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Original Article

Overview of Smart Contract Adoption in South America: Legal infrastructure, Projects and Initiatives

Panorama da adoção de Smart Contracts na América do Sul: Infraestrutura legal, projetos e iniciativas

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ABSTRACT

Objective: This article aims to analyze the adoption stage of smart contracts in the most representative South American countries, considering legal, institutional, technological aspects and ongoing practical initiatives.

Methodology: The study adopts a qualitative approach, based on documentary and bibliographic research. Legislation, court decisions, bills, governmental and business initiatives in seven South American countries were examined. Data collection involved official primary sources and a structured digital survey.

Results: The findings show that all analyzed countries legally recognize electronic signatures, providing a favorable environment for implementing smart contracts, even in the absence of specific legislation. Brazil stands out with bills under discussion. Colombia, Peru, and Paraguay present significant pilot initiatives in both public and private sectors.

Contributions: The study proposes a comparative analytical model that synthesizes the maturity level of smart contract adoption in South America. By articulating legal, institutional, and technological dimensions, the article contributes to academic debate and provides insights for public policy and regulatory harmonization strategies.

Keywords: Smart contracts; Blockchain; Legal innovation; South America; Digital transformation

RESUMO

Objetivo: Este artigo teve como objetivo analisar o estágio de adoção dos smart contracts (contratos inteligentes) nos países mais representativos da América do Sul, considerando aspectos legais, institucionais, tecnológicos e iniciativas práticas em andamento.

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Metodologia: A pesquisa é de natureza qualitativa, com abordagem documental e bibliográfica. Foram analisados legislações, decisões judiciais, projetos de lei, iniciativas governamentais e empresariais em sete países sul-americanos. A coleta de dados foi realizada por meio de fontes primárias oficiais e levantamento digital estruturado.
Resultados: Os resultados demonstram que todos os países analisados já reconhecem legalmente as assinaturas eletrônicas, o que cria um ambiente favorável à implementação dos smart contracts, mesmo na ausência de legislações específicas. O Brasil destaca-se por possuir projetos de lei em tramitação. Colômbia, Peru e Paraguai apresentam iniciativas experimentais significativas no setor público e privado.
Contribuições: O estudo propõe um modelo analítico comparativo que sintetiza o grau de maturidade da adoção dos smart contracts na América do Sul. Ao articular aspectos jurídicos, institucionais e tecnológicos, o artigo contribui para o debate acadêmico e fornece subsídios para formulação de políticas públicas e estratégias de harmonização regulatória.

Palavras-chave: Contratos inteligentes; Blockchain; Inovação jurídica; América do Sul; Transformação digital

1 INTRODUCTION

In recent decades, the advancement of digital technologies has profoundly transformed business models and legal interactions. Among these innovations, smart contracts have emerged as a significant development, attracting growing interest in both business and legal contexts w paradigm in the formalization and execution of agreements, enabling automatic (Pee et al., 2019; Zou, 2019; Cavalcanti, 2020). Smart contracts represent a ne, secure, and decentralized transactions through computer code executed on blockchain networks (Shafaq, 2020). Blockchain, as a distributed ledger technology, stores information in a decentralized and secure manner using cryptographically validated data blocks linked sequentially. These features ensure transparency, traceability, and resistance to fraud, expanding applications beyond cryptocurrencies to include smart contracts and supply chain management (Nakamoto, 2008; Swan, 2015).

Originally introduced by Szabo (1994), smart contracts are based on the coding of contractual clauses that are automatically executed by a computer system to reduce transaction costs and minimize the risks of malicious actions or human error. From

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this perspective, the contract evolves from being solely a traditional legal instrument to serving as a mechanism for automating obligations between parties.

Scholars have offered different definitions and delimitations of smart contracts. Lawand (2003) defines them as legal agreements formalized through electronic messages transmitted via the Internet, while Coelho (1998) characterizes them as contracts whose expression of intent occurs entirely in digital environments, without the need for physical documentation. Zou (2019) further notes that the term has been widely used to describe legal agreements expressed and operationalized in software.

Despite their potential, smart contracts face considerable challenges in terms of legal recognition and application. While jurisdictions such as the United States, the United Kingdom, Switzerland, and Germany already acknowledge their legal validity (Monteiro, 2022), ongoing debates persist regarding their contractual nature, regulatory classification, and enforceability in judicial disputes. The Smart Contracts Alliance (2018) has observed that the term “smart contract” may be misleading, as it does not necessarily denote either a legal contract or a system endowed with artificial intelligence. Similarly, Rohr (2019) argues that the term is “an unfortunate label for something that is neither inherently smart nor necessarily a contract.”

