

ПРАВОВАЯ ПРИРОДА ЦИФРОВЫХ АКТИВОВ И ПРОБЛЕМЫ ИХ ОБРАЩЕНИЯ В ИНФОРМАЦИОННОЙ ЭКОНОМИКЕ

Аннотация: В данном исследовании рассматривается правовая онтология цифровых активов и проблемы их обращения в условиях развивающейся информационной экономики. Анализируя криптовалюты, НФТ и токенизированные права, в статье выявляются фундаментальные противоречия между дематериализацией, программируемостью и криптографической проверяемостью характеристик активов на основе блокчейна и традиционными правовыми рамками, основанными на материальности и централизованном управлении. В нем критикуется неадекватность доктрин гражданского права, в частности российского режима собственности и договорного режима, в решении проблем передачи прав собственности, жесткости смарт-контрактов и трансграничных юрисдикционных конфликтов. Предлагая гибридную модель управления, авторы исследования выступают за нейтральное к технологии законодательство, многоуровневый надзор, объединяющий алгоритмическое исполнение и судебное толкование, и многосторонние протоколы для признания прав на блокчейн. Подчеркивая природу цифровых активов, авторы анализа призывают пересмотреть правовую субъектность и распределение ответственности в децентрализованных экосистемах, обеспечивая баланс между инновациями и правовой определенностью. Выводы подчеркивают потенциал России как первопроходца в создании адаптивной нормативно-правовой базы путем синтеза традиций кодификации с принципами криптографического управления.

Ключевые слова: Цифровые Активы, Технология Блокчейн, Правовая Квалификация, Смарт-Контракты, Нормативно-Правовая База

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The Legal Nature of Digital Assets and the Problems of Their Circulation in the Information Economy

Abstract: This study examines the legal ontology of digital assets and their circulation challenges within evolving information economies. Analyzing cryptocurrencies, NFTs, and tokenized rights, the paper identifies fundamental tensions between blockchain-based asset characteristics dematerialization, programmability, and cryptographic verifiability and traditional legal frameworks predicated on physicality and centralized governance. It critiques the inadequacy of civil law doctrines, particularly Russia's property and contract regimes, in addressing title transfers, smart contract rigidity, and cross border jurisdictional conflicts. Proposing a hybrid governance model, the study advocates for technology-neutral legislation, layered oversight integrating algorithmic execution and judicial interpretation, and multilateral protocols for blockchain entitlement recognition. Emphasizing the sui generis nature of digital assets, the analysis calls for redefining legal subjectivity and liability attribution in decentralized ecosystems while balancing innovation with legal certainty. The conclusions highlight Russia's potential to pioneer adaptive regulatory frameworks by synthesizing codification traditions with cryptographic governance principles.

Keywords: Digital Assets, Blockchain Technology, Legal Qualification, Smart Contracts, Regulatory Frameworks

Introduction

The emergence of digital assets as pivotal instruments within the information

economy signifies a transformative shift in global economic paradigms, necessitating rigorous jurisprudential scrutiny. These assets encompassing cryptocurrencies, tokenized securities, and blockchain based entitlements have engendered novel transactional modalities that transcend traditional market structures, operating within decentralized ecosystems governed by cryptographic protocols. Their proliferation challenges foundational legal categories predicated on physicality and centralized governance, exposing systemic incongruities between rapid technological innovation and static normative frameworks.[1] A critical asymmetry persists between the accelerating integration of digital assets into economic infrastructures and the unresolved ambiguity surrounding their legal ontology. While these assets demonstrate growing macroeconomic significance through capital formation, cross border remittances, and decentralized finance platforms, their juridical classification remains contested across civil law jurisdictions. This dissonance arises from attempts to subsume digital assets under antiquated property law doctrines or contractual paradigms, neglecting their inherent hybridity as both value-representative instruments and autonomous technological artifacts. The resultant regulatory indeterminacy inhibits secure circulation, fostering systemic risks in transactional certainty and rights enforcement.

