

DOI: 10.37930/2782-6465-2026-5-3-77-87

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THE NOOTRANSITION: INDUSTRIAL POLICY AS A TOOL FOR SHAPING THE MATERIAL BASE OF NIS.2

Abstract: Our civilization is experiencing an era of qualitative transformations driven by the contradiction between the capabilities of advanced technologies and the economic form of their application. Technologies of the sixth technological paradigm, based on NBICS convergence, create prerequisites for unmanned production and the satisfaction of humanity's rational needs. However, the capitalist organization of production directs them toward profit extraction and the generation of simulative needs. Resolving this contradiction requires a transition from the economy to noonomy, which relies on criteria of rationality instead of a limited economic rationality focused on inflating value indicators.

The article explores the issues of the fundamental transformation of industrial policy in the context of the nootransition – a managed process of movement toward noonomy through the formation of the material base of the new industrial society of the second generation (NIS.2). A key characteristic of NIS.2 consists in a sharp increase in the knowledge intensity of production, where the technological application of knowledge acquires a dominant share compared to the costs of materials, energy, and living labor. Production transforms into nooproduction, based on the displacement of humans from the immediate production process while maintaining control by the human mind embodied in knowledge, technologies, and cultural values.

A fundamental redefinition of industrial policy is considered: from stimulating traditional parameters of economic growth (employment, output, profit) to managing an autonomous technosphere and directing it toward satisfying nooneeds. Nooneeds are rational needs formed on the basis of culture, knowledge, creative personality development, and socially meaningful self-improvement. The technosphere acquires the capacity for self-organization and self-development within set parameters; however, goal-setting, control over permissible means of goal realization, and the blocking of undesirable directions remain the prerogative of human society.

As part of solving the problem of accelerating the nootransition, the strategic directions of industrial policy are analyzed: ensuring technological sovereignty in critical areas; the reintegration of science, production, and education; and new industrialization as a transitional stage to knowledge-intensive industries. In the Russian context, the formation of the material base of NIS.2 becomes an imperative of national security and an opportunity to offer the world an alternative to the “dead ends” of the neoliberal development model.

Keywords: noonomy, nootransition, industrial policy, NIS.2, knowledge intensity of production, knowledge-intensive product, technological sovereignty, reindustrialization.

For citation: Bodrunov S. D. (2026). The Nootransition: Industrial Policy as a Tool for Shaping the Material Base of NIS.2. *Noonomy and Noosociety. Almanac of Scientific Works of the S. Y. Witte INID*, Vol. 5, No. 3, pp. 77–87. DOI: 10.37930/2782-6465-2026-5-3-77-87

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智慧型转型:工业政策是构建第二代新工业社会物质基础的工具

摘要:我们的文明正经历着一场质的变革,其根源在于先进技术的功能与其实现其实际应用的经济形式之间的矛盾。基于NBICS的具有第六代技术范式的技术,为无人化生产和满足人类的理性需求创造了前提条件。然而,资本主义的生产组织模式却以营造虚假需求并牟利为目标。要解决这一矛盾,就必须从传统经济向智慧型经济转型,后者依靠的是理性标准,而不是以价值增长为目标的经济性。

本文探讨了在智慧型转型条件下工业政策发生根本性变革的问题。智慧型转型就是通过构建第二代新工业社会(NIS.2)的物质基础,有组织地向智慧型经济过度的过程。第二代新工业社会(NIS.2)的关键特征在于生产知识密集度的急速提升,此时知识的技术化应用在生产成本中所占的比重,已远超材料、能源和活劳动。生产正转型为智慧型,其基础在于人类脱离直接生产过程,同时保持由被转化到知识、技术和文化价值观中的人类理性对生产过程的管控。

本文探讨了工业政策的根本性重新定义:从刺激传统经济增长指标(就业、产量、利润)转向对自主技术领域的管理,并使其以满足智慧型需求为目标。智慧型需求是指基于文化、知识、个体的创造性发展以及具有社会意义的自我完善而形成的理性需求。技术领域在既定参数范围内获得了自我组织和自我发展的能力,但目标设定、对实现目标可用手段的控制以及对不良发展方向的排除,仍属于人类社会的专属权限。

为了解决加快智慧型转型这一问题,本文分析了工业政策的战略方向:在关键领域确保技术主权;实现科学、生产与教育的再融合;将新工业化作为向知识密集型产业转型的过渡阶段。就俄罗斯来讲,构建第二代新工业社会(NIS.2)的物质基础已成为国家安全的绝对需要,也是向世界提供一种可以替代走入死胡同的新自由主义发展模式的方案。

