generally requiring no conceptual efforts beyond individuals' understanding.

At the dawn of the 20th century, the overwhelming technological development driven by wartime conflicts and post-war inventions led the world into an almost hidden race for technological advancement. This technical and scientific evolution laid the foundation for the present reality, in which a significant portion of commercial activities is conducted in digital environments through the use of electronic resources. This scenario presents an increasing challenge for the legal field, as it requires lawyers, judges, judicial operators, and other actors involved in legal-economic relations to develop legal competencies related to the technological environment. Only by doing so will it be possible to ensure legal certainty in transactions carried out through digital means.

2. Statement of the Research Problem

Dogmatic legal knowledge has given way from its orthodox positions in favor of new approaches that recognize the impossibility of fully apprehending reality as a static object of study, thereby opening the door to alternative frameworks for addressing it. As a result, the normative formulas that regulate legal transactions are called for reinterpretation in light of technological advancement.

From the tridimensional approach to law—norm, value, and fact—this research proposes a theoretical framework aimed at reconstructing the axiomatic core of contracts in light of the use of digital technologies. Framed within qualitative research, the proposal is based on an emerging paradigm (Villabella, 2015) for contractual interpretation. To this end, recent sources on contractual typology (Etcheverry & Jaramillo, 2012, p. 42) have been selected to structure the dogmatic foundations (Nino, 1989) at the contractual level concerning technological disruption and neo-formalism (Bernal, 2016).

Traditionally, laws created or adopted by the legislator responded, to some extent, to society's demands. In this way, the object of legal knowledge—laws—and the subject abstracted from reality could reasonably support valid reasoning and interpretation. However, the emergence of information technologies and virtual reality has transformed the ways in which legal relationships are understood, regulated, and experienced, forcing the legal field to formulate new questions and methodologies. This research aims to contribute to building a solid bibliographic foundation on contracting in digital contexts, addressing the emerging boundaries between the social, legal, and technological spheres.

2.1 Why Is It Necessary to Understand the Object of Study in the Digital Society for Contractual and Commercial Scenarios?

The emergence of technology—regarded as a form of disruption (Bower & Christensen, 1995) and already incorporated into the legal field (Susskind, 2020)—has reignited debate around concepts that, until recently, were considered virtually unanimous within legal science. From the perspective of positivism, a school of thought that focused its object of study on legal norms, their production, application, and interpretation under an unyielding dogmatism, 19th-century positivists established dominance throughout the 19th century and the first half of the 20th century, shaping generations of jurists under a strictly legal-positivist vision. However, by the end of World War II, this paradigm began to be challenged by new schools of thought, leading to a reinterpretation of legal systems and the development of new frameworks and ways of thinking about the law (Rodríguez & Ruiz, 2015).

Although natural objects maintain their characteristics over time, this is not the case with jurisprudence or law. It is essential to consider that, when the legal community finally manages to define a concept after an extensive process, the object of study may have changed substantially. This limitation of legal knowledge is due to hermeneutical pre-understanding, which arises from having preliminary information, prejudices, or expectations about the subjects. Without prior information, it is impossible to understand the phenomena. However, an erroneous pre-understanding will distort the final knowledge or limit, in ontological terms of law, the results and analysis of legal realities.

In this context, global reality and technological innovations in the market and society impose new legal and political challenges on legislators. Likewise, jurisprudence takes on roles that contribute to this transformation of the object of study. Therefore, it is not possible to make universal generalizations when attempting to characterize the theoretical activity carried out by legal scholars (Guachetá & Torres, 2020).

From the logical philosophy of science, the object of study has focused on the formal principles of knowledge—that is, on the most general forms and laws of human thought. Meanwhile, epistemology has concentrated on the general material assumptions of scientific knowledge. Both approaches share an interest in the objective significance of thought in relation to objects, questioning the truthfulness of thought in its correspondence with those objects (Hessen, 2009).

