

Review

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# Technology Sovereignty as a New Imperative of National Sovereignty: Conceptual Framework and Legal Arrangements

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## ABSTRACT

The paper investigates technology sovereignty as a new imperative of national sovereignty in the digital age. The author analyzes the transformation of the conventional concept of sovereignty under the influence of advancements in technology and shows how the state's ability to control critical technologies and digital infrastructure is becoming a key element of national security and geopolitical authority. The paper focuses on the legal aspects of technology sovereignty in the context of contemporary challenges, including sanction pressure on Russia and the development of technology blocs in international relations. The paper traces the evolution of the legal regulation of technology sovereignty in Russia, from the first mentions in the 1990s to the contemporary systemic state policy as provided by the National Security Strategy and the Federal Law *On Technology Policy*. The author substantiates three strategic priorities ensuring technology sovereignty, including resilience to external challenges, development of competitive economic strength, and national autonomy. The paper provides a comprehensive analysis of legal arrangements used to implement technology sovereignty, including the regulation of critical and general purpose technologies, state support of innovations, and different types of international technology cooperation. The study contributes to the development of the national sovereignty doctrine, expands its traditional framework by adding the technology element, and offers best practices to improve legal regulation in this area.

**Keywords:** technology sovereignty; national sovereignty; national security; critical technologies; digital transformation; legal arrangements; sanction pressure.

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# Технологический суверенитет как новый императив государственного суверенитета: концептуальные основы и правовые механизмы реализации

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## АННОТАЦИЯ

В статье исследуется технологический суверенитет как новый императив государственного суверенитета в условиях цифровой эпохи. Автор анализирует трансформацию традиционной концепции суверенитета под влиянием технологического прогресса, демонстрируя, как способность государства контролировать критические технологии и цифровую инфраструктуру становится ключевым элементом национальной безопасности и геополитического влияния. Особое внимание уделяется правовым аспектам технологического суверенитета в контексте современных вызовов, включая санкционное давление на Россию и формирование технологических блоков в международных отношениях. В работе прослеживается эволюция нормативно-правового регулирования технологического суверенитета в России — от первых упоминаний в 1990-х годах до современной системной государственной политики, закрепленной в Стратегии национальной безопасности и Федеральном законе «О технологической политике». Автор обосновывает триаду стратегических приоритетов обеспечения технологического суверенитета: стрессоустойчивость к внешним вызовам, развитие конкурентоспособного экономического потенциала и обеспечение национальной автономии. Статья содержит комплексный анализ правовых механизмов реализации технологического суверенитета, включая регулирование критических и сквозных технологий, меры государственной поддержки инновационной деятельности и формы международного технологического сотрудничества. Исследование вносит вклад в развитие доктрины государственного суверенитета, расширяя ее традиционные рамки за счет технологического измерения, и предлагает практические рекомендации по совершенствованию правового регулирования в данной сфере.

**Ключевые слова:** технологический суверенитет; государственный суверенитет; национальная безопасность; критические технологии; цифровая трансформация; правовые механизмы; санкционное давление.

## Как цитировать

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## INTRODUCTION

At the beginning of the 21st century, technological advance ceased to be solely a driver of economic growth and became a key element of national security and sovereignty. Global digital transformation, rapid development of artificial intelligence, quantum computing, biotechnology, and other critical areas have led to the creation of a new paradigm of world order, where technological dominance is becoming the basis of geopolitical influence. In this context, the traditional framework of state sovereignty is expanding to include the country's ability to independently determine the path of its technological advancement, control strategic infrastructures, and protect digital sovereignty [1].

This issue has become particularly pressing in the context of growing geopolitical competition and sanctions pressure, which has most clearly manifested itself in relation to the Russian Federation after 2022 [2]. Restrictions on high-tech products supply, disconnection from international payment systems, and blocking access to foreign digital platforms and semiconductor technologies have demonstrated the vulnerability of nations dependent on external technological chains. These events were a clear illustration of how technological dependence can be used as a tool of political and economic coercion to challenge the exercising sovereign rights of the state in the digital age.

The current state of international relations is characterized by the creation of technological blocs, where groups of nations united around the technological leaders (USA, China, and EU) seek to ensure their dominance through control over critical standards, patents, and production capacities. In this regard, technological sovereignty is not just an economic category, as it is transforming into a fundamental aspect of national security and legal regulation [3].