The adoption of this technology is often associated with promises of greater efficiency, cost reduction, accelerated transactions, and disintermediation. Nevertheless, it also raises legitimate concerns regarding consumer protection, legal certainty, interpretation of contractual clauses, and dispute resolution (Duarte, 2019; Almasoud, 2020). Ortolani (2023) highlights the growing urgency of developing alternative mechanisms for dispute resolution, such as blockchain-based arbitration.

In this context, national legal systems face the pressing challenge of adapting their frameworks to accommodate the growing adoption of smart contracts. This includes revising legislation and creating norms that address issues ranging from legal validity to digital signatures, data protection, and civil liability (Li, Greenwood, & Kassem, 2019). As Isaacson (2014) points out, “the rise of digital over analog has

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reshaped the global economy, demanding new legal tools that keep pace with the speed of technological innovation."

Against this backdrop, it becomes essential to examine how South American countries—particularly those with greater economic relevance or stronger ties to Brazil, such as the Mercosur members—are addressing these challenges. Considering the increasing digitalization of commercial relations and the ongoing regional integration, it is crucial to analyze how legislation, judicial decisions, and business practices are responding to the advent of smart contracts.

Accordingly, this study undertakes a documentary and bibliographic investigation of the current stage of smart contract adoption in key South American countries (Brazil, Argentina, Uruguay, Paraguay, Chile, Peru, and Colombia). The analysis emphasizes existing regulations, applicable jurisprudence, governmental initiatives, and business applications. As an outcome, the study proposes an analytical model to monitor and assess the maturity level of smart contract adoption in each of these countries, providing a foundation for future public policies and regulatory harmonization strategies in the region.

2 THEORETICAL FRAMEWORK

2.1 Smart Contracts and Traditional Contracts

The advancement of digital technologies has driven substantial changes in the way business agreements are formalized, giving rise to new contractual practices. Smart contracts represent a disruptive innovation in this context, challenging the traditional contracts that, for centuries, have structured commercial relations (Mandloi, 2020; Almeida, 2020, & Efing, 2018).

According to De Plácido e Silva (2004), a contract in its classical conception is a bilateral legal transaction through which parties establish reciprocal obligations based on mutual consent. Such contracts are governed by principles such as autonomy of will, good faith, and social function. Coelho (1998) further complements this definition by

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emphasizing that traditional contracts generate legal effects by acquiring, modifying, or extinguishing rights. They are typically drafted in legal language and often require the mediation of professionals such as lawyers or notaries.

By contrast, smart contracts are self-executing computer programs, written in programming languages and deployed in decentralized environments such as blockchain. They automate the performance of contractual clauses once predefined conditions are met, thereby eliminating the need for intermediaries (Giancaspro, 2017; Mezquita, 2019; Jaccard, 2018). As Schechtman (2019) observes, trust between parties is replaced by reliance on the technological system, particularly in the immutability and security of blockchain infrastructure, fundamentally altering the dynamics of legal relations.

While traditional contracts may be renegotiated, revised, or annulled by mutual agreement or by force of law, smart contracts are inherently immutable once deployed (Petroni, 2018; Eenmaa-Dimitreva & Schmidt-Kessen 2019). This feature provides security and predictability, but may also constrain adaptability in the face of unforeseen circumstances or changing conditions.

Another significant distinction lies in the precision and lack of ambiguity in smart contracts, as they are written in code and operate through binary logic (Cavalcanti, 2020; Calderón, 2022). This reduces the margin for subjective interpretation but also restricts the legal flexibility inherent in traditional contracts, which may be construed in light of normative principles and contextual considerations (Petroni, 2018).

2.2 Legal Recognition of Smart Contracts

The legal validity and enforceability of smart contracts have become subjects of increasing concern for legislators, jurists, and regulators. As Kolvart (2016) pointed out, one of the main challenges faced by this technology lies in the need for either specific regulation or an extensive interpretation of existing contractual norms to integrate them into legal systems.