关键词: 智慧型经济、智慧型转型、工业政策、NIS.2、知识密集型生产、知识密集型产品、技术主权,再工业化。

引用注释:博德鲁诺夫S. D. (2026). 智慧型转型:工业政策是构建第二代新工业社会物质基础的工具//智慧经济与智慧社会. 维捷新兴工业发展研究所论文选, Vol. 5, No. 3, pp. 77–87. DOI: 10.37930/2782-6465-2026-5-3-77-87

Introduction: The Civilizational Turn and Technology Background of Noonomy

Modern civilization is entering a phase of qualitative transformation driven by vigorous technological progress that is dramatically altering the nature of production, social structure, and human nature itself. We are witnessing not just the next wave of scientific and technological revolution, but a transition to a fundamentally different way of managing economic activity – from economics to noonomy [Bodrunov, 2018a]. This transition, or nootransition, requires the establishment of an appropriate material basis, with its core being the New Industrial Society of the Second Generation (NIS.2) [Bodrunov, 2016].

The key feature of NIS.2 is associated with a sharp increase in the knowledge intensity of production and the transition to the production of knowledge-intensive products, where technologically applied knowledge acquires an increasing proportion compared to the costs of materials, energy, and human labor [Bodrunov, 2025a]. Ultimately, such production takes the form of noo-production, or noo-intensive production [Bodrunov, 2018b].

Under these conditions, industrial policy is redefined as a mechanism for managing the autonomous technosphere, its orientation toward satisfying nooneeds, and the establishment of institutional mechanisms for public oversight over self-developing production [Bodrunov, 2023a]. Traditional metrics of economic growth – employment, output, and profits – are losing their status as key criteria. It is this transformation of industrial policy that forms the subject of our analysis.

I. From Economic Paradigm to Noo-Industrial Paradigm: Theoretical Prerequisites for the Nootransition

1.1. Economic Management and its Limits

Economics, as a method of management, developed historically in conditions of resource scarcity and underdeveloped technology. Its criteria are based on maximizing value, economic rationality, and profit-making. However, as technology advances and production knowledge-intensity grows, the economic paradigm increasingly reveals its limitations.

A contradiction emerges between the capabilities of modern technologies and the economic forms of their application. Technologies of the sixth technological paradigm [Glazyev, 2015] based on NBICS convergence – that is, the convergence of nano-, bio-, information, cognitive, and socio-humanitarian technologies [Spohrer, 2004] – create the background for unmanned production and the satisfaction of reasonable needs of all humanity. However, the capitalist form of production management directs these powerful technological capabilities toward profit-making, the generation of simulative needs, and the expansion of production output for the sake of production itself [Bodrunov, 2022a].

Noonomy offers a fundamentally different criterial framework. A shift is underway from the paradigm of quantitative growth based on limited economic rationality to a paradigm of qualitative development based on the achievement of specific goals and the satisfaction of human needs shaped by culture, knowledge, solidarity, and the humanistic values of noosociety. A new nature of rationality (reasonableness) based on the criteria of reason and culture is acquiring paramount importance [Bodrunov, 2026a].

1.2. Nooproduction: The Technological Foundation of Noonomy

Nooproduction is a production based, firstly, on displacing humans from the direct production process through the maximum increase in its knowledge intensity, and, secondly, on placing this production under the supervision of human mind, based on an adequate level of society's culture [Bodrunov, 2018b].

Knowledge intensity of material production characterizes a state of the production process where knowledge embodied in technologies, production engineering, worker qualifications, and the properties of the created product becomes critical [Bodrunov, 2025a]. Critical synthesis is expressed in the fact that in high-tech production, humans begin to play a major role as the bearer, producer, and applicator of knowledge transformed into productive activity. As Karl Marx noted, human being “steps to the side of the production process” and “comes to relate more as watchman and regulator to the production process itself” [Marx, 1969].

The technology background of nooproduction includes hybrid technologies characterized by the interpenetration and interdependence of various technological platforms. The interplay of information technology, biotechnology, nanotechnology, and other advanced technologies is exploding. Modern manufacturing complexes increasingly rely on artificial intelligence, the In-

dustrial Internet of Things, big data processing, and additive technologies, creating highly automated production processes with minimal human involvement in the material and production process [Bodrunov, 2025b].