The legal aspects of technological sovereignty require deep understanding in the context of international law, constitutional provisions and industry regulations. In the context of sanctions and technological restrictions, the state faces a set of questions: What are the legal mechanisms for protecting technological sovereignty in the context of external pressure? How to ensure that national laws meet the challenges of the digital age without isolating itself from global innovation processes? What international legal tools can be used to counter discriminatory technological restrictions?

Faced with unprecedented sanctions, the Russian Federation is forced to actively develop a new model of technological independence, which requires both economic and industrial actions and improvement of legal regulation. The adoption of the Strategy for Scientific and Technological Development, the initiative for IT import substitution, the development of a national payment system, and data

protection as part of digital sovereignty—all this is indicative of the search for new legal and organizational solutions [4].

In the premises, the study of the conceptual foundations of technological sovereignty and legal mechanisms for its implementation in Russia is relevant in theoretical and practical terms to ensure the national security of the Russian Federation.

## Conceptualization of National Sovereignty

The classical legal doctrine considers national sovereignty as a fundamental feature of the state, including two interrelated components: internal (supremacy of the public authority) and external (independence in international relations) [5]. The category of sovereignty was first studied by Duguit, who considered it as an informal legal construct with authority and ability to organize society within a territory. Duguit emphasized that sovereignty is inseparable from supreme authority supported by internal legal order [6]. Jellinek developed this idea by defining sovereignty as the capacity for exclusive legal self-determination, allowing the state to decide on its competence [7]. Schmitt focused on the political domain of sovereignty, interpreting it as the ultimate political authority capable of making decisions, especially during exceptional circumstances that transcend ordinary legal frameworks [8].

Contemporary scholars analyze sovereignty through the perspective of the supreme authority, ensuring internal order and protection from external interference. In international law, it forms the basis for state independence, allowing it to determine the political system, exercise control over jurisdiction, and shape foreign policy. The key elements of internal sovereignty are exclusive territorial control, governance over resources, and a monopoly on legitimate coercion. External sovereignty ensures territorial integrity, protection from interference, and independent international decision-making. As Le Bret noted, sovereignty is indivisible and is an integral attribute of stateness [9]. In the contemporary geopolitical context, constitutional order is a mechanism for maintaining a balance between internal autonomy and external interdependence.

The supremacy of state authority is manifested in its unconditional cover of the entire population and social structures, the monopoly on legitimate coercion, the exercise of powers in specific legal forms, and the prerogative of annulling regulations of non-state entities conflicting with the established legal order. Independence of state authority means complete autonomy in managing internal and external matters, shaping foreign policy and establishing equal relations with other nations [10].

Today's legal science emphasizes that sovereignty exists only when both of these conditions are met. Absence of any of them indicates the lack of sovereignty of a political

entity [11]. In this context, the federation constituent entities limited by constitutional provisions in terms of exercising external functions and some internal powers cannot be considered as bearers of even limited sovereignty—the latter remains an exclusive attribute of the state as an integral political and legal body [12].

The key attributes of the national sovereignty are its unity, indivisibility, and inalienability. Unity involves a single center of sovereign authority, which excludes the legitimate self-declaration of sovereignty by individual territories. Indivisibility means that state authority has full sovereignty and cannot be “partially sovereign.” The principle of inalienability means that it is impossible to transfer sovereign powers, although it allows for voluntary and temporary limitation of individual prerogatives as part of international cooperation [13], e.g. Russia’s participation in the Eurasian Economic Union and the Commonwealth of Independent States.

The territorial component of sovereignty is of particular importance in the context of contemporary challenges to stateness as full jurisdiction is impossible without control over a certain territorial continuum. While direct military intervention is a clear violation of sovereignty, other actions can also be considered violations, such as any forms of indirect coercion that lead to decisions contradicting national interests. With digital transformation, the conventional understanding of sovereignty requires rethinking through the perspective of new aspects, where technological sovereignty is particularly important as the ability of the state to control critical technologies, digital infrastructure, and innovations. This new aspect of sovereignty is becoming a key factor in national security in the context of technological rivalry between global centers of power, which requires special consideration of its relationship with the classical parameters of national sovereignty [14].

### **Evolution of Legal Regulation of Technological Sovereignty in Russia: From Initial Discussions to Full-Scale Implementation of a State-Level Strategy**

The relevance of the innovative model of social development is determined by the increasing influence of science and new technologies on social and economic development over the past 20–30 years. The innovative development involves reorienting the focus to using fundamentally new technologies, high-tech production, implementation of advanced organizational and managerial decisions in innovative business, and intellectualization of all processes. These technologies have dramatically and rapidly changed the global economy mix. It turned out that the country’s failure to restructure its economy based on the innovative technological order (or delay in doing so) both slows down its development and entails social and economic

degradation, making it impossible for global economic processes to propagate [15].