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In Brazil, for instance, the Civil Code, under Article 107, stipulates that the validity of contracts does not depend on a specific form, except where expressly required by law. Thus, provided that the essential elements of a contract are present—such as consent, lawful object, and freely agreed-upon terms—there is no legal obstacle to using programming language as a means of expressing intent (Dykstra, 2023).

Nonetheless, contractual automation introduces significant hermeneutical challenges. Legal concepts such as "intention of the parties" and "consent" must be reinterpreted in a digital context where will is expressed through code and scripts. This demands interpretive adjustments from legal practitioners, as well as technical care in coding terms to ensure correspondence between the parties' agreement and its automated execution (Kolvart, 2016).

Despite these uncertainties, many countries have advanced in legally recognizing smart contracts. Ante (2021) notes that they are already being applied in sectors such as finance, real estate, healthcare, and logistics, paving the way for decentralized and collaborative ecosystems. In such environments, complex transactions can occur directly between agents, without human intervention, thereby increasing efficiency and reducing costs.

Yet, technical challenges persist. As Werbach and Cornell (2017) caution, smart contracts, being computer code, lack the capacity for interpretation and moral judgment, making them unsuitable for handling legal nuances or open-ended clauses. Buterin (2018), the creator of Ethereum, similarly acknowledges that the term "smart contract" is somewhat misleading, as the intelligence lies in automatic execution rather than contractual flexibility.

The literature also highlights the vulnerability of smart contracts to programming errors (bugs), which may compromise proper execution. This underscores the need for standardization, formal verification, and the development of safer programming languages for smart contracts (Atzei et al., 2017).

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Finally, Porto, Glória, and Brochado (2021) emphasize the importance of accessible and user-friendly tools for broader social acceptance of smart contracts. The lack of technical knowledge, coupled with the absence of consolidated regulatory frameworks, hinders dissemination, especially in countries with lower levels of digitalization. For this reason, collaboration between legal experts and technical professionals will be essential to strike a balance between innovation, security, and the protection of fundamental rights.

3 METHODOLOGY

3.1 Procedures of the Documentary Research

This study adopted a qualitative, descriptive, and comparative documentary research approach, with the purpose of analyzing the degree of adoption of smart contracts in major South American countries. To enhance the reliability and legitimacy of the data, official primary sources were used, including documents made available by government agencies, supreme courts, national parliaments, and legal institutions from each country under analysis.

Data collection began with the consultation of institutional websites of judicial bodies and high courts, through which judicial decisions, rulings, and opinions related to the application of smart contracts or blockchain-related legal provisions were identified. The analysis of these decisions made it possible to understand the judiciary's stance regarding the legal validity, automatic execution, and regulatory limits of smart contracts, thereby enabling comparisons between the interpretative approaches adopted across different jurisdictions.

In addition, the study incorporated the use of official legislative databases, which systematize and organize national legal frameworks. This made it possible to identify legal provisions applicable to smart contracts, even if indirectly. The comparative

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analysis of national regulatory frameworks revealed similarities, gaps, and divergences in the regulation of blockchain technology and smart contracts across the region.

The documentary approach was conducted through an exploratory digital survey. As argued by Soares and Machado (2019), digital sources represent a legitimate and up-to-date means of data collection for contemporary research. The survey was carried out to identify the main concepts, laws, judicial decisions, and companies related to smart contracts. For the literature review, the study adopted the method proposed by Tranfield, Denyer, and Smart (2003), who adapted the principles of systematic reviews originally developed in healthcare research for the field of applied social sciences. This method is structured into three main stages: (i) planning the review, which involves defining the research question, establishing the protocol, and setting inclusion and exclusion criteria; (ii) conducting the review, which encompasses structured searches in databases, the selection of studies according to established criteria, data extraction and synthesis, and the critical appraisal of the methodological quality of the included works; and (iii) reporting and disseminating the results, which entails presenting the synthesis of findings, identifying theoretical gaps, highlighting future research opportunities, and discussing both theoretical and practical implications. This procedure ensures greater rigor, transparency, and reproducibility, while reducing biases and strengthening the reliability of the results (Tranfield, Denyer, & Smart, 2003).

Considering the overall objective of this study—to identify the legal recognition of smart contracts in South American countries—a search was initially conducted on Google Scholar using the terms “smart contracts law enforcement courts validation”, which yielded 8,440 studies. To refine the results, a second search was performed using the terms “smart contracts law enforcement courts validation decision judgment”, which returned 3,600 studies. Finally, to align with the study’s regional focus, the country-specific terms “Brazil, Argentina, Uruguay, Paraguay, Chile, Peru, Colombia” were included, resulting in 1,455 studies.

