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Technological Neutrality of Norms: Prospects for Implementing a Legal Concept

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Abstract. Technological neutrality of legal norms is a category that lacks a single, substantive meaning applicable across most spheres of human activity. In scientific research, lawmaking and law enforcement, this category is invoked to address different problems. The purpose of the article is to assess the prospects for constructing legislation based on the idea of technological neutrality of norms and to evaluate the feasibility of using this category in lawmaking. The article analyses the main domains in which technological neutrality is discussed in scholarship and official documents, namely information technology, telecommunications and cryptography and considers the technological neutrality of potential regulatory solutions concerning crypto-assets. The research relies on formal-logical, formal-dogmatic, comparative and systemic methods. It argues that the idea of technological neutrality of norms can become an interdisciplinary scientific concept if researchers reach at least a working consensus on the meaning of this category. The article concludes that using the category of "technological neutrality" is possible and appropriate in specialized legislative acts and strategic planning documents, provided that the context clearly delineates the boundaries of such neutrality. At the same time, the system of norms should be structured around necessary restrictions on the use of technologies to protect human interests, taking into account the nature of particular technologies and the cultural characteristics of society.

Key words: technical regulation, information technology, electronic signature, certification, cryptocurrency, central bank digital currency, radio frequency spectrum, post-quantum cryptography, convergence

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Технологическая нейтральность норм как юридический концепт

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Аннотация. Технологическая нейтральность норм – одна из категорий, не имеющих содержательного наполнения, универсального для всех или значительной части сфер деятельности человека. В научных исследованиях, правотворчестве и правоприменении соответствующая категория используется для решения различных задач. Цель работы – оценить перспективы построения законодательства на основе идеи технологической нейтральности норм и возможность использования соответствующей категории в ходе правотворческой деятельности. Проанализированы основные сферы, применительно к которым в исследованиях и официальных документах ведется речь о технологической нейтральности: информационные технологии, телекоммуникация и криптография. Рассматривается проблема технологической нейтральности возможных нормативных решений, касающихся криптоактивов. Использованы формально-логический, формально-догматический, сравнительный, системный методы. Сделан вывод, что идея технологической нейтральности норм имеет перспективу стать междисциплинарной научной концепцией, если исследователям удастся прийти к консенсусу относительно значения соответствующей категории. Использование категории «технологическая нейтральность» возможно и целесообразно в специальных законодательных актах и документах стратегического планирования в соответствующем контексте, формирующем представление о границах этой нейтральности. Система норм законодательства должна строиться исходя из необходимости ограничений в использовании технологий для защиты интересов человека с учетом его природы и культурных особенностей социума.

Ключевые слова: техническое регулирование, информационные технологии, электронная подпись, сертификация, криптовалюта, цифровой рубль, радиочастотный спектр, постквантовая криптография, конвергенция

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Introduction

The technological neutrality of norms established by public authorities can be seen as one of the key concepts that, in the late 20th and early 21st centuries, was expected to enable the harmonious coexistence of societies divided by state borders through soft regulation of the information processes unfolding within them. The need to address technological neutrality in rulemaking, and the resulting body of law, became apparent as the telecommunications, media and information technology sectors began to converge, both in terms of the ability of different network platforms to provide similar types of services and in the integration of consumer devices such as the telephone, television and personal computer. This convergence of processes

and devices has produced a world where people can access ideas and images that have been recorded, photographed, sketched, spoken, or performed (Asthana & Panda, 2002:4).

The convergence of digital devices exacerbates the problem of economic globalization, which in its simplest form can be described as the unification of all economies through the use of modern technologies (Enebeli, 2024:97).

Convergence of information processes and devices attracted the attention of the authors of a preliminary governmental report containing proposals submitted by the European Commission for public consultation on December 3, 1997, namely the Green Paper on the convergence of the telecommunications, media and information technology sectors, and its regulatory implications – Towards an information society approach[1]. The expression "technology-neutral" regulation was mentioned there only once and was put in quotation marks[2].

Two years later, during the discussion of the bill in the House of Lords of the United Kingdom, the Earl of Northesk described attempts by the legislature to be technologically neutral by remarking that either the legislator does not does not understand how modern technologies work or behaves as though these technologies do not exist at all[3].