At the turn of the 20th and 21st centuries, the state’s influence on shaping the nation’s scientific and technological potential increased, necessitating the promotion of innovations among business entities and individuals. International experience of scientific and technological progress shows that the concept of technological dynamism (constant technological revolution) has gained credence in Western governments. This concept states that the leadership of the developed countries (USA, Japan, and Western Europe) in science and technology is determined both by the powerful development of the newest industries and the ability of quick ongoing reshaping of all sectors to create and diffuse the cutting-edge technologies as an innovative priority of the development of science and technology [16].

Technology policy develops in response to broader reforms aimed at encouraging productivity and economic growth and to address national concerns (such as jobs, education, and health) and global challenges, including energy security and climate change. New network and technology cluster initiatives are implemented, which, in the context of globalization, are helping to transform them from regional and isolated ones into world-class hubs. Implementation of these tasks contributes to successful cooperation between industry and research organizations [17].

In this context, technological policy objectives must be based on the public content determined by society in relation to the main components of the technological system and the signs of critical technologies [18]. Technologically advanced countries with critical technologies are securely positioned in the international arena. To regard a technology as critical, the screening procedure must be politically and technologically relevant (based on priorities of scientific and technological advancement), transparent, and accessible to the public.

Definition of such attribute as criticality and approaches to its assessment depend on the nation’s position and change from forecast to forecast. Factors that affect criticality and are considered in various forecasts include the influence on competitiveness, environment, national security, quality of life, etc. Critical technologies are sometimes defined as technologies that may be used in many areas of social productive activity (general-purpose technologies).

In international practice, governments keep focusing on determining priorities of scientific and technological advance, where one of the main elements is creating national lists of critical technologies. These lists are compiled for different purposes and the included technologies are selected by their potential contribution to achieving a particular goal. The basis for making lists of critical technologies are standards

reflecting both national and departmental (industry) distinctive features. From a certain perspective, these lists are a forecast of the future technological advancement of the nation, a reflection of its most important scientific and technical priorities. State programs for development of such technologies perform the steering function of the government in relation to high technologies based on securing federal funding for fundamental technologies. It is the government support that allows us to successfully compete in the markets for high-tech products and reach an appropriate level of technological safety [19].

Given the global experience of making lists of critical technologies as an instrument of governmental regulation of scientific and technological advancement, the evolution of fundamental approaches to technological sovereignty in Russia is of particular interest. While international practice demonstrates general principles for determining technological priorities, the Russian model has undergone a unique path of development, from the first use of the term “technological sovereignty” in 1992, including in the Executive Order *Matters of the Information and Analytical Center of the Administration of the President of the Russian Federation*,<sup>1</sup> in the context of information and analytical activities, through a period of focus on import substitution in the context of sanctions to a contemporary understanding of technological sovereignty as a strategy for creating own competitive technological solutions. This transformation shows the transition from a reactive policy of substituting foreign technologies to a proactive strategy of innovative advancement that ensures the nation’s actual technological independence.

Technological sovereignty is becoming both an element of national security and the most important determinant of the long-term economic development of Russia through achievement of Russia’s national development goals through 2030. Executive Order of the President of the Russian Federation *On the National Development Goals of the Russian Federation Through 2030 And For the Future Until 2036* determined key priorities, including a sustainable and fast-growing economy, technological leadership, and the digital transformation of the federal and municipal administration, economy, and social sector.<sup>2</sup>

The National Security Strategy of the Russian Federation<sup>3</sup> provides an expanded understanding of technological sovereignty, viewing it as an integral element of the overall national security system and an important criterion of scientific and technological security. The document emphasizes (Clause 22) that the key factors of the Russia’s long-term geopolitical position are the quality of human potential, technological leadership capacity, effective public administration, and transition of the economy to a new technological foundation. It is focused on economic security (Clause 62); in this sector, the need for structural changes is noted, including the transition from raw material exports to deep processing, development of high-tech industries, process improvement of basic industries using low-carbon technologies to ensure higher competitiveness and sustainability of the national economy. It is emphasized (Clause 68) that, in the context of global technological transition, leadership in scientific and technological development is becoming vital to ensure competitiveness and national security. The overall goal of scientific and technological advancement (Clause 75) is determined as achieving technological independence and competitiveness of the nation, implementation of national development goals and strategic priorities, which requires the comprehensive integration of political and economic strategies into a single national technological sovereignty policy. Specific implementation areas of this policy are determined in Resolution No. 603 of the Government of the Russian Federation dated April 15, 2023. It identified priority projects for technological sovereignty and structural adaptation of the economy, including 13 key areas (aviation industry, automotive industry, railway mechanical engineering and other strategic industries).<sup>4</sup>