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Following this final selection on Google Scholar, titles of all retrieved articles were reviewed. It was observed that a large portion of the studies associated with the search terms addressed cryptocurrencies, process automation, and artificial intelligence. From this pool, only those articles directly related to smart contracts and relevant to the research objectives were selected, as summarized in Table 1.

Table 1 – Research Corpus

1	Almeida, B. S. C. (2020). Applicability of smart contracts in financial institutions. *Revista da Procuradoria-Geral do Banco Central*, 14(1), 28–38.
2	Ante, L. (2021). Smart contracts on the blockchain: A bibliometric analysis and review. *Telematics and Informatics*, 57, 101519.
3	Calderón, K. L. S. (2022). *Los contratos mediante firmas digitales y sus implicancias en la seguridad jurídica de las universidades del centro del Perú en el año 2022* [Master's thesis, Universidad Peruana Los Andes]. Lima, Peru.
4	Eenmaa-Dimitrieva, H., & Schmidt-Kessen, M. J. (2019). Creating markets in no-trust environments: The law and economics of smart contracts. *Computer Law & Security Review*, 35(1), 69–88.
5	Efing, A. C., & Dos Santos, A. P. (2018). Analysis of smart contracts in light of the principle of the social function of contracts in Brazilian law. *Direito e Desenvolvimento*, 9(2), 49–64.
6	Giancaspro, M. (2017). Is a "smart contract" really a smart idea? Insights from a legal perspective. *Computer Law & Security Review*, 33(6), 825–835.
7	Jaccard, G. (2018). Smart contracts and the role of law. *SSRN*.
8	Kolvart, M., Poola, M., & Rull, A. (2016). Smart contracts. In *The Future of Law and Technologies* (pp. 133–147).
9	Li, J., Greenwood, D., & Kassem, M. (2019). Blockchain in the built environment and construction industry: A systematic review, conceptual models, and practical use cases. *Automation in Construction*, 102, 288–307.

Source: The author's

The use of Google Scholar as a primary database is justified by its ability to provide access to research across multiple disciplines on a given subject, its free accessibility, and the citation counts associated with its results (Jacsó, 2005; Repanovici, 2011). According to Noruzi (2005), Google Scholar is particularly useful for literature

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reviews because it enables the visualization of citation networks even when the full texts are not freely available.

As Jacsó (2005) emphasizes, the importance of Google Scholar lies not only in the vast volume of articles and publications sourced from diverse academic outlets but also in the platform's search refinement tools. These tools improve the efficiency of research by allowing the retrieval of relevant information from specific parts of publications, such as abstracts, titles, and full texts. Given that this study is concerned with works published in multiple fields—including Business, Management, and Law—Google Scholar is especially attractive as it is not segmented by discipline, which supports both interdisciplinarity and multidisciplinary.

The search was further conducted using Google Search, with keywords in Portuguese and Spanish, to reflect the linguistic diversity of the region and broaden the range of relevant results.

The digital research also targeted government, legal, legislative, and institutional portals, as well as repositories of jurisprudence and legislative consultation platforms. Priority was given to websites of Ministries of Justice, supreme courts, constitutional courts, national assemblies, and legislative chambers of the countries under study, in order to collect up-to-date information on regulations, rulings, and normative initiatives concerning smart contracts.

Beyond the public sphere, the survey was extended to the business and technological sectors, mapping both emerging startups and established companies engaged in the practical implementation of smart contracts. This included blockchain-specialized startups, technology firms that have already incorporated smart contracts into their operations, as well as pilot projects developed by financial institutions, logistics organizations, and supply chain networks. Public–private partnerships and university collaborations were also identified, particularly those focused on technological innovation applied to Law and digital business.

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This integrated approach enabled the identification of concrete applications of smart contracts while also providing a comprehensive understanding of the challenges companies and organizations face in adopting the technology. Among the obstacles observed were institutional resistance to contractual automation, the need for robust digital infrastructure, the absence of clear legal frameworks, and concerns regarding system security and data integrity.

The combination of legal-documentary analysis, strategic digital research, and the mapping of regional technological initiatives made it possible to construct a comprehensive overview articulating the legal, institutional, and economic aspects involved in the adoption of smart contracts. The systematization of the collected data also supported the development of a comparative framework across the countries analyzed, highlighting the current stage of regulation, applicable legal frameworks, relevant judicial decisions, and ongoing projects.