A key characteristic of nooproduct is the autonomy of technosphere. Technological systems are evolving to a state where they acquire the capacity for self-organization and autonomous dynamics, while remaining within the constraints of established social norms. However, this autonomy does not necessarily mean the technosphere is no longer subject to public oversight. On the contrary, the dimension of goal-setting, the articulation of goals and objectives, and control over the permissible means of their implementation fall within the remit of human society [Bodrunov, 2018a]. Autonomous technoentities remain dependent on human society which determines the limitations of their self-development, blocks areas that do not benefit society, and orients the technosphere toward satisfying nooneeds.

1.3. From Employment and Output to Nooneeds: Redefining Targets

Traditional industrial policy is focused on stimulating employment, increasing production volumes, and enhancing the competitiveness of national industry. These criteria are consistent with an economic paradigm where production is an end in itself and people are a means of achieving it.

Nootransition implies a radical rethinking of the very foundations of goal-setting in industrial policy. The primary criterion becomes the degree to which nooneeds are satisfied – needs that arise through creative self-development, learning, and cultural growth. Nooneeds are qualitatively different from traditional economic needs. They are oriented toward personal development, the fulfillment of creative potential, and the satisfaction of cognitive and cultural aspirations. An economic system based on promoting simulative needs, so-called excesses and fantasies, is increasingly at odds with this new reality [Bodrunov, 2022a].

Noonomy relies on non-economic criteria for the rationality of production and consumption, focusing on the actual level of satisfaction of reasonable needs. This presupposes a transition from the accumulation of volumetric monetary measures to the achievement of specific development goals and the satisfaction of various higher-order human needs.

II. Industrial Policy in the Context of Nootransition: New Content

2.1. Technological Sovereignty as a Prerequisite for Nootransition

In an era of global transformation and geopolitical turbulence, the issue of technological sovereignty is of crucial importance [Lenchuk, 2026]. Technological sovereignty is a broader category than technological self-sufficiency. It represents a combination of self-sufficiency in priority technological areas with the capability of equal exchange and cooperation, and the ability to independently determine technological development trajectories and exercise control over key technological chains [Bodrunov, 2023b].

Complete technological self-sufficiency across all types of technologies and production is impossible in the modern world – no state has the resources to achieve and replicate it. Therefore, technological self-sufficiency should be considered primarily in certain areas. Technological dependence is a state of a country when its defense capability, economic security, and ability to develop independently are under threat due to critical dependence on external technological supplies.

For Russia, securing technological sovereignty means developing its own NIS.2 technology expertise [Bodrunov, 2023b] capable of becoming the material foundation for noonomy. Without this foundation, the transition to a non-economic system is impossible – the country will become dependent on technology centers, which will retain control over goal-setting and courses of development.

Industrial policy in this context should be aimed at prioritizing the development of high-tech industries, establishing complete production cycles in critical areas (microelectronics, artificial intelligence, new materials, biotechnology), and creating conditions for NBICS convergence based on national facilities. At the same time, technological sovereignty does not mean autarky or isolation. On the contrary, it creates a foundation for equitable international technological and industrial cooperation. The goal is to develop our own industrial potential on a qualitatively new basis, draw on the best of global experience, and pool our efforts to address common civilizational challenges [Bezrukov, Baydarov, Faikov, 2026].

2.2. Integration of Science, Manufacturing and Education as a Key Mechanism

The transition to knowledge-intensive production necessitates the integration of science, manufacturing, and education into a single reproductive complex [Bodrunov, 2015]. These sectors cease to exist in isolation, merging into an organic whole and giving rise to a fundamentally new type of reproduction – nooreproduction – where the development of the noosphere as a domain of reason, knowledge, and culture becomes a priority [Vernadsky, 1991]. In this process, scientific research directly translates into technological development, education is linked to industrial practice, and the production process becomes a platform for generating new knowledge. The successful development of modern manufacturing is impossible without its deep integration with education and science.

Industrial policy should promote the creation of integrated scientific, industrial, and educational complexes where research, design, production, and educational activities interpenetrate [Dmitriev, 2026]. Technology transfer previously understood as the transfer of ready-made solutions from one entity to another is being transformed into a systematic process of knowledge circulation within a single system – similar to the circulation of nutrients within a living organism. Expanding the practice of public-private partnerships in this area and recreating elementary and secondary vocational education focused on the needs of high-tech production [Yakovleva, Shafanskaya, 2025] – these are the imperatives of modern industrial policy.