A comparative analysis of foreign and Russian approaches to understanding technological sovereignty reveals significant differences in their focuses due to different political, economic,

<sup>1</sup> Order No. 385-rp of the President of the Russian Federation *Matters of the Information and Analytical Center of the Administration of the President of the Russian Federation*, dated July 20, 1992 // Website of the President of Russia. URL: <http://www.kremlin.ru/acts/bank/1721>. Accessed on April 1, 2025

<sup>2</sup> Executive Order No. 309 of the President of the Russian Federation *On the National Development Goals of the Russian Federation Through 2030 And for the Future Until 2036*, dated May 7, 2024 // Website of the President of Russia. URL: <http://kremlin.ru/events/president/news/73986> Accessed on April 1, 2025.

<sup>3</sup> Executive Order No. 400 of the President of the Russian Federation *On the National Security Strategy of the Russian Federation*, dated July 2, 2021 // Website of the President of Russia. URL: <http://www.kremlin.ru/acts/bank/47046>. Accessed on April 1, 2025

<sup>4</sup> Resolution No. 603 of the Government of the Russian Federation *On Approval of Priority Areas of Technological Sovereignty Projects And Projects of Structural Adaptation of the Economy of the Russian Federation And the Regulations on the Conditions for Classifying Projects as Technological Sovereignty Projects And Projects of Structural Adaptation of the Economy of the Russian Federation, Submission of Information on Technological Sovereignty Projects And Projects of Structural Adaptation of the Economy of the Russian Federation, And a Register of Such Projects, And the Requirements for Organizations Authorized to Submit Opinions on the Compliance of Projects With the Requirements to Technological Sovereignty Projects And Projects of Structural Adaptation of the Economy of the Russian Federation*, dated April 15, 2023 (as amended on November 06, 2024) // ConsultantPlus Law Assistance System. URL: [https://www.consultant.ru/document/cons\\_doc\\_LAW\\_444820/92d969e26a4326c5d02fa79b8f9cf4994ee5633b/](https://www.consultant.ru/document/cons_doc_LAW_444820/92d969e26a4326c5d02fa79b8f9cf4994ee5633b/) Accessed on April 1, 2025.



and geopolitical contexts. However, overall unanimity can be traced in recognition of technological sovereignty as a key element of national security and economic growth. A Russian concept stands out by its focus on integration of technological advancement into the system of governmental policy with the priority of national control over critical and cross-cutting technologies [20].

The methodological foundation of legal regulation in the analyzed sector is the theory of technological paradigms stipulating that economic advance is achieved through a successive change of process methods, where each is characterized by specific technologies and production structures. This theoretical foundation is reflected in the Concept of Technological Development<sup>5</sup> determining the basic conceptual framework. In particular, the concept of technological sovereignty is defined as “a country having in place (under governmental control) critical and cross-cutting technologies for its own lines of development and conditions for production based on them to ensure the sustainable capacity of the state and society to achieve their national development goals and implement national interests.”<sup>6</sup> The Concept focuses on two types of technological sovereignty, i.e. development of critical and cross-cutting technologies and high-tech production based on them, maintaining international cooperation with friendly countries at the same time.

The concept emphasizes the need for a systemic transformation of approaches to scientific and technological development, especially with resource scarcity, which requires a clear identification of priorities and their consistent implementation at all stages of the innovation cycle. These provisions correlate with previous strategic documents, including Resolution No. 317 of the Government of the Russian Federation *On Implementation of the National Technological Initiative*, dated April 18, 2016,<sup>7</sup> and the digital transformation program,<sup>8</sup> which highlights a need for a new legal environment meeting the challenges of technological advancement.