From the perspective of legal science, whose object of study is human facts and voluntary acts insofar as they can be judged according to criteria of justice, it is observed that, in the field of private law, voluntarily undertaken patrimonial relations have made it possible to construct general and abstract knowledge of free human acts through their observation. This process has led to the formation of a broad set of concepts that allow for determining what constitutes a just or proper act within a given relationship or situation governed by the law—that is, the judgment concerning the justice of legal acts (Adame, 2022).

Thus, legal science, understood as an abstract concept, presupposes the existence of scientific objectivities constructed to facilitate access to legal knowledge and phenomenology, independent of individual subjects, thereby obscuring the condition of the act itself. In contrast, the cybernetic or cyber-legal methodology, as a new form of knowledge, proposes relinquishing these a priori constructed objectivities in order to integrate content based on results that are sensitive to the context of action. In other words, it advocates moving from the absolutist stance—characteristic of legal positivism—toward a productive and reflective relativism as an alternative to computational processes. Cybernetic research, with its specific object of study, can thus be positioned as a means of accessing the understanding of action and its consequences. In this regard, a possible convergence emerges between pure science and applied science (Ghersi, 2013).

In this regard, García (2014) argues that the phenomena of social and legal interrelation, together with the logic and techniques of legal formalization and the understanding of how computers operate, make it possible to structure a logical-formal mode of thought aimed at applying electronic systems to legal production—a development known as ius-cybernetics (Falcón, 1992; Losano, 2006). Building on Thomas Kuhn's notion of paradigm, Von Foerster (2003) stated that a paradigm shift occurs when the prevailing model begins to fail or is called into question, whether due to inconsistencies or contradictions in the use of a particular term within a specific culture or in the use of specialized language.

It must not be overlooked that modern civil law, from a methodological perspective, is a product of legal positivism, which emerged as a reaction against the excesses and abstract frameworks of rationalist natural law. However, today, neither the

dogmatic method nor the teleological method proves sufficient to provide genuine answers to the contemporary challenges of the legal phenomenon. In this context, the adoption of an integralist methodology (Villabella, 2015, p. 923; Recaséns, 2004) may offer suitable paths for assessing, from both speculative and practical dimensions, the diverse perspectives of law. This approach makes it possible to adopt pluralist positions that coherently harmonize normative and conceptual factors with the social context to which the legal canon is addressed (Llamas, 2009).

In modern life, technological, economic, and even social challenges have emerged, where factors such as the market and globalization are distancing both the law and the State from the reach of the individual. This situation reflects a postmodern reality in the effort to recognize the nature of things beyond ideological frameworks, a perspective that can be understood as economic realism (de Trazegnies Granda, 2018).

The transformations of private law, in this context, have taken place outside the framework of codifications. The alterations and reformulations of its dogmas and principles have been accompanied by profound changes in the socioeconomic structure. As Rodríguez and López (2004) point out, "the decline of liberal economic organization was followed by the deconstruction of the notion of the code as a closed system capable of containing within itself the solution to legal problems".

This new understanding of global technological changes, along with social, economic, legal, and even political transformations, fosters a macro-systemic vision in constant evolution (Ramírez, 2012). In this context, business and contractual settings influenced by technology call for careful consideration of the foundations of technological change and how it can be incorporated into the contractual sphere.

The transformations of contemporary law show that its source of legal production no longer resides exclusively in individual development, as in the classical conception, nor solely in the State's interventionist role characteristic of the modern era. Today, legal production extends to both organized and unorganized sectors, where the State acts as a legal coordinator and regulator. This role enables it to guarantee free competition within the market economy, freedom of consumption, economic freedom, and freedom of contract, while also ensuring social development. Consequently, contemporary law is not only presented as a diverse, complex, and flexible system, but also directs its focus toward expansion, improvement, and adaptation to meet social needs and provide effective solutions to conflicts among members of society (Lafont, 2016).

Thus, when analyzing the relationship between technology and law—particularly in the contractual sphere—it becomes essential to revisit the concepts of declaration and autonomy of will within the framework of classical dogmatic positivism, where the notion of formality prevails. In the current context, it is necessary to subject these concepts to new streams of knowledge that address the effects of technological transformation. This requires considering changes in electronic commerce and the legal perspective, especially regarding the use of electronic means. In this way, it becomes possible to reinterpret the requirements that constitute a binding agreement between the parties, both in its formation and execution, recognizing its legal validity and enforceability in digital environments.