Mentions of technological neutrality in scientific publications and official documents addressing regulatory issues are often tied to specific applications or technologies. This paper assesses the prospects for constructing legislation based on the idea of technological neutrality of norms, as well as the feasibility of employing this category in law-making activities.

Neutrality of regulations in selected technology sectors

A Russian research team comprising experts in legal and technical sciences proposed, based on studies *of information systems'* functioning patterns, that the principle of technological neutrality be enshrined at the legislative level (Jarova et al., 2012:31).

Russian legal scholars A.Yu. Sokolov and O.L. Soldatkina argue that legal research benefits from precise terminology, as "clarifying terminology will allow us to attract effective research tools from technical disciplines" (Sokolov & Soldatkina, 2022:708). Descriptions of issues related to information transmission are best addressed using specialized terms. However, whether such terminology belongs in regulatory acts raises more complex questions.

[1] European Commission document dated December 3, 1997. Available at: https://digital-strategy.ec.europa.eu/en/library/green-paper-convergence-telecommunications-media-and-information-technology-sectors-and [Accessed 17th July 2024].

[2] Item IV.2.1 "A need for new definitions?" of Green Paper on the convergence of the telecommunications, media and information technology sectors, and the implications for Regulation – Towards an information society approach.

[3] Available at: https://hansard.parliament.uk/Lords/2000-06-28/debates/2b0681ab-c0cd-4d16-a941-b8d8066c1ce7/PartIiRelevantAuthoritiesForThePurposesOnlyOfS27 [Accessed 17th July 2024].

Legal researcher Ilse M. van der Haar from Tilburg University (Netherlands) notes that once a technology secures a customer base in network industries – characterized as winner-take-all markets – it becomes difficult to displace that technology with competing innovations (van der Haar, 2007:12). The challenge of technological neutrality in regulating information flows is particularly acute and interpreted through diverse lenses by specialists. For example, *net neutrality* appears in engineering research (Ezeigweneme et al., 2024:84) as well as legal scholarship (Danilenkov, 2016: 66).

In telecommunications research, Yu.A. Dombrovsky and V.A. Levchik note that abroad, the technological *neutrality in radio frequency spectrum* use allows operators to select a radio technology within their allocated band or switch to a new one without special permission from the national regulator (Dombrovsky & Levchik, 2012: 66). Sh.S. Nanushyan's analysis of Russian companies' competitiveness similarly observes that mobile operators can introduce news technologies within designated frequency ranges under such conditions (Nanushyan, 2014:208).

O.V. Biryukova, studying international legal regulation of *audiovisual services,* argues that technological neutrality's meaning is context-depended: it may function as a guiding principle, a mandatory rule, or merely an evaluative option (Biryukova, 2023:112).

Legal scholar Chris Reed from the University of London addresses technological neutrality in relation to *electronic signatures* (Reed, 2007:271–275) and *digital money* (Reed, 2007:276–278), both tied to cryptographic data protection. The content of Russian official documents on the digital ruble's legal regime[4], is likely to spark controversy in this context.

Cryptocurrency and Technological Neutrality of the Legislator

The inevitability of new objects of civil rights is noted by Russian civil-law scholars S.I. Suslova and U.B. Filatova, who speak about the *emergence principle* inherent in such objects (Suslova & Filatova, 2019:10). The system of objects of civil rights does indeed appear to have this feature, since its properties are not reducible to a mere sum of the properties of its constituent elements, and the emergence of a new element can radically change the role of others within this system.

The industrial development of certain inventions, such as steam engines, led to the formation of special legal constructs, including the doctrine of a source of increased danger, while the subsequent spread of automobile internal combustion engines promoted the introduction of compulsory civil liability insurance for vehicle owners[5].

[4] See paragraphs 38-41 of Article 3 and Article 7.1 of Federal Law No. 161-FZ of June 27, 2011 "On the National Payment System" (Collection of Legislation of the Russian Federation. 2011, No. 27, Art. 3872) and Bank of Russia Regulation No. 820-P of August 3, 2023 "On the Digital Ruble Platform" (Bulletin of the Bank of Russia, 2023, No. 58).

[5] See (Boldyrev & Shishkin, 2024:102).

Considering the problem of technological neutrality in relation to a contemporary phenomenon such as cryptocurrency helps to illustrate the complexity of decision-making facing the modern legislator.