In 2024, in order to consolidate resources for implementation of scientific and technical programs aimed at achieving economic sovereignty and national security, Executive Order No. 529 of the President of the Russian Federation *On Approval of Priority Areas of Scientific And Technological Development And a List of the Most Important Science-Intensive Technologies* was passed on June 18, 2024.<sup>9</sup> This regulation identifies seven key areas of scientific and technological advancement, including high-performance and resource-saving energy generation; preventive and personalized medicine, including healthy longevity programs; highly productive and environmentally sustainable agriculture; security of receiving, storing, transmitting, and processing information; intelligent transport and telecommunication systems, including autonomous vehicles; strengthening the social and cultural identity of the Russian society and improving its education; adapting to climate change, preservation and efficient use of natural resources. In addition, the Executive Order distinguishes between critical and cross-cutting technologies; the list of critical technologies includes 21 items, covering energy and transport systems; biomedical, agricultural, information, social, and environmental technologies; whereas cross-cutting technologies include 8 areas, including synthetic biology and genetic engineering, new materials, artificial intelligence, and biotechnology.

Thus, in the context of achieving technological sovereignty, technological foresight has become a key instrument of public administration over the past decade, ensuring strategic planning of Russia's industrial and economic development in the short and long term. Having a cross-border and inter-industry effect, critical and cross-cutting technologies provide a technological foundation for the upgrading of Russia's industry and achieving global competitiveness. The rate of technological transformations in the nations leading the scientific and technological development confirms a decisive role of innovative high-performance technologies as a booster for economic growth. In this case, technological sovereignty requires a comprehensive consideration of relationship between four key development factors, including institutional conditions, economic mechanisms, technological capabilities, and organizational models. Their optimal configuration is the basis for sustainable technological development and competitive solutions in global markets.

<sup>5</sup> Resolution No. 1315-r of the Government of the Russian Federation *On Approval of the Concept of Technological Development Through 2030 (Together With the Concept of Technological Development Through 2030)*, dated May 20, 2023 (as amended on October 21, 2024) // Website of the Government of the Russian Federation. URL: <http://government.ru/docs/48570/> Accessed on April 1, 2025.

<sup>6</sup> Ibid.

<sup>7</sup> Resolution No. 317 of the Government of the Russian Federation *On Implementation of the National Technological Initiative*, dated April 18, 2016 // Website of the Government of the Russian Federation. URL: <http://static.government.ru/media/files/f1ArmUxbZla9jSRRPCM3ASByLzqyCyba.pdf> Accessed on April 1, 2025.

<sup>8</sup> Executive Order No. 203 of the President of the Russian Federation *On the Strategy For Development of the Information Society in the Russian Federation for 2017–2030*, dated May 09, 2017 // Website of the Government of the Russian Federation. URL: <http://www.kremlin.ru/acts/bank/41919>. Accessed on April 1, 2025

<sup>9</sup> Executive Order No. 529 of the President of the Russian Federation *On Approval of Priority Areas of Scientific And Technological Development And a List of the Most Important Science-Intensive Technologies*, dated June 18, 2024 // Website of the President of Russia. URL: <http://www.kremlin.ru/acts/bank/50755> Accessed on April 1, 2025.

## Technological Sovereignty in the Context of Modern Challenges: A Triad of Strategic Priorities

Innovations and technology advancement is a complex and multifaceted phenomenon, necessitating the consideration of international and regional aspects to identify its priorities. However, this requires steering and development of fundamental and applied research to lay the basis for technological advancement in general, which may bring rapid and significant results beneficial for the society. Therefore, given the innovative nature of technological changes, scientific and technological public policy should create the resource and intellectual potential of a specific region in line with national priorities for development of this sector. The international technological exchange capabilities allow to accelerate the social and economic development of the nation and its regions. International technology transfer is important for the technological support of social and economic development [21].

Social and economic growth has always been accompanied by technological restoration of all human productive activities from the industry to the way of life. The level of advancement of a nation can be assessed by the level of technology. However, the issue of primary influence of economics and technology on the acceleration of social and economic growth is still unsolved.

The extreme complexity of the technological sector requires a significant increase of generation of scientific information required both for the development and even for the security of the technological sector. In this context, the society has increasing needs for scientific research, including the original developments of Russian scientists, which makes the issue of protecting intellectual property more pressing.

Providing conditions for the development of Russian technological potential and its effective use for the benefit of the society based on global experience and the priorities of innovation and technology advancement aims to effectively implement the scientific and technology public policy by supporting Russian fundamental and applied research and culture as part of the global information and technological space.

Thus, we believe that technological sovereignty as an integral element of a nation's sovereignty should be based on three main pillars:

- Stress resistance;
- Development of competitive economic potential;
- Securing national autonomy.