This study seeks to resolve this epistemic impasse by constructing a functional taxonomy of digital assets grounded in legal theory, while systematically deconstructing barriers to their circulation. By synthesizing civil law property doctrines with insights from digital governance theory, the analysis advances beyond descriptive categorization to interrogate how cryptographic architectures reconstitute legal relationships. The objective is twofold: to delineate the sui generis nature of digital assets through their constitutive technological and economic attributes, and to propose coherent principles for regulating their circulation that reconcile innovation imperatives with the need for legal predictability. Such an approach not only addresses the conceptual vacuum in existing scholarship but also provides a

normative foundation for harmonizing digital asset markets with the rule of law requirements intrinsic to mature information economies.

Conceptual Demarcation of Digital Assets

The precise juridical categorization of digital assets necessitates a multidimensional analysis of their constitutive elements, transcending superficial analogies to conventional property forms. At the ontological level, digital assets manifest as heterogeneous constructs spanning cryptocurrencies, non-fungible tokens, and tokenized contractual rights, each embodying distinct functional and legal attributes. Cryptocurrencies operate as decentralized mediums of exchange, challenging fiat currency monopolies through cryptographic verification mechanisms. NFTs introduce scarcity into digital environments by anchoring uniqueness to blockchain authenticated metadata, thereby redefining notions of ownership in intangible domains. Tokenized rights, conversely, represent programmable claims over physical or digital objects, collapsing traditional distinctions between possession and entitlement through algorithmic governance.

Fundamental to their legal identity is an irreducible technological substrate blockchain or distributed ledger architectures that imposes structural constraints absent in tangible property regimes. This infrastructural dependency generates a dual ontology: digital assets simultaneously function as economic value carriers and as cryptographically secured data artefacts. Their dematerialized existence disrupts the *corpus possessio* framework central to civil law property doctrines, rendering traditional concepts of physical control and transfer inapplicable.[2] The paradigm shift extends to programmability, wherein smart contracts autonomously execute predefined obligations, dissolving the temporal separation between agreement formation and performance that underpins classical contract theory.

Such characteristics coalesce into a *sui generis* legal category demanding reconceptualization of property rights beyond physicalist assumptions. The absence of tangible *res* necessitates evaluating digital assets through hybrid criteria combining

cryptographic verifiability, network consensus mechanisms, and economic utility. This tripartite framework exposes the insufficiency of analogical reasoning in civil law systems, advocating for *lex specialis* approaches that acknowledge code-based governance as a constitutive legal force rather than mere technical implementation. Jurists must therefore grapple with the epistemological challenge of reconciling immutable cryptographic records with the interpretative flexibility inherent in legal normativity.

Jurisprudential Foundations of Digital Asset Qualification

The juridical classification of digital assets confronts foundational tensions within legal theory, necessitating a reappraisal of orthodox doctrinal frameworks. Across civil and common law jurisdictions, divergent ontological approaches reveal a conceptual schism: while some legal systems attempt to assimilate digital assets into existing property or contractual paradigms, others advocate for recognizing them as a *sui generis* category. This discord stems from the inherent duality of digital assets, which operate simultaneously as vehicles of economic exchange and as cryptographically secured technological artifacts. The application of classical property rights theory falters when confronted with assets lacking physical corpus, as blockchain based ownership transcends traditional notions of possession and transfer. Civil law systems grounded in the *numerus clausus* principle face particular challenges, as digital assets defy rigid categorization within statutory property types through their programmability and dematerialized existence.[3] A central paradox emerges from the interplay between economic functionality and technological infrastructure. Digital assets derive their exchange value not merely from market consensus but from the immutable cryptographic protocols that govern their creation and circulation. This duality destabilizes conventional legal distinctions between the substrate of value and its representational form. The debate intensifies when examining decentralized autonomous assets governed by self executing smart

contracts, which challenge anthropocentric legal personhood doctrines. Such assets operate through algorithmic governance structures that lack traditional legal subjects, raising questions about liability attribution and the very notion of volition in juridical acts.

