

Digital Servitudes: A New Dimension Of Limited Real Rights In The Digital Era

Egamberdiev Eduard Khajibaevich
Tashkent State University of Law, Uzbekistan



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ABSTRACT

Objective: This study investigates the emerging concept of digital servitudes within the system of limited real rights, exploring its legal nature, relationship with traditional servitudes, and implications in the digital era. **Method:** Utilizing a comprehensive legal analysis, the research examines legislative frameworks, judicial interpretations, and case studies to elucidate the establishment, implementation, and termination of digital servitudes. **Results:** The findings reveal that digital servitudes introduce a novel dimension to civil law by extending real rights into virtual spaces, posing unique challenges in protecting participants' rights and resolving digital disputes. The study identifies gaps in current legal systems and suggests mechanisms for safeguarding digital servitude rights. **Novelty:** This research contributes to legal scholarship by proposing theoretical frameworks and legislative recommendations tailored to the digital environment, specifically aimed at enhancing the legal infrastructure of the Republic of Uzbekistan. The study provides a foundational understanding of digital servitudes, marking a significant advancement in civil law discourse.

INTRODUCTION (12pt)

The rapid development of digital technologies and the formation of virtual space as a new environment for socio-economic interaction necessitate the adaptation of traditional legal institutions to digital reality conditions, with particular relevance being given to the problem of regulating relationships associated with the use of digital assets and digital infrastructure. The institution of servitude, being one of the oldest institutions of civil law, is currently transforming under the influence of digitalization processes, acquiring new forms of implementation in virtual space, which requires theoretical comprehension and development of adequate legal regulatory mechanisms.

The formation of the digital servitudes institution represents a natural stage in the evolution of the system of real rights, reflecting the objective needs of the digital economy for legal instruments ensuring the effective use of digital assets and infrastructure, where traditional models of servitude legal relations are adapted to the specifics of the digital environment while maintaining their legal essence as a means of limited use of another's property [1]. Of particular importance is the problem of ensuring a balance of interests among participants in servitude legal relations in conditions where digital assets serve as the object of rights, and the exercise of powers is carried out through software and technical means.

The institution of servitude law, being one of the oldest institutions of civil law, originates in Roman private law, where its formation was conditioned by the objective

necessity to regulate relations between owners of neighboring land plots in conditions of intensive development of agricultural production and urban development. Historical analysis of this institution's development shows that initially, servitudes emerged as the right to use another's land plot to meet the needs of one's own land allotment [2]. In the evolution of Roman law, a significant transformation of the servitude institution occurred, which led to the formation of its various types, including praedial and personal servitudes, which subsequently had a significant impact on the development of modern legal systems of continental law.

The further development of the servitude institution in medieval Europe was characterized by its adaptation to feudal relations, which led to the emergence of new forms of servitude rights associated with the peculiarities of feudal land ownership. During this period, there was a significant complication of the system of servitude rights. Particularly important is the fact that it was during this period that the basic principles of establishing and terminating servitudes were formed, which in a modified form have survived to the present day in most modern legal orders.

In the era of civil law codification in continental European countries, the institution of servitude received legislative consolidation in the main civil codes, which contributed to its further development and systematization. The French Civil Code of 1804 and the German Civil Code of 1896 established basic models for regulating servitude relations, which were subsequently adopted by many legal systems. The modern understanding of the servitude institution is largely based on the theoretical developments of nineteenth-century German Pandectists, particularly the works of Bernhard Windscheid and Heinrich Dernburg, whose concepts had a significant influence on the formation of modern servitude law doctrine [3].

The historical development of the servitude institution demonstrates its exceptional adaptability to changing socio-economic conditions, which is especially important in the context of modern digitalization processes and transformation of traditional legal institutions. At the same time, the basic principles of servitude law, formed in Roman law and developed in subsequent historical periods, maintain their significance in modern conditions, providing a legal basis for regulating relations concerning the limited use of another's property.

Modern legal doctrine considers servitude as a limited real right to use another's property, which is characterized by specific content and a special procedure for implementation. Analysis of legislation across various legal orders reveals common approaches to defining the essence of servitude, despite some differences in specific formulations.