3. Hypotheses in the face of new realities

The accelerated technological development of recent decades, rapidly integrated into commercial activities—particularly in transactions involving goods and services through electronic systems—poses questions regarding the applicable legal framework when considering circumstances that may present plural characteristics in their management. In such cases, conventional legal rules, traditionally accepted by society, together with the use of technology, information societies, and digitalization, face the challenge of being harmonized. The goal is for both legal norms and technological tools to offer coherent and plausible outcomes that benefit society as a whole.

It must be acknowledged that the discussion surrounding technology presents ambiguities, which become evident when contrasting the vast amount of available information. On one hand, there are perspectives that view technology as an agent of historical change; on the other, as a phenomenon or system of oppression and control exercised by those who have the means to finance its research and development (Hernández, 2018).

In this regard, Lagerspetz (1999) clearly distinguishes two ways in which a rule can exist: based on mutual belief or grounded in another rule. This distinction can be understood as a general differentiation between conventional and institutional entities. If only a small part of the community believes in the existence of a particular entity or rule, it does not exist as a conventional canon but solely as an institutional entity. If legal authorities believe in the existence of a specific rule or legal principle, while the majority of legal subjects do not yet recognize its existence, it can still be said that the rule exists—even if its existence is not yet generally acknowledged.

In this sense, Lagerspetz —as cited by Peczenik and Hage (1999)—argues that conventional facts, such as law, depend on the beliefs and actions of all relevant individuals; that is, law is regarded as such because everyone is convinced that it is.

4. Results and Discussion

4.1. A Reinterpretation of Contract Form and Its Externalization in the World: Relevant Aspects in the Commercial Context

In the field of commercial law and in light of technological advancements, Osorio (2018) notes that the mutability of this branch of law largely responds to the behavior of the merchants themselves. As the author states: “it is the commercial conduct of merchants that significantly influences its regulations.” In this way, the normative creation of commercial law is reflected in the relevance of facts, and thus, the reality of merchants’ actions and their formulation into legal judgments become sources of regulation.

Contractual scenarios in the digital society have significantly migrated to the Internet, enabling the acquisition of goods and services and making intangibility evident (Silva et al., 2012).

This transformation must be complemented by the notion of juridical act developed within the German and Spanish legal systems, understood as an abstract category that seeks to encompass all voluntary human acts involving a

declaration of intent aimed at producing a legal effect. This notion, together with that of legal act, recognizes the dichotomy whereby the law attributes specific effects both to the legal act itself and to declarations of intent made by multiple individuals. Such a notion has acquired a central role within the legal systems of continental Europe. However, this conceptual construction is not accepted within the common law system or the French legal system, where the concept of contract is fundamental (Vaquer, 2017).

Although a mere declaration of intent was once sufficient to create binding obligations, over time, formal requirements emerged to strengthen the agreement between the parties, leading to the consolidation of the written form. For centuries, contract theory aimed to support and give full legal force to the declaration of intent by individuals considered to be physically present, reflecting the notion of their physical presence. In such contexts, parties would accept or reject contractual proposals in real time, within the same moment and setting.

It must not be overlooked that the traditional formula of legal positivism for determining the moment of formation and conclusion of a contract was understood through agreements between parties physically present, where the relevant moments coincided. However, in cases involving absent parties, it was up to the legislator to resolve uncertainties regarding the exact moment the contract was concluded. In such situations, legal theory was set aside, as general rules or statutory law did not provide a clear answer, leaving the decision to the competent authority responsible for applying the law.

Among the solutions established within the legal order, it was prescribed that, in cases where the parties are not present in the same place at the moment of declaring their intent, it would be necessary to register the text of the agreement in a designated registry for the convention to have binding force (Kelsen, 2007).