2.3. New Industrialization as a Transitional Stage

For most countries, including Russia, nootransition is impossible through a direct leap from post-industrial decline to a noonomic future. A transitional stage is required – reindustrialization on a new technological basis, or new industrialization [Bodrunov, 2013; Ryazanov, 2014], providing movement from a deindustrialized economic reality to the material basis of NIS.2 and subsequent nootransition [Bodrunov, 2016]. For Russia, new industrialization is not just the restoration of industrial production after the deindustrialization of the 1990s, but a transition to a fundamentally new quality of industrial development based on advanced technological paradigms [Glazyev, 2026].

New industrialization presupposes profound structural shifts in favor of knowledge-intensive manufacturing industries, the establishment of developed mechanical engineering facilities as

the foundation of technological self-sufficiency, and the creation of full production cycles for complex high-tech products. The fundamental features of the new industrialization include a shift away from “technological gigantism” (oversizing production), reorganization and integration of production processes, and the development of key foundational technologies that secure technological self-sufficiency.

Industrial policy at this stage must be proactive and targeted. The delusion of an “invisible hand of the market” capable of independently leading the economy out of a deindustrial impasse has long been dispelled by historical experience. Without government intervention, without strategic planning, without public-private partnership mechanisms, the depth of deindustrialization cannot be overcome by market mechanisms alone [Bodrunov, Grinberg, Sorokin, 2013]. A comprehensive system of measures is required, including adequate monetary and fiscal policies, boosting domestic demand for high-tech products, and supporting priority development areas. Reintegrating science and production, building on well-developed research capabilities that facilitate the generation of innovations and their penetration into mass production – these are the key areas of reindustrialization.

III. Governance of the Autonomous Technosphere: Contours of Public Oversight

3.1. Goal Setting in Nooproduction: Who Determines the Goals?

The key, perhaps most pressing, issue of nooproduction is the problem of goal setting. When production becomes autonomous, when humans leave the realm of direct production operations, society faces a fundamental question: who determines the goals of this autonomous production, and by what criteria? The very possibility of transitioning to noonomy depends on the answer – whether it will be a socially controlled transformation or a spontaneous process leading to unpredictable consequences.

Goals in nooproduction are set by society, based on the criteria of reasonableness. This marks a determinant break with economic rationality. Human knowledge is an integral part of human culture, determining how we use this knowledge, what goals we use it for, and what values we are guided by. Culture is a special kind of knowledge – knowledge about how people should live, what values are supreme, and what goals should be pursued.

Industrial policy in the context of nootransition is called upon to create an architecture of social goal-setting – a system of institutions and mechanisms that enable society to determine the areas of production development, set priorities for technological advancement, and formulate requirements for the production system.

Strategic planning here operates as a process of development, long-term implementation, monitoring, and subsequent refinement and updating of strategy – a strategizing process. This process involves constructing a hierarchy of public interests, defining priorities for technological and industrial development, assessing required resources, and correlating development goals with the timeframes for their achievement [Bodrunov, 2025c].

3.2. Oversight and Accountability: Institutional Mechanisms

An autonomous technosphere acquiring the capacity for self-development appears to society like a two-faced Janus: on the one hand, it opens up unprecedented opportunities to liberate people from routine labor, but on the other, it carries the risk of slipping beyond public oversight. Therefore, the creation of effective mechanisms for monitoring and ensuring accountability be-

comes an imperative of the nootransition. Society must have the ability to set production goals, supervise the methods of achieving them, block undesirable development trends, and ensure that production activities meet safety, environmental, and social acceptability criteria.

Industrial policy must include the development and implementation of institutional mechanisms for such oversight. This requires the creation of systems for monitoring the development of technosphere and assessing the social and environmental consequences of new technologies. We need to develop socio-humanitarian technologies – tools for public management of scientific and technological progress, aimed at preventing and mitigating threats arising from rapid technological development and ensuring the rational use of technological advances, consistent with supreme human values [Bodrunov, 2022b].

3.3. Social Orientation of Production: From Profit to Needs

The transition to nooproduct requires a fundamental reversal of the production system's vector: from profit maximization to satisfying nooproduct needs, from increasing output to qualitative human development, from economic efficiency to reasonable sufficiency. This implies a change in the criteria for assessing production efficiency, the incentive system, and the institutional environment.

Industrial policy should promote such a transformation through the development of institutions for the socialization of economic relations – public-private partnerships, associated forms of ownership, diffusion of ownership, and public oversight over the use of production output [Bodrunov, 2021]. In modern production, the role of the individual is fundamentally changing. They act, first and foremost, as bearers of knowledge – the primary resource for development.