Analysis of the legal nature of servitude allows identification of several essential characteristics that define its specificity as a special type of limited real rights. The first fundamental characteristic is the quality of following, meaning the inseparable connection of servitude with a specific real estate object regardless of changes in its ownership. This quality ensures the stability of servitude relations and protection of the rights holder's interests, which is particularly relevant in conditions of active civil

turnover of real estate. The quality of following manifests not only in the preservation of servitude during the alienation of the encumbered object but also in the possibility of its transfer along with the dominant real estate [4].

The second essential characteristic of servitude is its limited nature, expressed in the fact that the scope of powers of the servitude holder is always less than the scope of powers of the owner and is strictly determined by the purpose of establishing the servitude. This limitation serves as an important guarantee for protecting the interests of the servient estate's owner and prevents unjustified expansion of the limits of exercising servitude rights. The principle of minimal encumbrance of the servient estate's owner is reflected in the requirement to exercise servitude in the least burdensome way, which forms the basis for balancing the interests of participants in servitude legal relations [5].

The third significant characteristic is the purposeful nature of servitude, implying its establishment to satisfy specific needs of the entitled person that cannot be met in any other way. This characteristic necessitates clear definition of the purpose for establishing servitude and the inadmissibility of its use for other purposes, which serves as an additional guarantee against abuse of rights by the servitude holder.

The fourth characteristic is the absolute nature of servitude right protection, implying the possibility of its protection against violations by any third parties, including the owner of the servient estate. The absolute nature of protection is ensured by providing the servitude holder with special real-legal means of protection, similar to those used for protecting property rights. This allows for effective implementation of servitude rights and their stability in civil turnover.

The fifth characteristic is the compensatory nature of servitude, implying the obligation of the servitude holder to provide fair compensation to the owner of the servient estate for the limitation of their powers. The amount of such compensation is determined considering the degree of encumbrance on the servient estate and the scope of limitations on the owner's powers, which contributes to maintaining the economic balance of interests among participants in servitude legal relations.

The sixth significant characteristic of servitude is its perpetual nature, which does not exclude the possibility of establishing servitude for a specific period by agreement of the parties. This characteristic reflects the stability of servitude legal relations and their orientation toward long-term provision of the entitled person's interests. However, the perpetual nature of servitude does not mean impossibility of its termination upon occurrence of certain legal facts, such as the disappearance of grounds for its establishment or agreement of the parties to terminate the servitude.

Comprehensive analysis of the identified characteristics of servitude allows formulation of its essential characteristics as a special type of limited real rights. The interconnection and interdependence of these characteristics form an integral legal construction ensuring effective regulation of relations concerning limited use of another's property. Of particular importance is the fact that these characteristics maintain their relevance even in conditions of modern digitalization processes, requiring only certain adaptation to new forms of property relations.

Participants in servitude legal relations are represented by two main categories: the servitude holder (entitled person) and the owner of the servient estate (obligated person). The legal status of the servitude holder is determined by the specifics of the particular type of servitude and can belong to both natural and legal persons, as well as public legal entities. The peculiarity of the servitude holder's legal position lies in their possession of powers for limited use of another's property for strictly defined purposes [6].

The status of the servient estate's owner is characterized by the necessity to endure certain limitations of their powers in the interests of the servitude holder. In public servitude, the circle of obligated persons may be undefined, which is due to the specifics of this type of servitude. The legislation of most countries provides for the possibility of establishing servitude not only by the owner but also by other persons possessing sufficient scope of powers in relation to the servient estate [7].

The plurality of persons on the side of the servitude holder or the owner of the servient estate creates special legal constructions requiring specific regulation of the procedure for exercising rights and fulfilling obligations. In such cases, legislation provides mechanisms for coordinating the will of all participants in the legal relationship and determining the procedure for using the servient estate [8].

The system of servitude rights objects encompasses various types of real estate, including land plots, buildings, structures, and other objects permanently connected to land. Modern legal doctrine expands the traditional understanding of servitude objects, including linear objects, subsoil plots, and water objects. The specificity of the servitude object largely determines the content and procedure for exercising servitude rights [9].