I. *Stress resistance.* Sanctions aimed at restricting Russia's access to critical technologies, international payment systems, and high-tech supplies have clearly demonstrated the vulnerability of economies dependent on global value chains. In this context, sustainability of the national economy requires implementation of a set of actions, including

reducing critical dependence on foreign technologies, components, and financial instruments used for political pressure; designing adaptive mechanisms for prompt response to new restrictions through the diversification of foreign economic relations and building alternative logistics and financial routes; and the development of closed process cycles in strategic industries providing for the basic needs of the economy and the nation's defense.

Along with the sanctions challenges, the global issue of anthropogenic impact on ecosystems remains unsolved, making the issues of sustainable development pressing. Disregard of environmental issues in the long term aggravates technological dependence as the resource-based economy increases vulnerability to fluctuations in global markets and the lack of green technologies leads to increased environmental costs and limits access to global markets with stringent environmental standards.

Thus, ensuring the economy's resilience to stress in the context of sanctions requires a comprehensive approach that combines technological independence of critical sectors, an accelerated transition to a sustainable development model, and effective legal mechanisms that reduce the risks of further external pressure. The absence of such measures inevitably leads to increased dependence on external factors, significantly limiting the sovereignty of the nation in making key political and economic decisions.

II. *Development of competitive economic potential.* In the context of increased geopolitical instability, the competitive economic potential is becoming the key element of the nation's technological sovereignty. As Porter rightly noted, in the contemporary global economy, competitive advantages are created by the ability of the economic system to constantly undergo innovative improvement rather than using traditional inputs, which is becoming especially relevant for the Russian Federation in the context of technological confrontation [22].

The basis of competitive potential includes three related areas, i.e. development of the high-tech sector through innovative products, process improvement and deployment of advanced management technologies; encouraging of innovations through support for research and development, and creation of favorable conditions for technological start-ups; building of an effective innovative infrastructure, including venture financing, technological clusters, and mechanisms for cooperation between science and business. In today's context, the development of import-independent technologies in strategic industries such as microelectronics, machine tool manufacturing, pharmaceuticals, IT, and telecommunications is crucial.

Global experience shows that successful technological advancement is based on a set of factors, including constant

renewal of production equipment, development of human capital, an effective system for the commercialization of developments, and a favorable investment environment. For Russia, the task of creating closed technological chains in critical industries is becoming especially pressing and requires concerted actions by the government, business, and the scientific community, as well as development of proper legal mechanisms to support innovations. Thus, in the contemporary geopolitical context, the development of competitive economic potential converts from a purely economic task into the most important element of national sovereignty.

III. *Securing national autonomy.* Escalation of global technology competition calls for securing national autonomy in science and technology. Creation of a sustainable model of technological development capable of maintaining economic stability and political independence under external pressure requires a comprehensive approach that includes three related aspects.

First, strategic self-sufficiency involves creating own production potential in critical areas, including basic industrial technologies, information security systems, defense developments, and pharmaceutical products. Second, a flexible model of technological sovereignty is based on the development of national scientific and technological potential, diversification of international cooperation, and creation of back-up technologies. Third, the optimal balance between autonomy and cooperation is achieved through priority interaction with friendly countries, forging alternative technological alliances, and participation in mutually beneficial international projects.

Designing a comprehensive national innovation system that combines a powerful research complex, effective mechanisms used to commercialize developments, a modern educational infrastructure, and flexible types of public-private partnership is particularly important. Recent global experience convincingly demonstrates that it is the ability for technological self-sufficiency that determines the actual sovereignty of a state; at the same time, the most important condition is an optimal balance between the development of one's own potential and selective international cooperation.

From a legal perspective, technological autonomy requires consistent improvement of laws on scientific and technical policy, special legal treatment of critical technologies, effective for intellectual property protection mechanisms, and a technological forecasting system. In the contemporary geopolitical context, technological autonomy is transformed into a fundamental principle of technological sovereignty, simultaneously acting as a guarantor of economic stability and political independence against growing global challenges.

In general, technological sovereignty is a complex, multi-faceted category requiring a balanced combination of economic, technological, and legal mechanisms

to ensure national security and sustainable development in the face of global challenges. Effective implementation of these principles requires comprehensive legal regulation. The Russian Federation made a big step in this direction by adopting the Federal Law *On Technological Policy* in the Russian Federation,<sup>10</sup> dated December 28, 2024, which undoubtedly represents an important milestone in the development of the legal basis for technological sovereignty. Indeed, this regulation positioned as system-forming introduces a comprehensive mechanism of state regulation of technological development and seems timely in the context of current geopolitical realities.