4 RESULTS

The documentary analysis revealed that all the countries included in the sample — Argentina, Brazil, Uruguay, Chile, Colombia, Peru, and Paraguay —already legally recognize electronic signatures and digital documents. This normative recognition constitutes a crucial milestone for the implementation of smart contracts, as it establishes the legal validity of acts carried out in digital environments. Although most of these nations do not yet have specific legislation dedicated to smart contracts, the findings indicate a favorable scenario for their gradual adoption, supported by public initiatives, pilot projects, and evolving jurisprudence.

4.1 Adoption of Smart Contracts in Argentina

Documentary evidence shows that Argentina presents a dynamic environment for the development of blockchain and smart contract–based solutions, involving both the

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public and private sectors. Several companies have been engaged in creating systems to support government agencies, registries, educational institutions, and private firms.

Smart contracts are already integrated into certain aspects of daily and economic life. Since 2018, for example, Carrefour has implemented a blockchain-based traceability system in Spain, which was later replicated in Argentina by the National Service for Agri-Food Health and Quality (SENASA). In agriculture, the startup Agree has sought to modernize commodity trading through blockchain technology, while in the legal field, the Blockchain Arbitration Society (BAS) has gained prominence as the world's first blockchain-based arbitral tribunal.

Another relevant initiative is the Blockchain Federal Argentina (BFA), a national platform that incorporates blockchain into a variety of governmental and private applications. The BFA enables the creation and execution of smart contracts, ensuring more secure, transparent, and efficient transactions.

From a regulatory perspective, although Argentina lacks specific smart contract legislation, it has an indirect framework that supports their use. The Digital Signature Law (Laws 25.506 and 27.446, complemented by Decree 182/2019), the regulation of electronic signatures (Civil and Commercial Code, Articles 1106–1108), and provisions on contractual autonomy, data protection, cybercrime, and consumer protection form the applicable regulatory basis.

In summary, although Argentina does not yet have dedicated legislation for smart contracts, there is a clear process of gradual integration. Practical applications in strategic sectors, coupled with complementary regulations, suggest a favorable environment for future consolidation and expansion as the technology evolves and new legal and economic demands emerge.

4.2 Adoption of Smart Contracts in Uruguay

In Uruguay, the adoption of smart contracts is still at an early stage, although important advances have been made. The main regulatory framework is the Electronic

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Trust Services Law (Law No. 18.601), which recognizes the validity of electronic signatures and digital documents. This legislation has opened the way for sectors such as finance, law, real estate, and agriculture to begin exploring the potential of blockchain technology and smart contracts.

Electronic signatures — considered a crucial first step toward the effective use of smart contracts — have already been upheld in several judicial decisions:

- 15th Civil Court of First Instance (2015): validated a promissory note signed electronically.
- 6th Civil Court (2016): confirmed the validity of a sales contract signed electronically.
- Supreme Court of Justice (2017): recognized electronic documents as judicial evidence, provided authenticity and integrity requirements were met.

These precedents demonstrate that, although no specific rules for smart contracts yet exist, Uruguay already has a legal and jurisprudential framework favorable to their future adoption.

4.3 Adoption of Smart Contracts in Chile

In Chile, smart contracts are not yet regulated by specific legislation. However, provisions of the Civil Code and the Commercial Code can be applied insofar as they are compatible with the nature of smart contracts. Article 1.438 of the Civil Code defines a contract as "an act by which one party binds itself to another to give, to do, or not to do something," a formulation that allows for an extensive interpretation to cover digital contracts.

Despite the absence of explicit regulation, companies have already begun implementing the technology. Notable examples include Webdox (focused on digital contract management) and Auna Blockchain, both of which develop and promote smart contract applications. Thus, although still at an initial stage, Chile demonstrates an active business environment willing to integrate blockchain-based solutions within the existing legal framework.

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4.4 Adoption of Smart Contracts in Paraguay

Paraguay is also in the early stages of adopting smart contracts. While no specific legislation has yet been enacted, two legal instruments provide an important foundation:

- Law No. 4.017/2010 (Electronic Signatures and Digital Documents): recognizes the validity of electronic signatures.
- Law No. 4.988/2016 (E-Commerce): establishes guidelines for electronic transactions.