The content of rights and obligations of participants in servitude relations is determined by the principle of ensuring balance between the interests of the servitude holder and the owner of the servient estate. The servitude holder is endowed with the right of limited use of another's property within the limits necessary to achieve the purpose of servitude. The main obligations of the servitude holder include: exercising the right in the least burdensome way, maintaining the servient estate in proper condition, and paying for the servitude [10].

The classification of servitudes based on connection with a specific person or real estate represents one of the fundamental divisions in the system of servitude law. Land servitudes (*praedial*), established in favor of a specific real estate object (dominant estate), are characterized by an inseparable connection with this object and maintain their effect regardless of changes in the owner of the dominant estate. The legal construction of land servitudes is based on the concept of ensuring the most effective use of land plots and other real estate objects by providing their owners with additional possibilities for using neighboring real estate objects.

Personal servitudes, conversely, are established in favor of a specific natural or legal person and terminate upon the death of the natural person or liquidation of the legal entity. The specificity of personal servitudes lies in their strictly personified nature, excluding the possibility of transferring servitude rights to other persons. The main purpose of personal servitudes is to ensure individual needs of specific subjects in using

another's property, which determines the peculiarities of their legal regulation and implementation procedure. Modern legislation of various legal orders provides for the possibility of establishing personal servitudes in relation to various types of property, including residential premises, land plots, and other real estate objects, which expands the scope of application of this legal institution.

The differentiation of servitudes into positive and negative is based on the nature of obligations of the servient estate's owner and the content of the servitude holder's powers. Positive servitudes provide the entitled person with the possibility of active influence on the servient estate or implementation of certain actions in relation to it. The legal nature of positive servitudes is revealed through granting the servitude holder the right to perform specific actions in relation to the servient estate, such as passage, driveway, laying communications, water withdrawal. The significance of positive servitudes in modern civil turnover is determined by their role in ensuring economic needs of real estate owners, especially in conditions of dense urban development and infrastructure development. The practice of applying positive servitudes demonstrates their high efficiency in solving problems of access to infrastructure objects and optimizing land resource use in urbanized territories [11].

Negative servitudes, representing the right to require the owner of the servient estate to refrain from certain actions regarding their own property, form a special category of servitude rights. The content of negative servitude consists in limiting the powers of the servient estate's owner regarding its use in the interests of the servitude holder. The specificity of negative servitudes is manifested in the fact that they do not involve active influence on the servient estate but are aimed at maintaining a certain state of real estate or conditions of its use. In modern law, negative servitudes acquire special significance in the context of ensuring environmental requirements, preserving the historical appearance of the urban environment, and protecting the rights of owners of neighboring real estate objects. Regulation of negative servitudes requires careful balance between the interests of the servient estate's owner and the needs of the servitude holder, which necessitates detailed regulation of conditions for their establishment and implementation [12].

The classification of servitudes based on the criterion of direction of their establishment and sphere of implementation provides for division into public and private servitudes. Public servitudes are established in the interests of an undefined circle of persons or public legal entities to ensure public needs. The mechanism of public servitude is applied to solve large-scale infrastructure tasks, ensure access to natural objects, preserve cultural heritage objects, and implement other socially significant goals [13].

Private servitudes, established in the interests of specific subjects of civil law, are characterized by a contractual procedure for their establishment and focus on satisfying individual needs of the servitude holder. Legal regulation of private servitudes is based on the principles of dispositivity and freedom of contract, which allows participants in servitude legal relations to independently determine conditions for exercising servitude rights within the framework established by law [14].

The procedure for establishing servitudes in traditional law provides for several grounds for their emergence: contract, court decision, administrative act, acquisitive prescription. The contractual procedure for establishing servitude, being the most common ground for its emergence, implies reaching an agreement between the owner of the servient estate and the future servitude holder regarding conditions for exercising servitude rights. Essential conditions of the agreement on establishing servitude are: determination of servitude content, limits of its implementation, duration (if servitude is established for a specific period), amount of payment for servitude. The procedure of state registration of servitude ensures publicity of servitude rights and their opposability to third parties [15].