The Law is a noteworthy attempt to systematize approaches to technological development by identifying critical (Article 10) and cross-cutting technologies (Article 11) and build institutional foundations for national projects of technological leadership (Chapter 4) and the development of cross-cutting technologies (Chapter 5). However, it should be noted that the effectiveness of these mechanisms will be determined by the quality of their specification in by-laws and their practical application.

The Law is distinguished by the detailed regulation of the powers of authorities at different levels (Articles 7–8); roles of publicly owned organizations (Article 9); mechanisms of technological cooperation (Article 16); and actions to encourage innovations (Articles 22–24). On the one hand, this provides legal certainty, but on the other hand, may lead to excessive bureaucratization of innovations, requiring an in-depth analysis of the possible consequences for the competitive environment, primarily in light of upgrading the legal status of key state corporations.

The Federal Law *On Technological Policy in the Russian Federation* is an important but risky attempt to create a legal basis for technological sovereignty. It benefits from its comprehensive approach to regulation, but final conclusions on the effectiveness of this law can only be made based on the sufficient law enforcement practice and an analysis of its impact on national innovations.

## CONCLUSION

The study allows us to make some fundamental conclusions that are important for understanding the contemporary transformation of the concept of state sovereignty. At the beginning of the 21st century, technological advance ceased to be solely a driver of economic growth and became a key element of national security and sovereignty. The global

<sup>10</sup> Federal Law No. 523-FZ *On Technological Policy in the Russian Federation And Amendments to Individual Laws of the Russian Federation*, dated December 28, 2024. ConsultantPlus Law Assistance System URL: [https://www.consultant.ru/document/cons\\_doc\\_LAW\\_494804/](https://www.consultant.ru/document/cons_doc_LAW_494804/) Accessed on April 1, 2025.



digital transformation has led to a new paradigm of world order, where technological dominance is becoming the basis of geopolitical influence and the conventional framework of state sovereignty is expanding, now including the ability of a nation to independently determine the trajectory of its technological development.

An analysis of the current geopolitical context, especially the sanctions pressure on Russia, clearly demonstrated the vulnerability of states dependent on external technological chains. Restricted supply of high-tech products and disconnection from international payment systems have shown how technological dependence can be used as a tool of political and economic coercion. In this environment, technological sovereignty ceases to be solely an economic category, transforming into a fundamental aspect of national security.

A study of the classical doctrine of state sovereignty has confirmed that its key characteristics—unity, indivisibility, and inalienability—take on new meaning in the digital age. The territorial component of sovereignty is complemented by a technological domain, where both direct military intervention and technological coercion should be considered as a violation of sovereignty.

The Russian Federation is taking systemic steps to develop the legal basis for technological sovereignty as reflected both in scheduled regulations and specific substantive laws. Thus, the adopted regulations form a comprehensive system of legal regulation, including the definition of critical and cross-cutting technologies, mechanisms of public administration and encouraging innovations. Adopted in 2024, the Federal Law *On Technological Policy* is an important step in creating an effective legal mechanism of technological sovereignty. It is an important detailed regulation of the powers of authorities, the roles of publicly owned organizations, and actions to encourage innovations. However, a lot will depend on the proper implementation of the envisaged provisions and their specification in the by-laws of executive authorities based on the three key pillars of technological sovereignty, including resilience to external threats, development of competitive economic potential, and national autonomy. The analysis showed that the combination of these elements allows to maintain sovereignty in the context of technological competition of global centers of power.

In general, the study confirms that in contemporary conditions, technological sovereignty is becoming an integral component and material basis of state sovereignty. State sovereignty requires a balanced approach that combines the development of own scientific and technology potential with selective international cooperation. Further research should be aimed at developing criteria of technological sovereignty and improving the mechanisms of its legal protection in the context of global technological competition.

## ADDITIONAL INFO

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## ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

**Вклад автора.** Д.В. Галушко — определение концепции, сбор, анализ и обобщение литературы, написание черновика, пересмотр и редактирование рукописи. Автор одобрил рукопись (версию для публикации), а также согласился нести ответственность за все аспекты настоящей работы, гарантируя надлежащее рассмотрение и решение вопросов, связанных с точностью и добросовестностью любой ее части.

**Источники финансирования.** Статья подготовлена по результатам исследований, выполненных за счет бюджетных средств по государственному заданию Финансового университета при Правительстве Российской Федерации.