Judicial decisions reinforce this understanding, such as the Supreme Court of Justice ruling (2013), which upheld the validity of a sales contract signed electronically under existing legislation.

On the practical side, both public bodies and private organizations are exploring blockchain applications. Key initiatives include the Paraguay Digital program, the Ministry of Industry and Commerce, and the Paraguayan Chamber of Electronic Commerce (CAACE). These efforts suggest that the country is moving gradually toward the adoption of smart contracts.

4.5 Adoption of Smart Contracts in Peru

Peru follows the regional trend of lacking specific legislation for smart contracts, while relying on regulations that support their use. The key legal framework is the Digital Signature Law (Law No. 27.269), which recognizes electronic signatures and documents as legally valid.

Jurisprudence has reinforced this framework:

- Constitutional Court (2006): declared the constitutionality of Law No. 27.269.
- Supreme Court of Justice (2011): accepted electronic documents as judicial evidence.
- Lima Civil Court of Appeals (2014): recognized an electronic promissory note.

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- Lima Civil Court (2017): validated a shareholders' meeting record signed electronically.

Additionally, Peru has engaged in legislative innovation with proposals such as the Fintech Bill (2018) and the Blockchain Bill (2021), both aimed at creating a regulatory framework for emerging technologies. As a result, Peru demonstrates a growing landscape, combining favorable jurisprudence with an evolving legislative environment.

4.6 Adoption of Smart Contracts in Colombia

Colombia was a pioneer in Latin America with the enactment of Law No. 527/1999, which recognized the validity of electronic signatures and documents. This legal milestone laid the foundation for the subsequent adoption of smart contracts.

Later initiatives included the Fintech Bill (2017) and the Blockchain Bill, both currently under discussion, aimed at providing broader regulation of emerging technologies.

Although there are no judicial decisions specifically addressing smart contracts, Colombian jurisprudence has consistently validated electronic signatures and documents:

- Constitutional Court (2008, 2014): upheld e-signatures, even without biometric requirements.
- Council of State (2013): equated electronic documents with paper-based ones.
- Supreme Court of Justice (2014): recognized e-signatures in judicial proceedings.
- Superior Court of Bogotá (2015): validated documents with simple electronic signatures.

Institutions such as the Ministry of Information and Communication Technologies (MinTIC), the Chamber of Informatics and Telecommunications (CCIT), and private companies such as Rappi have been investing in blockchain and smart contracts, signaling an environment conducive to technological growth.

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4.7 Adoption of Smart Contracts in Brazil

In Brazil, smart contract adoption remains incipient but is steadily expanding across several sectors, including finance, law, real estate, and agribusiness. Companies such as B3, IBM, and R3 already offer blockchain-based solutions.

Although there is no specific legislation, Brazil has a set of norms that provide a solid foundation for smart contracts:

- Provisional Measure No. 2.200-2/2001: established the Brazilian Public Key Infrastructure (ICP-Brazil).
- Law No. 11.419/2006: regulated digital signatures in electronic judicial proceedings.
- Law No. 14.063/2020: expanded the use of electronic signatures in interactions with public entities.
- Law No. 14.478/2022 (Cryptoassets Law): created a legal framework for cryptoassets, including smart contracts.
- Draft Bill No. 954/2022: proposes amendments to the Civil Code to legitimize atypical contracts validated by technological solutions.

Although Brazilian jurisprudence does not yet address smart contracts directly, it has consistently upheld the validity of electronic documents:

- Supreme Federal Court (RE 567.924-RJ): recognized the validity of e-signatures in private contracts.
- Superior Court of Justice (REsp 1.722.610-RJ; REsp 1.640.754-RJ): upheld electronic signatures in judicial proceedings and credit instruments.
- Federal and State Courts: have confirmed the validity of digital documents in various contexts.

These developments position Brazil as one of the most advanced countries in the region in creating a robust legal framework for smart contracts, even though the process remains ongoing.

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Across all the countries analyzed, judicial decisions validating electronic signatures have been identified, reinforcing the legal security and reliability of digital documents. This creates a favorable normative environment for the implementation of automated technologies such as smart contracts. Legal scholars cited in the literature argue that, even without specific smart contract legislation, the current legal frameworks already enable their application, grounded in contractual freedom and the recognition of digital means. Table 2 below provides a comparative synthesis of the analysis.