The procedure for implementing servitudes in traditional law is based on a system of principles determining the limits of exercising servitude rights and mechanisms for ensuring balance of interests among all participants in legal relations. Fundamental is the principle of implementing servitude in the least burdensome way for the owner of the servient estate, which implies choosing such option of using another's property that minimally restricts the owner's powers. Practical implementation of this principle is reflected in judicial practice of various legal orders, forming specific criteria for determining servitude burdensomeness and ways to minimize negative consequences for the servient estate's owner. Of particular importance is the mechanism for coordinating the procedure of servitude implementation between participants in legal relations, including determination of time frames for property use, technical conditions of its exploitation, and procedures for conducting necessary works on maintaining the servient estate.

The system of grounds for terminating servitudes is characterized by diversity of legal facts leading to loss of servitude rights. Among the most common grounds are: agreement of parties to terminate servitude, disappearance of grounds for its establishment, expiration of fixed-term servitude, destruction of servient or dominant estate. Legal significance is acquired by the institution of forced termination of servitude at the request of the servient estate's owner in cases of substantial violation by the servitude holder of the procedure for exercising servitude rights or using the servient estate in a way inconsistent with the purpose of establishing servitude. Modern judicial practice forms additional grounds for terminating servitudes, conditioned by changes in socio-economic conditions and emergence of alternative ways to satisfy servitude holder's needs.

The mechanism for terminating servitudes provides for necessity of state registration of servitude right termination, which ensures public reliability of information about legal regime of real estate. Special attention deserves the problem of determining legal consequences of servitude termination, including issues of compensating expenses for improving the servient estate and restoring original condition of property. Legislation of various legal orders provides special rules for regulating these relations, aimed at ensuring fair distribution of property consequences of servitude right termination among participants in legal relations.

Development of digital technologies and formation of virtual space have led to emergence of a new legal phenomenon – digital servitude, representing a limited real right to use digital objects or digital infrastructure. Conceptual understanding of this institution requires an interdisciplinary approach, considering both traditional civil law constructions and specifics of digital environment. In context of digital economy, servitude legal relations acquire a new dimension related to necessity of ensuring access to digital resources and infrastructure while maintaining basic principles of servitude law. Legal nature of digital servitudes is characterized by dualism, combining elements of classical real rights and peculiarities of regulating relations in digital space [16].

Digital servitude can be defined as a limited real right to use digital object or digital infrastructure belonging to another person, within certain limits and in accordance with established purpose. Specificity of digital servitude is manifested in peculiarities of object of legal relations, which are digital assets, information systems, software complexes and other objects of digital environment. Essential aspect of defining digital servitude is its focus on ensuring functioning of digital economy by creating legal mechanisms for access to digital resources and their joint use. Modern doctrine considers digital servitude as an innovative legal instrument adapting classical institutions of real rights to needs of digital era [17].

Comparative analysis of digital and traditional servitudes allows identification of both common features and significant differences between these legal constructions. Fundamental similarity is manifested in the purposeful orientation of both types of servitudes – ensuring possibility of limited use of another's property to satisfy certain needs of the entitled person. Fundamental differences are found in nature of objects of servitude rights: while traditional servitudes are established predominantly in relation to material real estate objects, digital servitudes extend to virtual objects and digital infrastructure. Specificity of digital environment determines peculiarities of implementing classical principles of servitude law, such as quality of following, principle of minimal encumbrance of servient estate's owner, compensatory nature of use [18].

Mechanisms for establishing and terminating digital servitudes also have significant peculiarities conditioned by specifics of digital environment. Unlike traditional servitudes requiring state registration, digital servitudes can be established through smart contracts and recorded in distributed ledgers. Automation of processes for establishing and terminating digital servitudes, ensured by application of blockchain technologies, creates new opportunities for effective regulation of servitude legal relations in digital environment. Meanwhile, necessity remains for ensuring balance of interests among participants in legal relations and protecting their rights in case of disputes [19].