Jurist R.E. Tovmasyan notes that the state's right to issue its own currency is a fundamental feature of the modern times (Tovmasyan, 2012:195). The threat posed by crypto-assets to the state is obvious: the existence of an alternative to official state currency systems and fiat (unbacked) money undermines the exclusivity of state financial authority and at the same time diminishes the effectiveness of measures to counter money laundering and the financing of terrorism[6].

Domestic legal scholars assess the risks of cryptocurrency circulation as a "threat to the fundamentals of state regulation of the economy" (Sannikova & Kharitonova, 2019: 91). However, imposing a ban or restrictions on cryptocurrencies by Russian authorities amid entrepreneurs' struggles with politically motivated foreign sanctions – would exacerbate discrimination against economically active civil market participants. Moreover, such regulation could hinder the development of distributed ledger technology (blockchain) (Sannikova & Kharitonova, 2021:149). Specifying in legislation the conditions for permitting or prohibiting the circulation of innovative products that society has valued as assets influences technology development and thus cannot be considered technologically neutral. Enumerating objects of civil rights in law represents one of the most potent tools for steering societal technological progress and inherently lacks technologically neutral.

The current situation – where the Russian legislator effectively ignores cryptocurrencies[7] while law enforcement treats them as property[8] – constitutes what we view as qualified legislative silence. Directly including cryptocurrencies among objects of civil rights would likely trigger a profound shift in civil law, prompting a reevaluation of the state's role and functions, and marking the initial step toward rethinking foundational principles of modern law. Society appears unprepared for such changes.

Historical experience shows that romantic anarchists often yield to those who value state regulation and balanced hierarchical structures aligned with human nature. As A.S. Erashov, an expert in budgetary legal relations, observes, both the state and not-state societal actors will eventually engage in regulating cryptocurrency issuance and circulation (Erashov, 2021:163).

[6] Federal Law No. 115-FZ of August 7, 2001 "On Countering the Legalization (Laundering) of Proceeds from Crime and the Financing of Terrorism" (Collection of Legislation of the Russian Federation. 2001. No. 33 (Part I), Art. 3418.

[7] The mention of digital currency in Federal Law No. 259-FZ of July 31, 2020 "On Digital Financial Assets, Digital Currency and Amendments to Certain Legislative Acts of the Russian Federation" (Collection of Legislation of the Russian Federation. 2020. No. 31 (Part I), Article 5018) did not establish a civil law regime for crypto assets and clarify their place within Russia's system of objects of civil rights.

[8] Ruling of the Judicial Board for Civil Cases of the Supreme Court of the Russian Federation No. 44-KG20-17-K7 (Case No. 2-2886/2019) of February 2, 2021. Accessed at: https://legalacts.ru/sud/opredelenie-sudebnoi-kollegii-po-grazhdanskim-delam-verkhovnogo-suda-rossiiskoi-federatsii-ot-02022021-n-44-kg20-17-k7-2-28862019/ [Accessed 17th July 2024].

The issue of crypto-assets in relation to technological neutrality of norms is also noteworthy because the emergence of super-powerful quantum computers poses risks to cryptographic protections relying on established technologies and encryption keys. A. Muhammad from Middlesex University's Faculty of Computer Science (United Kingdom) notes that "post-quantum cryptography" has become highly relevant (Muhammad, 2021:2). Using the category of "cryptocurrencies" in legislation or designating a separate class of such digital assets would likely stimulate the issuance of even more such "assets". The ethics and justification for fully legalizing such "values" from perspective of economic security remain highly questionable: bitcoins cannot deliver real benefits to people, as they fail to satisfy concrete human needs.

Cryptocurrency mining is extremely energy-intensive, efficiently expending energy to heat the atmosphere – a process that conflicts with international climate norms[9]. Studies on sustainable development highlight how current crypto operations contributes to global carbon dioxide emissions (Lal & You, 2024:1), meaning that the legalizing cryptocurrencies would clash with established principles of energy saving and efficiency enshrined in the Federal Law[10].