The contractual rights framework proves equally inadequate, as smart contracts autonomously enforce obligations without requiring ex post judicial interpretation. This erodes the discretionary space typically reserved for legal institutions in assessing contractual validity and performance. Comparative analysis reveals that jurisdictions adopting hybrid approaches recognizing digital assets as a distinct legal category while prescribing functional equivalences to traditional rights demonstrate greater coherence in addressing circulation challenges. The Russian legal tradition, with its emphasis on systematic codification, faces a critical juncture in either expanding the interpretation of “other property” under Article 128 of the Civil Code or establishing dedicated legislative regimes. Such determinations must account for the meta-legal nature of blockchain protocols, which effectively constitute parallel normative systems governing asset circulation through consensus algorithms.[4] This necessitates reimagining legal subjectivity and rights enforcement mechanisms to accommodate decentralized architectures where code operates as both infrastructure and regulator.

Structural Barriers to Digital Asset Circulation

The circulation of digital assets encounters systemic impediments rooted in the dissonance between blockchain native operational logics and inherited legal frameworks. At the core of transactional uncertainty lies the inadequacy of traditional property law doctrines to address title transfer mechanics in decentralized ecosystems. Civil law systems, predicated on physical possession and registral publicity, struggle to reconcile blockchain’s cryptographic proof-of-ownership with formalized transfer protocols.[5] The absence of a centralized authority to authenticate transactions undermines the numerus clausus principle governing property rights, as blockchain

entries operate through probabilistic finality rather than deterministic legal certainty. This creates a juridical vacuum where ownership disputes risk being adjudicated against incompatible evidentiary standards, particularly in jurisdictions like Russia where Article 224 of the Civil Code ties movable property transfers to physical delivery.

Smart contract self-execution further destabilizes contractual formalism by collapsing the temporal and procedural distinctions between agreement formation, performance, and enforcement. Unlike conventional contracts requiring ex post judicial interpretation of bona fides or force majeure, smart contracts autonomously execute coded terms irrespective of contextual equity. While this ensures transactional efficiency, it negates the discretionary space courts traditionally reserve for adjusting obligations under Article 451 of the Russian Civil Code, which permits contract modification due to material circumstance changes. The resultant rigidity raises fundamental questions about aligning algorithmic determinism with the principle of *clausula rebus sic stantibus*, essential for maintaining contractual justice in volatile digital markets. Blockchain's transaction irreversibility introduces unprecedented challenges for error remediation and rights restitution. Legal systems built on reversible transactions and error correction mechanisms confront immutable ledgers where erroneous or fraudulent transfers become permanently embedded.[6] This nullifies conventional remedies like restitution or annulment, as blockchain's consensus protocols lack jurisdictional mechanisms to reverse validated transactions. The problem intensifies in cross border contexts, where conflicting national laws on transaction finality collide with blockchain's borderless architecture.

Jurisdictional fragmentation exacerbates these challenges through unresolved conflicts of laws in cross-border asset transfers. Digital assets circulating in decentralized finance protocols inherently bypass territorial legal systems, rendering traditional conflict of law rules based on *lex loci contractus* or *lex situs* inapplicable. The absence of a universally recognized situs for blockchain-based assets creates

regulatory arbitrage opportunities, as market participants exploit disparities between jurisdictions with restrictive regimes and permissive havens. This fragmentation undermines efforts to establish coherent supranational standards, while decentralized autonomous organizations operating without legal personality further complicate liability attribution.

The regulatory arbitrage risks inherent in such ecosystems threaten financial stability by encouraging jurisdictional competition that prioritizes technological innovation over systemic risk containment. Russia's evolving stance on digital assets, oscillating between prohibitionist drafts and controlled experimentation in regulated sandboxes, reflects the broader struggle to balance innovation with legal safeguards. Without harmonized international frameworks recognizing blockchain's *lex cryptographica* as a distinct normative layer, digital asset circulation remains ensnared in a paradox: globalized technological infrastructure constrained by territorially fragmented legal ontologies. Overcoming these barriers demands reimagining legal concepts of finality, reversibility, and jurisdictional authority through a synthesis of cryptographic trust mechanisms and adaptive regulatory models that preserve systemic integrity without stifling technological progress.