Therefore, the need to trace the course of the will of contracting parties imposed the challenge of devising a secure, permanent, and unalterable form of what had been agreed upon, ensuring its full enforcement. Historically, this concern was addressed through the prominent use of paper, understood as a tangible medium that provided support to the manifestation of intent. Specifically, the necessity of giving physical form to the agreement of wills led legal scholars to propose forms capable of representing such declarations of intent. In this way, the form of the contract became the subject of investigation within the deepest legal theories of private law—an area that today can be reconsidered in light of contemporary developments.

However, whether a contract has been formed or its formation is denied should not be regarded as entirely distinct situations, as both share a notable common element: the remedy of legal protection in favor of the holder of a protectable interest. This protection can be distinguished as either protection through binding effect or protection through compensation, as proposed by Roppo (2005). Both forms of protection constitute the source of normative existence and contractual safeguarding.

In modern law, the fundamental principle in contract formation is to facilitate the conclusion of the contract through a sufficient agreement, whereby

the parties have established enough terms to allow its execution. What is essential in this process is the parties' intention to be bound by a contract, thereby promoting its conclusion to the fullest extent (Vaquer, 2017).

The use of information technology and telematics has made it possible to dispense with the traditional formalities and mechanisms previously employed in contract formation. In this context, electronic contracting has become a streamlined method for exchanging information or documents, as well as for establishing time-related conditions, reducing spatial limitations. Nevertheless, the fundamental concept of the contract does not change, as the agreement still arises from the mutual consent of the parties, just like any other contract. What does change is the means of communication or dialogue between the contracting parties, which is now conducted through electronic or digital channels (Medina, 2013).

A. Commerce and New Forms of Manifestation of Will in the Digital Society

Electronic commerce emerged with the incorporation of the Internet into business and social activities, generating a significant impact on how relationships between individuals adapt in contemporary society (Rincón, 2017). This new environment facilitated the rise of electronic commerce as a framework suited to digital dynamics. However, the next generation of electronic commerce will significantly reduce the margins of freedom in contracting, shifting the debate toward algorithmically supported digital agents, which, by managing transactions, will influence consumer preferences and may even conclude or execute transactions autonomously (Flórez, 2022).

From a regulatory standpoint, current legislation contemplates various forms of contracting, including contracts entered into through electronic or telematic means, as well as those concluded remotely or outside the commercial establishment (Roppo, 2005, p. 70). The technological metamorphoses affecting both society and institutional organization—as a result of what has been termed the technological or information revolution—have given rise to a succession of new proposals, both technological and legal. These developments are expanding rapidly with broad acceptance, while also triggering concerns within both national and international regulatory frameworks (Walteros-Salazar, 2021).

Innovation in contract law is demanding reconciliations and renewals across various areas in order to adapt to the challenges posed by the digital revolution. At the international level, contracts have undergone a progressive transformation since the Vienna Convention, considered a first phase of standardization. Today, the focus of legal debate centers on electronic commerce and the perfection of contracts through electronic communication, within the framework of what has been referred to as the Internet of Things (Shulze, 2016, p. 19).

In this context, the notion of the smart contract emerges, associated with the figure of the algorithmic contract (Rengifo, 2019), conceived as a special form of contract within the digital environment. This modality impacts the business world, raising questions regarding both contract formation and the performance of contractual obligations. It establishes interpretive frameworks aimed at properly assessing these contractual forms within judicial and arbitral proceedings.

It must not be overlooked that, in the current technological landscape, data generated and stored through electronic media and machine learning software can lead to actions being carried out without human supervision. This occurs specifically due to the storage of information about the individual performing the actions, allowing parameters to be determined or predicted through algorithmic configuration. As a result, the machine is capable of producing similar outcomes autonomously (Floréz, 2022).

An initial approach to addressing the algorithmic contract emerges, one that acknowledges technological progress and its deployment in everyday life, which can facilitate and accelerate the conclusion of large-scale procedures but raises doubts regarding its infallibility (Arce, 2022, p. 75). Although electronic commerce offers significant advantages for users, it also presents challenges for society. For this reason, the infrastructure supporting the network—including increased bandwidth, new servers, and technologies such as ISDN (Integrated Services Digital Network), which enables the digital transmission of data, images, voice, video, and text—makes legal certainty in transactions a cornerstone for ensuring the validity of agreements between users and businesses operating in the digital world.