Conceptual understanding of digital servitudes' place in system of real rights requires rethinking traditional approaches to understanding real rights in relation to digital environment. System of real rights, formed in conditions of material world, faces necessity of adaptation to virtual space, where objects of legal relations exist in digital form. Inclusion of digital servitudes in system of real rights is conditioned by objective

needs of modern civil turnover, requiring legal mechanisms for regulating relations regarding digital assets and infrastructure. Specificity of digital servitudes as special category of real rights is manifested in their dual nature, combining classical features of real rights with peculiarities of digital environment functioning [20].

Traditional features of real rights, such as absolute character, right of following, real-legal protection, acquire new content in relation to digital servitudes. Absolute character of digital servitudes is implemented through technical mechanisms of rights protection in digital environment, including cryptographic methods and access control systems. Right of following in context of digital servitudes is ensured through distributed ledgers and smart contracts recording encumbrances of digital assets. Real-legal protection of digital servitudes implies combination of traditional legal mechanisms with technical means of ensuring security in digital environment.

Peculiarities of digital servitudes as limited real rights are manifested in specific characteristics conditioned by nature of digital environment, whereby these characteristics significantly transform traditional understanding of limits for exercising real rights. Multi-level structure of digital servitudes, including technical and legal components, forms unique model of limited real right, within which limits of exercising powers are determined not only by legal norms but also by program code implementing automatic execution of servitude conditions. Fundamental importance is acquired by possibility of simultaneous establishment of multiple digital servitudes regarding one digital asset without substantial limitation of its use possibilities, since digital nature of object allows parallel access by various entitled persons.

Characteristic feature of digital servitudes is their dynamic character, manifested in possibility of automatic adaptation of servitude right content to changing conditions of digital asset use, whereby flexibility of legal construction of digital servitude is ensured by application of smart contracts allowing programming of various models of interaction among participants in servitude legal relations.

Institutional peculiarities of digital servitudes are also manifested in mechanisms of their protection, which must consider specifics of digital environment, whereby traditional methods of protecting real rights are supplemented by technical means of ensuring security and controlling access to digital assets. Integration of legal and technical mechanisms for protecting digital servitudes requires development of new approaches to ensuring balance between automatic execution of program code and possibility of judicial control over exercise of servitude rights, which is especially relevant in cases of disputes between participants in legal relations.

System of legal grounds for emergence of digital servitudes is characterized by combination of traditional civil law mechanisms with innovative technological solutions ensuring automation of process of establishing servitude rights in digital environment. Fundamental ground for emergence of digital servitude is agreement of parties, implemented through smart contract which automatically executes conditions embedded in it and records fact of establishing servitude right in distributed ledger. Legal nature of such agreement is characterized by complexity, as it simultaneously acts

as civil law contract and program code determining technical parameters of servitude right implementation, which requires special attention to issues of correlation between contractual conditions and algorithmic logic of smart contract [21].

Second substantial ground for emergence of digital servitudes is connected with administrative acts of authorized bodies, adopted to ensure public interests in digital environment, when necessity of establishing servitude is conditioned by needs of developing digital infrastructure or ensuring access to significant information resources. Specificity of this ground is manifested in necessity of integrating administrative procedures with technological solutions ensuring practical implementation of servitude right in digital space, whereby special significance is acquired by issues of determining fair compensation to owner of encumbered digital asset and mechanisms for protecting their interests.

The third ground is court decision on establishing digital servitude, made in cases when objective necessity for servitude encounters absence of voluntary consent from digital asset owner. Judicial practice in this sphere is in formation stage, which necessitates development of criteria for evaluating validity of claims for establishing digital servitude and determining conditions of its implementation. Fundamental importance is acquired by problem of technical implementation of court decisions on establishing digital servitudes, requiring development of special mechanisms for forced implementation of program code into existing information systems.