The necessary "technological bias"

Regulation of entrepreneurial obligations in Russia based on the idea of technological neutrality of norms remains inconsistent. A letter from the Federal Antimonopoly Service[11] (FAS of Russia) states that assessing an economic entity's dominant position for potential competition law violations requires adherence to the principle of technological neutrality. However, the FAS of Russia also notes that access technologies may vary significantly across Russian regions, indirectly acknowledging that the degree of technological neutrality in current decisions by commercial entities and their regulator is shaped by prior regulatory choices. This relativistic approach to technological neutrality has become a tool for managing technical and economic processes. Indirect administration – where economic actors operate within tight constraints yet remain formally unbound by explicit legal norms or directives – arises from the shift from hierarchical to distributed network principles of system organization (Kuznetsov, 2016:70).

Caris J. Craig, Professor of law at York University (Canada), rightly observes that neutrality itself is illusory – a myth used to conceal inequality, personal interests, or political agendas – and the principle of technological neutrality proves no exception (Craig, 2016:605).

[9] United Nations Framework Convention on Climate Change (May 9, 1992, New York). Available at: https://www.diplomatie.gouv.fr/IMG/pdf/convru_cle4374ef.pdf [Accessed 17th July 2024].

[10] Federal Law No. 261-FZ of November 23, 2009 "On Energy Saving, Increasing Energy Efficiency and Amendments to Certain Legislative Acts of the Russian Federation" (Collection of Legislation of the Russian Federation. 2009. No. 48, Art. 5711).

[11] Letter of the Federal Antimonopoly Service of Russia No. AG/28438/13 of July 22, 2013 "On Sending Methodological Recommendations". Available at: https://www.consultant.ru/document/cons_doc_LAW_150397/ [Accessed 17th July 2024].

Econometric analyses of societal transformation confirm digital inequality as a modern reality, observable even among economically advanced societies (Andrei et al., 2023:1). Dong Hee Shin, Associate Professor at Penn State University's School of Information Science and Technology (USA), emphasizes that technology continues to erode the previously illusory boundaries between personal and public interests amid digital inequality (Shin, 2006:49).

Modern technologies blur not only private-public boundaries, but more critically, those between human and machine, individual and society. Andrey Zwitter, Professor of political theory and governance at the University of Groningen (Netherlands), argues that this technological convergence on *the "human platform"* also fosters convergence in governance from a legal-regulatory perspective (Zwitter, 2024:5).

Technologies – along with their associated artificial (machine) and natural (human) languages – not only shape individual legal norms but also influence or predetermine the choice of legal system whose norms courts apply to disputes, notes V.N. Lisitsa, a private international law specialist (Lisitsa, 2023b:146).

References to technological neutrality in Russian official documents, though present, remain rare. For example, the *principle of climate policy*[12] requires technological neutrality in government measures taken in this area. Similarly, license agreements concluded as part of an experiment granting rights to use computer programs, algorithms, databases, and related documentation under open license conditions must meet the technology neutrality criterion[13].

Bias, as a quality of human thinking, inevitably manifests in technology use (Rajab, 2009:5). Twenty-century standards development consistently favored technologies that had already proved themselves. Thus, Article 1 of the European Convention on International Commercial Arbitration[14] permits arbitration agreements – bringing disputes within arbitral competence – to be concluded via telegrams or teletype messages, reflecting their prevalence in 1961 when the convention was drafted. This casuistic formulation does not preclude using other information technologies for modern arbitration agreements, as noted by V.N. Lisitsa (Lisitsa, 2023a:356). Italian legal scholar Gabriele Gagliani aptly observes that every seemingly technologically neutral ruling rests on hidden assumptions or "technological thinking" shaped by the progress prevailing at the time of drafting (Gagliani, 2020:732).

[12] Decree of the President of the Russian Federation No. 812 of October 26, 2023 "On Approval of the Climate Doctrine of the Russian Federation" (Collection of Legislation of the Russian Federation. 2023. No. 44, Art. 7865).

[13] Decree of the Government of the Russian Federation No. 1804 of October 10, 2022 "On Conducting an Experiment on Granting the Right to Use Computer Programs, Algorithms, Databases and Related Documentation, Including Those Whose Exclusive Rights Belong to the Russian Federation, under Open License Conditions and Creating Conditions for the Use of Open-Source Software" (Collection of Legislation of the Russian Federation. 2022. No. 42, Art. 7183).