However, some sectors of legal doctrine argue that the so-called smart contract does not, in the strict sense, constitute a contract, but rather an automated mechanism for executing computer instructions. While this mechanism is indeed used for contract execution, it operates primarily within *Distributed Ledger Technology* (DLT) environments, although it could also be applied in other technological settings (Ibáñez, 2018). Transactions conducted through DLT enable the registration of payment operations with low latency, avoiding the double-spending problem, which represents an advantage over traditional physical transactions by reducing intermediation costs (Barroilhet, 2022).

Another definition relevant to this purpose is offered by Feliu (2018), who, when referring to the concept of *contrato inteligente* (in Spanish), highlights the common understanding of *smart contract* as "a set of computer protocols, processed and executed autonomously by electronic devices, without the need for human intervention" (p. 2). Accordingly, it can be initially posited that the verification of contractual conditions—such as the agreed-upon performance—would not require intermediaries or, at the very least, would not necessitate human intervention in the execution and fulfillment of the programmed obligations. In addition, the replacement of human intervention with a set of protocols would result in the operational automation of obligations, that is, in the automatic execution of transactional contractual performances.

The idea of a self-executing contract—whose performance would be inexorable, automatic, and irreversible—is based on the trust that judicial intervention will not be necessary, aiming to guarantee the security of the legal transaction. In this way, a mechanism would be triggered that operates automatically, backed by a centralized legal system that ultimately ensures the enforceability of contracts in the digital environment. The primary objective of eliminating human intervention in contracts ex post is to reduce transaction costs, making contracting and contractual contingencies more affordable. In this manner, human conduct and legal rules are displaced, allowing contracts to be concluded without the mediation of a central organization (Coderch, 2018).

In this new paradigm, the declaration of intent is not an isolated act; it emerges within the legal framework of a legal system, with the declaration or agreement of wills of the involved parties serving as the foundation of the juridical act. These parties seek to achieve an outcome that the law deems worthy of protection and enforcement (Jiménez, 2015). Consequently, from the perspective of the theory of juridical acts, it is entirely feasible to apply the electronic environment to regulate the occurrences and legal effects of declarations of intent, in a broad sense, provided that such manifestations are recognizable, verifiable, and comply with the principles of the prevailing legal system.

B. The Current Landscape of Solemnity: The Re-foundation of Formalism

The theories that underpin the juridical act and its formation are traditionally based on the theory of will and the theory of declaration. Both schools of thought have served as the foundation for the validity and effectiveness of contracts and have been incorporated into Latin American legal systems.

In the late 19th and early 20th centuries, the backbone of the contract was built upon the declaration of individual emancipation, portraying the individual as powerful and self-sufficient in accordance with individualism and the guarantee of equality before the law. However, this notion gradually shifted toward a form of social freedom aimed at achieving the common good, grounded in contractual solidarism (Bernal, 2007). This reinterpretation of the contract, more closely aligned with social reality, challenged the limits of contractual freedom when it resulted in the imposition of power or authority by the stronger party over the weaker. It demanded more equitable responses from the theory of autonomy of will (Acosta & Gual, 2018).

Now, the insignia of the declaration of will — understood as the means through which the internal element of the legal transaction— is externalized, allowing it to be recognized by the other associates, depending on the legal transaction, is precisely the vehicle that, in addition to containing the volitional element, transports from the interior of people to the exterior what is required by the agent who promotes their declaration (Jaramillo, 2014).

To this conception is added the influence of individualist liberalism, which advocated for the subjective exercise of rights with no other limitations than ensuring that other members of the community could enjoy the same rights. This idea aligns with Emmanuel Kant's thesis, dominated by an individual-centered criterion, whereby autonomy of will becomes a pillar of economic individualism, as reflected in the Napoleonic Code and in other legal systems inspired by or adopted based on that same legal framework. Therefore, in this context, contractual freedom is the rule, recognizing that individual will is autonomous, except for the inseparable limits established by law (Castrillón & Luna, 2017).