Normative Proposals for Legal Infrastructure Development

The maturation of digital asset markets demands legislative frameworks that transcend reactive regulatory adjustments, instead embedding adaptive governance structures within legal systems. Central to this endeavor is the formulation of technology-neutral definitions capable of accommodating rapid technological evolution while preserving juridical coherence. Such definitions must avoid anchoring regulatory scope to transient technical specifications, focusing instead on functional criteria such as value transfer capacity, cryptographic verifiability, and network consensus mechanisms that capture the essence of digital assets irrespective of their underlying protocols.

A layered governance model emerges as imperative to reconcile algorithmic

autonomy with legal oversight. This paradigm envisions smart contracts as operational executors of predefined rules, while reserving interpretive authority to legal institutions for disputes exceeding coded parameters. Such stratification mirrors the Russian civil law distinction between substantive rights and procedural enforcement, ensuring smart contracts function within boundaries established by mandatory legal norms.[7] The model's efficacy hinges on developing interoperability standards between blockchain protocols and judicial interfaces, enabling courts to audit smart contract operations without compromising network integrity a technical juridical synthesis requiring collaboration between legislators, cryptographers, and judicial authorities. Institutional innovation must complement legislative modernization. Establishing specialized digital asset registries under state supervision would inject legal certainty into decentralized ecosystems by creating presumption of ownership effects for blockchain recorded transactions. Concurrently, ratifying multilateral protocols for cross border recognition of blockchain entitlements could mitigate jurisdictional fragmentation. Drawing from the Hague Securities Convention's conflict of law principles, such protocols would designate *lex cryptographica* the consensus rules governing blockchain networks as the applicable "law" for determining asset transfers, subject to overriding public policy safeguards.

The proposed architecture necessitates reimagining the Civil Code's provisions on property formalization and transactional validity. Amendments could introduce a hybrid registration system where blockchain transactions gain *ex lege* validity upon meeting cryptographic integrity thresholds verified by authorized registries. This would bridge the gap between blockchain's probabilistic finality and civil law's demand for deterministic legal certainty, fostering an environment where technological innovation flourishes within structured juridical parameters. By anchoring reforms in Russia's codification traditions while embracing functional equivalence principles, these proposals aim to position digital assets as integral

components of a modernized legal economy rather than peripheral anomalies requiring exceptional treatment.

Conclusion

The juridical reconceptualization of digital assets as hybrid legal-technological constructs necessitates abandoning binary classifications that oppose technological innovation to legal tradition. These assets epitomize a synthesis of cryptographic architecture and economic value creation, demanding legal frameworks that recognize code as both regulatory instrument and normative constraint. The Russian legal system's historical capacity for integrating technological advancements evident in its adaptation to electronic document circulation under Federal Law No. 63-FZ provides a doctrinal foundation for such evolution. However, the sui generis nature of blockchain based assets requires transcending analogical interpretations of the Civil Code, particularly concerning property formalization under Articles 128 and 224, which remain anchored in corporeal paradigms.

A critical equilibrium must be struck between fostering technological progress and ensuring legal predictability. This balance can only be achieved through dynamic regulatory models that treat blockchain protocols as constitutive legal facts rather than mere evidentiary tools. The proposed layered governance frameworks, combining smart contract automation with judicial oversight mechanisms, offer a pathway to reconcile algorithmic efficiency with the discretionary imperatives of civil justice. Russia's ongoing experimentation with regulatory sandboxes for digital financial assets signals receptiveness to such adaptive approaches, yet systemic implementation requires codifying principles of cryptographic verifiability and network consensus as legally binding criteria. Future research must address the emergent confluence of AI-driven governance and decentralized asset ecosystems. As machine learning algorithms increasingly mediate asset valuation and transactional workflows, legal theory confronts the challenge of attributing liability in systems where human agency dissipates across autonomous protocols. This trajectory

demands reimagining civil law categories of volition and fault within environments governed by self optimizing code. By anchoring such inquiries in Russia's robust tradition of cybernetic legal scholarship, jurists can pioneer frameworks capable of governing the next evolutionary phase of digital assets where law and technology coalesce into inseparable dimensions of economic reality.

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