[14] European Convention on International Commercial Arbitration (concluded in Geneva on April 21, 1961; Bulletin of the Supreme Arbitration Court of the Russian Federation. 1993. No. 10). Entered into force for the USSR (Russia's predecessor) on January 7, 1964 pursuant to Decree of the Presidium of the Supreme Soviet of the USSR No. 67-VI of May 14, 1962 "On the Ratification of the European Convention on International Commercial Arbitration" (Bulletin of the Supreme Soviet of the USSR. 1962. No. 20, p. 210).

Neuroscientists conclude that assessments of behaviors as safe and productive typically stem from observing others' experiences, manifesting as imitative behavior (Dubynin, 2022:49). Yet in the digital space, perceiving others' experiences demands extreme caution (Provalinsky, 2023:52). Laws of evolutionary selection cannot yet be deemed equally applicable to digital reality.

The emergence of the concept of "high-tech law" (Bertovsky, 2021:742; Isakov, 2023:923) – which involves implementing law enforcement activities using advanced technologies and regulating relations involving such technologies – confirms that lawyers are forming a stable connection in their minds between technical and social problems.

Scientific thought once rigidly dichotomizing binding norms into legal and technical categories, has gradually softened this division. This shift stems from evolving ideas about technical-social (Golovkin & Zotova, 2010:88), technical-juridical (Lukyanova, 2007:16; Ivanova, 1983; Cherdantsev, 1964), or technical-legal norms (Matuzov, 1996:145).

As N.V. Kovaleva observes, "the role of technical-legal norms (as a type of social norms) is only increasing in modern conditions" (Kovaleva, 2016:10). She emphasizes their accessory-concretizing function, derivation from legal norms, and necessity for detailing the rights and obligations of the parties (Kovaleva, 2016:12). N.I. Matuzov similarly describes their additional, accessory role (Matuzov 1996:145). Such views now appear incomplete, overemphasizing conscious-volitional human behavior based on prognostication. In his philosophy of law, I.A. Isaev notes that machines "began to claim power: they dictate and demand" and "for effective operation require adherence to rules" (Isaev, 2019:122).

Technologies are not neutral toward humans (Emelin, 2013:66). Digitalization's impact on the cognitive sphere provides clear evidence of this, with extensive discussion on the need for cautious handling of digital technologies – particularly artificial intelligence (Arkhipov, Naumov & Smirnova, 2021:895; Bryzgalina, 2021:10; Shishkin, 2021; Boldyrev, Svarchevsky & Klepalova, 2024). Thus, promoting technologies through legislation – such as explicitly permitting their use – demands extreme caution.

C.D. Craig argues not for "technological blindness" but for continuous "equilibrium adjustment" as technology evolves (Craig, 2016: 603). B.A. Greenberg, Legal Adviser and Research Associate at Yale Law School (USA), contends that technological discrimination can sometimes enhance social well-being (Greenberg, 2016:1498). The key question concerns the rational degree of such "technological bias" and its adequacy in relation to regulated system.

Technologies gain acceptance due to perceived advantages, not legal sanction, as Chris Reed clarifies (Reed, 2007:278) – evidently for those viewing positive law as primary. L.V. Sannikova deems excessive adherence to technological neutrality a mistake for the Russian legislator (Sannikova, 2019:87).

"Technological bias" in thinking exhibits generational divides, rendered starkly visible amid explosive information technology development. Whether in industrial production or civil rights circulation, technological neutrality

acquires context-specific (ad hoc) meaning through public or professional discourse. Framing the issue of norm neutrality matters, as developers cannot fully neutral – they often must embrace deliberate "technological bias".

Conclusion

The idea of technological neutrality of norms helps address challenges in fostering economic competition and ensuring stable communication within human communities based through device and information process compatibility.

Technological neutrality of norms currently represents a legal idea that with potential to evolve into a full-fledged interdisciplinary scientific concept, provided specialists from diverse fields reach consensus on its precise meaning. Initial consensus-building would benefit from employing the category in official documents without formal definitions.

The category "technological neutrality" proves advisable primarily in specialized legislative acts and strategic planning documents, applied within contexts that delineate its boundaries. Simultaneously, centrally adopted norm systems should incorporate sufficient "technological bias" to safeguard human interests, accounting for biological nature, cultural characteristics, and prevailing moral norms.

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