Thus, the will of the legislator, expressed through a set of rules that in private law take the form of mandatory, default, and supplementary provisions, also includes non-coercive norms. The application of such norms is not imperative but rather subsidiary, generally inspired by the aim of private utility and, indirectly or mediately, by outcomes of general interest that impose specific behaviors, restrictions, or conditions on

individuals. This ensures that the legal system grants validity and effectiveness to the declaration of intent made by the parties (Ferrer, 2011).

In this context, Roppo (2005, p.20) highlights the growing importance of special regulations as a source within the contractual sphere, which has given rise to two parallel phenomena: on the one hand, decodification, meaning the emergence of extra-codex microsystems that give new prominence to specific types of contracts to the detriment of the general contract; and, on the other hand, efforts toward significant recodification or restructuring aimed at recovering the figure and the regulatory framework of the contract.

Although the norms or codes in a legal system are the product of the process through which the provisions and wills of the legislator emanate, it is no less evident that legal provisions are tied to specific time periods, special social circumstances that at the time demand responses to guarantee legal certainty. As López (2023, pp.178-179) argues, extrapolating the notions referring to the concept of disruption and referring to disruptive norms, modifications or ruptures in the normative system should not always be of a negative nature, that is, the disruptive nature of normativity does not seek to establish positive and negative norms, but rather the source of normative production that expands and blurs in legal systems, and the effect of alteration in the system must be evaluated based on the usefulness of the disruptive normative typology.

Finally, the conditions created by innovation and technological development present both legislators and the legislative process concerning individuals' acts and juridical transactions with scenarios for debate, ensuring that the use of technology in private commercial activities is not hindered.

C. Contractual Freedom in the Use of Technologies

In the Colombian legal system, contractual freedom is established as a fundamental principle, expressly enshrined in Article 1602 of the Civil Code, which states that "every contract lawfully entered into by the parties constitutes a private law," becoming invalid either by mutual agreement or through legal provisions. This is complemented by Article 15 of the same legal framework, which allows the parties to waive the rights granted to them by law, provided it concerns their individual interest (Supreme Court of Justice, 1936).

Throughout the 20th and 21st centuries, numerous legal systems explicitly reflect the legislative intent to preserve the general framework of private contracting established in separate legal bodies. These frameworks stand as a clear acknowledgment of private autonomy and freedom of contractual arrangement, restricted only in those cases expressly authorized by the legislator. Thus, the general rule *Regulae inhaerendum est, donec de fallentia constet* is upheld as a cornerstone of contractual practice (Supreme Court of Justice, 2007).

The concepts of private autonomy and contractual freedom converge in the formation of obligational relationships, such that the dissection of the term *nomie* refers to the binding nature between the contracting parties, comparable to

subjection to the law, while the term *auto* conveys the self-imposed nature of that binding effect—meaning it is freely established. Therefore, once concluded, the legal relationship arising from the contract expresses the positively exercised contractual freedom within the economic institution of stipulation. This freedom of choice in contract formation is expressed as *positive freedom* —in the Kantian sense— recognized and protected by the law, whereby civil or commercial legal provisions mutually guarantee and safeguard the rights and obligations of the contracting parties (Schapp, 1998).

In the field of commercial law, the principle of *consensualism* is fundamental—not only because of the origins of this branch of law but also due to the pursuit of efficiency in economic relations within commercial transactions, where simplicity and speed are essential to meet immediate needs and bring goods closer to consumers. From a *neo-formalist* perspective, the effectiveness of the juridical act, both in its evidentiary function and as a protection mechanism, reflects an approach aimed at making written forms more flexible and facilitating their verification (Bernal, 2016).