Table 2 – Comparative Analysis of Smart Contract Adoption in South America

Country	Legislation	Jurisprudence	Level of Adoption / Initiatives
Argentina	Digital Signature Laws (25.506; 27.446; Decree 182/2019). Provisions on e-signatures, data protection, and consumer defense.	No specific rulings on smart contracts; indirect jurisprudence recognizes e-signatures.	Advanced: SENASA (agri-food traceability), Carrefour (supply chain), Agree (agribusiness), Blockchain Arbitration Society (BAS), Blockchain Federal Argentina (BFA).
Uruguay	Electronic Trust Services Law (18.601) – recognition of e-signatures and digital documents.	Decisions (2015, 2016, 2017) validated electronically signed contracts and digital evidence.	Initial: finance, legal, real estate, and agriculture sectors exploring applications.
Chile	No specific legislation; Civil and Commercial Codes applied subsidiarily.	No specific rulings; laws interpreted flexibly.	Initial: Webdox (contract management), Auna Blockchain promoting private initiatives.
Paraguay	Law 4017/2010 (E-Signatures and Digital Documents); Law 4988/2016 (E-Commerce).	Supreme Court (2013) upheld validity of e-contracts under Law 4017/2010.	Emerging: Paraguay Digital program, Ministry of Industry and Commerce, CAACE.
Peru	Digital Signature Law (Law 27.269). Fintech Bill (2018) and Blockchain Bill (2021).	Constitutional Court (2006), Supreme Court (2011), Lima Courts (2014, 2017) validated e-documents.	Growing: legislative initiatives and private-sector adoption of smart contracts.

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Country	Legislation	Jurisprudence	Level of Adoption / Initiatives
Colombia	Law 527/1999 (E-Signatures and Digital Documents). Fintech Bill (2017) and Blockchain Bill under discussion.	Court rulings (2008, 2013, 2014, 2015) upheld validity of e-signatures and e-documents.	Advanced: initiatives from MinTIC, CCIT, and private companies such as Rappi.
Brazil	MP 2.200-2/2001 (ICP-Brasil), Law 11.419/2006, Law 14.063/2020, Law 14.478/2022 (Cryptoassets), Draft Bill 954/2022 (smart contracts).	STF, STJ, federal and state courts validated e-signatures in contracts, credit instruments, and petitions.	Growing: B3, IBM, and R3 applying smart contracts; Brazil among most advanced in the region.

Source: Author's elaboration based on legal, judicial, and institutional data (2025).

Brazil stands out in the sample for having draft bills currently under discussion in the National Congress that aim to regulate smart contracts. This reflects a proactive evolution of the national legislature in response to technological innovations. Other countries, such as Colombia, Paraguay, and Peru, although they do not yet have specific legal frameworks, are already developing pilot projects and public–private partnerships that employ smart contracts in areas such as public services, logistics, and finance. Table 3 summarizes the main Validating findings.

Table 3 – Summary of Smart Contract Adoption in South America

Country	Accepts E-Signatures	Judicial Decisions E-Signatures	Public Initiatives with Smart Contracts	Specific Smart Contract Laws	Draft Bills on Smart Contracts
Argentina	Yes	Yes	No	No	No
Brazil	Yes	Yes	Yes	No	Yes
Chile	Yes	Yes	No	No	No
Colombia	Yes	Yes	Yes	No	No
Paraguay	Yes	Yes	Yes	No	No
Peru	Yes	Yes	Yes	No	No
Uruguay	Yes	Yes	No	No	No

Source: Author's elaboration (2025)

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Overall, the results demonstrate that while all the analyzed countries already recognize electronic and digital signatures — thereby showing openness to the digitalization of legal and commercial processes — none yet possesses specific smart contract legislation. Nevertheless, practical advancements in both public and private initiatives indicate a trend toward technological and regulatory convergence in the region.

Brazil stands out as the most advanced case in the sample, given the presence of draft bills in Congress that aim to regulate smart contracts, reflecting a proactive legislative stance toward technological innovation. Meanwhile, countries such as Colombia, Paraguay, and Peru, though lacking dedicated legal frameworks, have been developing pilot projects and public–private partnerships in areas such as public services, logistics, and finance.

Thus, the findings reveal that, despite being at different stages, all countries analyzed are moving toward the modernization of contractual practices, supported by legal systems that already recognize digital documents and by practical experimentation with blockchain-based technologies. This environment fosters the gradual adoption of smart contracts, provided it is accompanied by regulatory frameworks that ensure their validity, enforceability, and legal certainty.