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## REFERENCES | СПИСОК ЛИТЕРАТУРЫ

1. Ivanov VV. Technological sovereignty as a factor of strategic development. *Futurity Designing. Digital Reality Problems*. 2024;(7):33–37. EDN: RFCRWN doi: 10.20948/future-2024-1-2
2. Porokhovskiy AA. Economic sovereignty of Russia: problems of formation and maintenance. *Economic Revival of Russia*. 2023;(77):10–15. doi: 10.37930/1990-9780-2023-3-77-10-15 EDN: CVZNNO
3. Edler J, Blind K, Kroll H, et al. *Technology sovereignty as an emerging frame for innovation policy: Defining rationales, ends and means*. Fraunhofer ISI Discussion Papers Innovation Systems and Policy Analysis. 2021;70. doi: 10.24406/publica-fhg-301112
4. Dudin MN, Shkodinskij SV, Prodchenko IA, et al. *Economic sovereignty of the state in the digital age: theoretical and applied aspects*. Moscow: Rusajns; 2022. 240 p. (In Russ.)
5. Galushko DV. On a state sovereignty in international law. *Proceedings of Voronezh State University Series Law*. 2013;(14):366–374. EDN: QRWAAJ
6. Duguit L. *Law in the modern state*. New York: B.W. Huebsch; 1919.
7. Jellinek G. *General theory of the state*. New York: Lawbook Exchange; 2002.
8. Schmitt C. *Dictatorship*. Cambridge: Polity Press; 2014.
9. Costa P, Zolo D, editors. *The rule of law: history, theory and criticism*. Dordrecht: Springer; 2007. 700 p. doi: 10.1007/978-1-4020-5745-8
10. Zhuleva MS, Konev YuM. The concept of state sovereignty in the context of transformation of the modern world order. *Proceedings of Higher Educational Institutions. Sociology. Economics. Politics*. 2022;15(3):35–49. doi: 10.31660/1993-1824-2022-3-35-49 EDN: KUYQTO
11. Podosinnikova LA. State sovereignty: modern understanding and its types. *Uchenye trudy Rossiiskogo universiteta advokatury i notariata imeni G.B. Mirzoeva*. 2024;(73):16–25. EDN: GYJELL
12. Yakovlev MM. Unified state power and its sovereignty as decisive factors in the formation of federal unity of the Russian State. *Law and State: The Theory and Practice*. 2024;(230):75–77. doi: 10.47643/1815-1337\_2024\_2\_75 EDN: JTSJJZ
13. Galushko DV. International integration organizations and sovereignty of member states. *Legal Concept*. 2021;20(1):137–143. doi: 10.15688/lc.jvolu.2021.1.21 EDN: HWUUOK
14. Varlen MV. Information, technological, economic and financial sovereignty as newest types of autonomy. *Courier of Kutafin Moscow State Law University (MSAL)*. 2023;(109):214–222. doi: 10.17803/2311-5998.2023.109.9.214-222 EDN: WTJMUZ
15. Pushkareva LV. *Modern global problems of the world economy*. Saint Petersburg: Izdatel'sko-poligraficheskaya assotsiatsiya vysshikh uchebnykh zavedenii; 2022. 140 p. (In Russ.) EDN: GRTCUG
16. Bodrova EV, Kalinov VV. *Scientific and technical potential of Russia: search for ways to implement a technological breakthrough at the beginning of the 21st century. 3rd ed*. Moscow: Dashkov i K; 2023. 432 p. (In Russ.) EDN: XPPKDI
17. Khachatryan AA. *Human capital in the context of technological globalization*. Moscow: LLC Ruscience; 2023. 182 p. (In Russ.) EDN: TFYZBH
18. Gu H. Data, big tech, and the new concept of sovereignty. *Journal of Chinese Political Science*. 2024;29:591–612. doi: 10.1007/s11366-023-09855-1 EDN: RERQIF
19. Broeders D, Cristiano F, Kaminska M. In search of digital sovereignty and strategic autonomy: normative power Europe to the test of its geopolitical ambitions. *Journal of Common Market Studies*. 2023;61(5):1261–1280. EDN: DDTSZN doi: 10.1111/jcms.13462
20. Potapsteva EV, Akberdina VV, Ponomareva AO. The concept of technological sovereignty in the state policy of contemporary Russia. *AlterEconomics*. 2024;21(4):818–842. EDN: QMSCPH doi: 10.31063/AlterEconomics/2024.21-4.9
21. Schot J, Steinmueller WE. Three frames for innovation policy: R&D, systems of innovation and transformative change. *Research Policy*. 2018;47(9):1554–1567. doi: 10.1016/j.respol.2018.08.011
22. Porter ME. *On competition. updated and expanded edition*. Boston: Harvard Business School Publishing; 2008. 576 p.

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