Contemporary contract law is defined by characteristics and principles such as *effectiveness*, understood as the contract's capacity to produce its intended effects in accordance with the will of the parties. Within this framework, contractual forms are not ends in themselves but rather means or criteria that enable contracts to be fulfilled and allow for the realization of the specific features present in each contractual expression that is entered into (Lafont, 2016).

4.2 The Smart Contract in Light of Disruptive and Contractual Technological Scenarios and the Principle of Neutrality

Worldwide, numerous online transactions are carried out through electronic means, ranging from the payment of taxes and services to the purchase of real estate, goods, and services. Legislators are working to establish legal frameworks that guarantee legal certainty in digital transactions, benefiting both businesses and consumers. In the contractual sphere, where the parties' obligations and the expectation of performance are based on autonomy of will and good faith, human intervention is essential for the formation, execution, and interpretation of obligations. However, the development of the smart contract aims to minimize human intervention as much as possible (Valderrama, 2023).

The world today differs significantly from the one that served as the foundation for many existing legal systems. The passage of time influences rights, affects individuals, and also has an impact on laws, procedural systems, and evidentiary mechanisms, making renewals and adjustments necessary. This requires constant updates. New facts are externalized in different ways, leaving traces; science advances at an accelerated pace, and civil and commercial relationships multiply while simultaneously becoming less formal. Within this framework, evidentiary law—whose purpose is to prove facts under discussion before the judge—cannot fall behind, under the risk of generating legal uncertainty for citizens (Canosa, 2001).

With regard to smart contracts, their programming is based on cryptographic protocols that

integrate computer files relationally through identifiers—alphanumeric codes—generated by algorithms identically across multiple computers. To this is added a subjective element: the parties involved. When a sufficient number of users participate in the system, it allows for perfect, irreversible, and synchronous identification of the content embedded in those files (Ibáñez, 2018).

In the *e-contracting* phase, the data message tangibly represents the intention of the parties in an electronic contract and, therefore, in a smart contract. However, with *blockchain* technology, the data message—such as emails or instant messaging—evolves through the integration of cryptography (hashing), authenticity (identification keys required to access and use the system), and the chaining of blocks of information. This has resulted in higher levels of reliability, integrity, security, and availability. With the automation of data exchange between information systems on the Internet, it influences the general theory of contract and business practice, currently enabling the automated execution of smart contracts (Peña, 2018).

The increasing capacity of both network operators and service providers to offer Internet access has reignited the need to protect the open and neutral nature of the network, ensuring non-discrimination in the treatment of data packets, regardless of their origin or destination. The objective is to guarantee fast and equitable access for all users, providers, and consumers of the network, making rapid access under optimal conditions possible (De Miguel Asensio, 2022).

Technological neutrality within a legal system that regulates electronic commerce implies having the capacity and suitability to incorporate the technology available at the time of its formulation, establishing rules that can adapt to future technologies without requiring profound modifications. This aims to protect the interests of the broader community and to prevent the creation of technological monopolies. Furthermore, it considers coherence with technical development, taking into account future technological advancements (Cullell, 2010; Torres, 2011).

Another perspective that allows this scenario to be problematized emerges when considering technological change within legal frameworks. Recognizing only one or certain specific technologies would render the law outdated, making it essential for the legal norm to be reliable in ensuring the integrity of data messages and consistent with the state of the art at the time of its application (Remolina, 2006).

While from a dogmatic perspective, the notion of neutrality in the legal system can and should be reflected upon, for normative legal positivism it is desirable that legislation be rooted in socially unidentifiable, accessible, and uncontroversial origins, aiming to uphold formal and institutional characteristics. The particular relationship between neutrality and the state corresponds to stability and alignment with societal expectations (Celano, 2012).

As a principle, technological neutrality seeks to guarantee equitable access for all users, content, and information, as well as equal treatment in network traffic. This leads to the conclusion that undermining neutrality exposes vulnerable users to high risks of discrimination (Arce, 2022).