5 CONCLUDING REMARKS

The research on the adoption of smart contracts in South American countries has made it possible to identify significant advances in both legal and technological fields, revealing the emergence of a digital ecosystem increasingly conducive to the incorporation of automated contracts. One of the main findings concerns the observation that, although most of the countries analyzed do not yet have specific legislation dedicated to smart contracts, the existing legal framework—based on the principle of contractual freedom—has been considered sufficient to validate their legal application. This understanding demonstrates the flexibility and adaptability of South

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American legal systems, allowing innovations to be assimilated without the immediate need for deep legislative reform.

This context points to a resilient legal environment capable of absorbing the effects of digital transformations. Legal certainty is maintained, even in the absence of specific regulation, through the application of general principles of contract law, especially supported by rules that recognize and validate electronic signatures and digital documents. Such an approach prevents normative fragmentation and allows for greater agility in the implementation of new technologies, facilitating the transition toward the use of smart contracts.

Nevertheless, the research also identified that the creation of regulatory frameworks for digital certificates is essential to strengthen the legal infrastructure necessary for the safe adoption of smart contracts. Digital certificates are indispensable instruments for ensuring authenticity, integrity, and non-repudiation of transactions carried out in digital environments, serving as a structural basis for trust among the parties involved.

Beyond the normative dimension, there has been a growing development of blockchain- and smart contract–based management systems in both public and private sectors across the region. This expansion reflects a clearer perception — by both governments and businesses — of the benefits provided by these technologies, such as reduced operational costs and greater efficiency in contractual execution. The digital modernization of commercial and administrative transactions has the potential to significantly transform the way legal interactions are conducted.

Based on the evidence collected, it is possible to project that the use of smart contracts will expand in South America in the coming years. This expansion will be driven by factors such as the evolution of technological infrastructure, improvements in digital security, the consolidation of electronic certifications, and the gradual awareness of both public and private sectors regarding the use of this technology. Given its economic and legal diversity, the region has the potential to become a

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reference in integrating smart contracts into existing contractual practices, thereby accelerating digital transformation.

Another relevant aspect highlighted by the study is the strengthening of digital infrastructure and innovation capacity in the region. The adoption of smart contracts is stimulating the emergence of new technological solutions and business models that promote automation, decentralization, and efficiency in both public and private sectors. This movement is creating an ecosystem favorable to innovation and sustainable economic development, with potential impacts on strategic areas such as finance, logistics, healthcare, and public administration.

In summary, the results indicate that, even in the absence of specific regulation, South American countries already have the institutional and technological conditions necessary to advance toward the widespread adoption of smart contracts. The existing normative flexibility, combined with the progress of digital certification and the growing digitalization of processes, provides fertile ground for the expansion of this technology across the continent. Smart contracts thus have the potential to become a consolidated practice in different domains of economic and institutional life, promoting gains in efficiency, security, and transparency.

Given the transformative potential of smart contracts, several promising lines of inquiry for future research can be identified:

Integration with public management systems: Studies could explore the application of smart contracts in processes such as civil registries, licensing, administrative contracts, and public procurement. Analyses of real cases may provide valuable insights for modernizing the public sector and combating corruption.

Comparative sectoral studies: Future investigations could examine the adoption of smart contracts in specific sectors such as agribusiness, healthcare, real estate, and logistics. Analyzing the particularities, challenges, and best practices in each sector will contribute to the development of adoption models tailored to local realities.

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Legal challenges and regulatory harmonization: Another relevant line of research concerns the analysis of legal aspects and regulatory gaps, especially in cases of disputes or contractual failures. The need for harmonization among South American legal frameworks to facilitate cross-border transactions also deserves attention.

Information security and data protection: Considering the increasing number of digital transactions, it is crucial to investigate security risks and vulnerabilities, as well as to propose mechanisms for protecting sensitive data in the use of blockchain and smart contracts.

Integration with artificial intelligence: Studies could explore the use of machine learning algorithms in smart contracts, enabling them to adapt to external variables and make decisions based on real-time data. The ethical and legal implications of such complex automation should also be examined.

Transparency and governmental accountability: Finally, it is important to investigate how smart contracts can contribute to integrity and efficiency in public administration, particularly through automated accountability mechanisms and the reduction of opportunities for corrupt practices.

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