Process of exercising rights under digital servitude is characterized by complex interaction of legal and technological mechanisms, where realization of servitude holder's powers is inextricably linked with functioning of software and technical means ensuring access to digital asset. Automation of processes for exercising servitude rights through smart contracts forms new paradigm of implementing real rights in digital environment, where limits and conditions of digital asset use are determined not only by legal norms but also by program code, which ensures automatic execution of established restrictions and control over compliance with servitude conditions, whereby fundamental importance is acquired by problem of correspondence between algorithmic logic of smart contract and legal principles of exercising servitude rights.

Essential peculiarity of exercising rights under digital servitude is necessity of ensuring technical compatibility of information systems between servitude holder and digital asset owner, since effective implementation of servitude right is possible only with appropriate technical infrastructure allowing secure and controlled access to digital asset. Multi-level system of technical requirements and interaction protocols forms additional layer of relations between participants in servitude legal relationship, connected with ensuring technical conditions for implementing servitude right, whereby violation of technical requirements can lead to factual impossibility of exercising servitude holder's powers even with legal grounds present.

Special attention deserves problem of determining limits of exercising rights under digital servitude in conditions of dynamically changing digital environment, where technological changes can significantly affect possibilities and ways of using digital asset.

Mechanism of adapting servitude right content to changing technological conditions must provide possibility of operative revision of technical parameters for servitude implementation while maintaining its legal essence and ensuring balance of interests among participants in legal relationship, which requires development of flexible legal constructions considering specifics of digital environment.

System of grounds for terminating digital servitudes includes both traditional grounds characteristic for real rights in general and specific grounds conditioned by peculiarities of digital environment. Fundamental ground is agreement of parties on terminating servitude, implemented through smart contract which automatically terminates operation of program code ensuring exercise of servitude right. Procedure for terminating digital servitude by agreement of parties must provide mechanisms for verifying will expression of participants and recording fact of servitude termination in distributed ledger, since legal certainty in relations between participants in civil turnover depends on correctness of these procedures.

Specific ground for terminating digital servitudes is substantial change in technological conditions making impossible or impractical further exercise of servitude right in originally established form. This ground acquires special relevance in conditions of rapid development of digital technologies, where technological changes can lead to factual loss of servitude right object or radical change in ways of its use. Mechanism for terminating servitude on this ground must provide procedure for evaluating substantiality of technological changes and determining procedure for compensating expenses incurred by participants in legal relationship.

Third significant ground for terminating digital servitudes is systematic violation of established requirements for exercising servitude right, including violation of technical security protocols or exceeding established limits of digital asset use. Specificity of this ground lies in necessity of developing objective criteria for evaluating nature and substantiality of committed violations, since automatic termination of servitude at any deviation from established parameters can lead to violation of balance of interests among participants in legal relationship. Special importance is acquired by mechanism of pre-trial settlement of disputes related to termination of digital servitudes on this ground.

The system of protecting digital servitude holder's rights is characterized by an integral system including both traditional civil law methods of protection and special mechanisms considering specifics of digital environment. Real-legal methods of protection applied to digital servitudes are transformed under influence of technological peculiarities of digital assets, whereby traditional negatory action acquires new content aimed at removing obstacles in access to digital asset or restoring technical possibility of implementing servitude right. Effectiveness of these methods of protection largely depends on possibility of technical implementation of adopted court decisions, since restoration of violated right may require changes in program code or modification of information systems.

Obligatory-legal methods of protecting servitude holder's rights include claims for compensation of losses caused by violation of conditions for implementing digital

servitude, whereby special difficulty is presented by determining amount of lost profit in conditions of high volatility of digital assets' value. Mechanism for calculating losses must consider not only direct property damage but also indirect losses connected with impossibility of using digital asset in entrepreneurial activity or violation of technological chains dependent on servitude functioning.

Innovative element of servitude holder's rights protection system is technical means of protection embedded in smart contract program code, which ensure automatic prevention of violations and restoration of violated rights without necessity of recourse to traditional legal mechanisms. Implementation of automatic protection systems requires thorough elaboration of algorithms for their functioning and establishment of clear criteria for identifying violations, since erroneous activation of protective mechanisms can lead to unjustified restriction of participants' rights in legal relationship.