For example, Chile has the oldest network neutrality law, established on August 18, 2010, through Law 20.453, which allowed zero-rating tariffs starting in 2014. Additionally, Law 18.168, known as the General Telecommunications Law, explicitly prohibits in Article 24H any Participatory Action Research (PAR) practices that arbitrarily differentiate content, applications, or services based on their origin or ownership. Similarly, Brazil had been debating network neutrality since the late 2000s, and by the end of 2013, the political process accelerated due to foreign surveillance of telecommunications and Internet traffic, which led to the enactment of Law 12/965, known as the Marco Civil da Internet (Marsden, 2017).

The notion of neutrality is related to the Internet, understood as a platform that enables access to services, content, and applications. In this context, certain actors or Internet intermediaries can reach the final recipient, who is located at the edge of the network. These actors may influence terms and conditions through the technological capabilities of Internet access providers, conditioning access or reciprocal communication over the Internet between end users and providers of content, services, and applications (Barata, 2019).

In the Colombian case, neutrality is circumscribed to the use of the electromagnetic spectrum, technologies, and service providers in accordance with legal regulation. The national legal system is up to date from a broad legal perspective; however, it is unquestionable that in various areas—whether judicial, administrative, personal, or economic within Colombian society—the use of technologies is limited by technical, logistical, and legislative factors.

Access speed and the availability of services and content remain a challenge, as public authorities do not possess the technical capacity to directly monitor and oversee what occurs on the Internet. Regarding self-regulation, from an economic and technological standpoint, the Internet could regulate itself through agreements and a system of checks and balances, with a value chain through which significant economic value circulates via numerous intermediaries (Barata, 2012b).

Regarding technological neutrality, its considerations involve several actors, such as Internet service providers and companies that offer services through the network, including major technology industries like Facebook and Google. This situation compels national regulators to give it the importance it deserves for national progress in this area and to adopt the necessary positions so that the debate on technology, its application, and use aligns with the international agenda. This has become particularly relevant following the introduction and rapid approval of Free Basics, an initiative aimed at offering specific content without affecting the contracted data limit (Universidad Externado de Colombia, 2017).

5. By way of conclusions

The emergence of technology in the business sphere has challenged certain notions that legal systems previously safeguarded without significant effort, such as the validity and enforceability of solemn contracts. In contexts where contractual freedom operated smoothly, the mere external expression of intent or any conclusive conduct was protected and upheld by the legal system.

Today, the use of programming language codes, the decentralization of contractual relationships, and even the involvement of intelligent agents—external to the contracting parties—with the intended aim of eliminating human participation in the interpretation and performance of contracts, introduce new frontiers in contractual relations. While these developments may initially appear convincing and effective, they simultaneously require the establishment of judicial, regulatory, or conventional mechanisms capable of addressing and overcoming future contingencies.

In this regard, it is not advisable to conceive of the smart contract as a new object within the contractual world, since its characteristics represent merely a form of expression of intent, without yet constituting a new type of contract or, at least, a novel form of expressing will. To the traditional declarative and volitional propositions in the business world, there is now the added element of the intangibility or dematerialization of the document as the contract's supporting medium. Therefore, the form of the contract becomes the matter of interest both for the parties involved and for the legislator in its regulation.

Imposing additional legal requirements for the validity of juridical acts in virtual environments by the legislator could negatively impact business dynamism or sacrifice efficiency in favor of excessive legal protection. The challenge lies in finding a balance that preserves legal certainty without hindering technological innovation, particularly in digital contractual relationships.

It is therefore expected that regulations operate from at least two perspectives. On one hand, public regulation should, while recognizing its technical, structural, and logistical limitations, avoid the mistake of overregulating in a way that stifles technological initiatives in the contractual field. On the other hand, self-regulation within the private sphere should allow the very actors, operators, and users of the network to have their actions recognized, while simultaneously ensuring that they find protection within the legal system.

This particular synchrony between the public and private spheres, the use of technologies in value creation, and the legal certainty of users would be achieved through an adjustment in the approach developed by academia and judicial operators regarding the evidentiary elements presented before them. Such an approach should not be constrained by technical or ideological limitations and should be capable of addressing new realities, recognizing both certainty and adherence to the legal system while fostering initiatives in the application of technologies.

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