Legal status of encumbered digital object owner implies existence of special protection mechanisms aimed at preventing illegal expansion of limits for exercising servitude right and ensuring safety of digital asset. Fundamental method of protection is right to demand termination of illegal actions by servitude holder exceeding established limits of digital servitude implementation, where violation can be recorded through technical means of monitoring and automatic control of digital asset use. Mechanism for implementing this right must provide possibility of operative response to identified violations, including automatic blocking of access to digital asset upon reaching critical usage parameters.

Second significant element of owner's rights protection system is right to demand modification of conditions for implementing digital servitude in case of substantial change in technological or economic circumstances affecting nature of digital asset use. This right acquires special relevance in conditions of dynamic development of digital technologies, when initially established servitude parameters may become inadequate to changed conditions of digital asset use. Procedure for modifying conditions must ensure balance of parties' interests and consider technical possibilities of implementing introduced changes.

Special attention deserves problem of protecting owner's rights in plurality of digital servitudes established regarding one digital asset, since interaction of various servitudes can lead to conflict of their technical parameters or exhaustion of digital asset resources. Mechanism for resolving such conflicts must be based on clear criteria of servitude priority and rules for distributing available resources, which requires development of special algorithms for managing multiple servitudes.

Development of legislation in field of digital servitudes requires systematic approach to regulating new forms of property relations in digital environment. Priority direction of improving legal regulation is formation of unified conceptual apparatus defining legal status of digital assets as objects of servitude rights, since absence of unified terminology complicates formation of consistent law enforcement practice. Legislative consolidation of basic concepts must be accompanied by development of special norms

regulating peculiarities of establishing, implementing, and terminating digital servitudes considering specifics of digital environment.

Special direction of improving legislation is development of mechanisms for state registration of digital servitudes integrated with distributed ledger systems. Legal regulation of registration procedure must ensure combination of public reliability of information about servitude rights with technological possibilities of automatic recording of changes in legal status of digital assets. Special attention deserves problem of determining competence of registering bodies and establishing requirements for technical parameters of registration systems.

Third significant direction is improvement of mechanisms for protecting rights of participants in servitude legal relations in digital environment, including development of special procedural norms regulating procedure for considering disputes related to digital servitudes. Legislative regulation must provide possibility of using technical means for recording violations and automatic execution of court decisions through smart contracts.

Integration of digital servitudes institution into civil law system has transformative impact on fundamental principles and constructions of civil law regulation. Paramount importance is acquired by rethinking classical concept of real rights in relation to digital assets, since virtual nature of digital rights objects requires modification of traditional approaches to understanding owner's powers and limits of their restriction. Influence of digital servitudes on development of real rights theory is manifested in formation of new models of legal regulation considering specifics of digital environment and peculiarities of subjects' interaction in virtual space.

Significant trend in civil law development under influence of digital servitudes becomes integration of legal and technological mechanisms for regulating property relations, where program code acquires significance as instrument for implementing legal norms. This trend generates necessity of developing new methodological approaches to legal regulation considering possibilities of automatic execution of legal prescriptions through smart contracts and other technological solutions. Fundamental importance is acquired by problem of determining limits of legal regulation automation and preserving role of human factor in law enforcement process.

Influence of digital servitudes on development of contract law is manifested in formation of new types of contractual constructions combining elements of classical civil law contracts with technical protocols of interaction in digital environment. Modification of contractual regulation principles under influence of digital technologies requires rethinking traditional approaches to determining essential contract conditions, procedure for its conclusion and execution. Special importance is acquired by problem of ensuring balance between automation of contractual processes and preservation of parties' will autonomy.

CONCLUSION

Fundamental Finding : The study reveals that digital servitudes signify a transformative evolution of classical servitude rights, adapting to digital environments by merging real rights with technological control mechanisms, thus forming a hybrid legal construct. This convergence of legal norms and program code necessitates new regulatory paradigms. **Implication :** The findings highlight the need for comprehensive legislative reforms in the Republic of Uzbekistan to regulate digital servitudes, including the integration of legal protections with technological enforcement mechanisms, such as smart contracts and automated monitoring systems, ensuring a balanced legal framework in the digital realm. **Limitation :** This study primarily focuses on theoretical legal analysis and lacks empirical data on the practical application and enforcement of digital servitudes. **Future Research :** Further studies are recommended to explore the practical implementation of digital servitudes across different jurisdictions and to develop empirical models for evaluating the effectiveness of legal-technical regulatory mechanisms in safeguarding digital property rights.

REFERENCES

- [1] R. Adams, "The Evolution of Intellectual Property Rights in the Digital Age," *Journal of Modern Law and Policy*, vol. 3, pp. 52-63, 2023. doi: 10.47941/jmlp.1554.
- [2] D. V. Dozhdev, *Roman Private Law: A Practical Course*. Moscow: NORMA, 2018.
- [3] R. Zimmermann, *The Law of Obligations: Roman Foundations of the Civilian Tradition*. Oxford: Clarendon Press, 1996.
- [4] T. W. Merrill, "Property Rules, Liability Rules, and Adverse Possession," *Northwestern University Law Review*, vol. 79, pp. 1122-1154, 1985.
- [5] S. van Erp, "European Property Law: A Methodology for the Future," in *European Private Law - Current Status and Perspectives*, Schulze and Schulte-Nölke, Eds. Munich: Sellier European Law Publishers, 2011.
- [6] U. Mattei, *Basic Principles of Property Law: A Comparative Legal and Economic Introduction*. Greenwood Press, 2000.
- [7] R. H. Brescia, "Private Largess in the Digital Age: Privacy in Reich's The New Property," *Touro Law Review*, vol. 36, no. 3, 2021. Albany Law School Research Paper Forthcoming.
- [8] B. Lundqvist, "The Objectives of Regulating the Digital Economy Indicate That There is a Right to Data in the Digital Markets Act with Direct Effect and Applicability," *Faculty of Law, Stockholm University Research Paper No. 123*, 2023.
- [9] J. Van der Walt, *Constitutional Property Law*. Oxford University Press, 2012.
- [10] T. W. Merrill and H. E. Smith, "The Architecture of Property," in *Research Handbook on Private Law Theory*, H. Dagan and B. C. Zipursky, Eds. Edward Elgar Publishing, 2020.
- [11] M. R. Cohen, "Property and Sovereignty," *Cornell Law Review*, vol. 13, p. 8, 1927.
- [12] H. Dagan, *Property: Values and Institutions*. Oxford University Press, 2011.
- [13] G. S. Alexander, "The Human Flourishing Theory," *Cornell Legal Studies Research Paper No. 20-02*, 2020.
- [14] L. A. Fennell, "Property Beyond Exclusion," *William & Mary Law Review*, vol. 61, p. 521, 2019. University of Chicago Coase-Sandor Institute for Law & Economics Research Paper No. 873.

- [15] F. I. Michelman, "Property as a Constitutional Right," *Washington & Lee Law Review*, vol. 38, p. 1097, 1981.
- [16] Lehavi, *The Future of Property Rights: Digital Technology in the Real World*, 2020.
- [17] J. Fairfield, "Virtual Property," *Boston University Law Review*, vol. 85, p. 1047, 2005. *Indiana Legal Studies Research Paper No. 35*.
- [18] P. M. Schwartz, "Property, Privacy, and Personal Data."
- [19] J. Fairfield, "Property as the Law of Virtual Things," *Frontiers in Research Metrics and Analytics*, vol. 7, Article 981964, 2022. doi: 10.3389/frma.2022.981964.
- [20] M. A. Lemley, "The Economics of Improvement in Intellectual Property Law," *Texas Law Review*, vol. 75, p. 989, 2008. *Stanford Law and Economics Olin Working Paper No. 365*.
- [21] D. G. Post, "What Larry Doesn't Get: Code, Law, and Liberty in Cyberspace," *Stanford Law Review*, vol. 52, p. 1439, 2000.

Egamberdiev Eduard Khajibaevich

Tashkent State University of Law, Uzbekistan

Email: e.eduard@tsul.uz