The gradual decline in the importance of utilitarian and simulative needs and the rise of nooneeds requires corresponding changes in the incentive system, value orientations, and cultural attitudes of society. The transformation of economic relations and institutions is taking place towards their socialization and humanization, particularly through the intensive development of noo-oriented economic programming and the implementation of a vigorous industrial policy aimed at prioritizing the development of smart manufacturing.

IV. Russia on the Path to Nootransition: Imperatives of Industrial Policy

4.1. Current Status and Challenges

Russia today finds itself at a historical crossroads, a point of civilizational choice. The country faces a dilemma: either achieve the status of a technologically sovereign actor in global development, capable of independently determining the trajectory of its future, or find itself on the periphery of the emerging noosociety, dependent on external technology centers [Bodrunov, 2026b].

The contradictions in Russia's current situation are obvious. On the one hand, the country possesses significant scientific and technological potential preserved from the Soviet industrialization era, a well-developed education system, and experience in implementing large-scale technological projects. On the other hand, the deep wounds from the deindustrialization of the 1990s, technological dependence in a number of critical areas, and the lag in mastering the technologies of the sixth technological paradigm are creating serious, sometimes dramatic, obstacles to the achievement of NIS.2 [Glazyev, 2026; Bodrunov, 2026c].

Geopolitical turbulence of recent years, unprecedented sanctions pressure, and the need to ensure development within technical and technological constraints are transforming the task of

establishing the material basis for NIS.2 from an academic problem into an imperative of national security and historical survival. Here, it's appropriate to recall the formula: the most important thing for a country is to maintain technological sovereignty, for only sovereign countries can hope for a sovereign future. The loss of technological independence means the loss of the ability to set goals, becoming the object of other countries' strategies and a supplier of resources for other countries' development.

At the same time, the current situation, for all its complexity, also opens a window of opportunity. The disruption of traditional technological chains, the need for import substitution in critical areas, and the mobilization of domestic resources – all of this can become a catalyst for a qualitative technological breakthrough if adequate mechanisms for industrial policy and strategic management are developed [Bodrunov, 2023a]. History knows many examples of external challenges becoming a stimulus for internal modernization and technological breakthrough.

4.2. Strategic Areas of Industrial Policy

To support the nootransition, Russia's industrial policy should focus on the following priority areas [Bodrunov, 2023a]:

First. Establishment of technological sovereignty in priority areas – microelectronics, artificial intelligence, new materials, biotechnology, which form the foundation for the development of NBICS convergence on a national basis [Spohrer, 2004]. Only with such a foundation can a country act as an equal partner in international technological cooperation, rather than a passive recipient of other countries' technological solutions [Bezrukov, Baydarov, Faikov, 2026].

Second. Reintegration of science, production, and education through the creation of integrated scientific-production-educational complexes that provide a full cycle from fundamental research to mass production and personnel training [Bodrunov, 2015]. Bridging the gap between these sectors, inherited from the era of market reforms of the 1990s, when science was separated from production, and education from the practical needs of the economy, is becoming a key prerequisite for the transition to knowledge-intensive production. The integration of science, production, and education into a single system creates the conditions for transforming research deliverables into labor qualifications and technological innovation, and for industrial activity to become a platform for knowledge diffusion and the training of highly skilled professionals.

Third. Priority development of mechanical engineering as a backbone element of industry, providing structural self-sufficiency and the ability to independently reproduce technological capabilities. Without a highly-developed mechanical engineering sector capable of producing machine tools, equipment, and advanced technical systems, neither technological self-sufficiency nor the transition to high-tech production is possible. Mechanical engineering is a sector that “produces production,” creating well-developed industrial capabilities for the manufacture of complex, high-tech products. Restoration and modernization of the mechanical engineering complex on a fundamentally new technological foundation is also an imperative of new industrialization [Ryazanov, 2014].

Fourth. The establishment of institutional mechanisms for strategic planning and noo-based development programming that provide targeted and controlled progress toward NIS.2. Strategizing, as a continuous process of developing, implementing, monitoring, and constantly updating strategy, should become the integral foundation of public development management, replacing

the spontaneous self-organization of the market, which is incapable of securing structural shifts on the required scale. Strategic planning here serves as a tool for public goal-setting, a mechanism for aligning the interests of various social groups and directing collective efforts toward achieving national goals.

Fifth. Develop a system of public oversight over the development of the technosphere, along with mechanisms for comprehensively assessing the social, environmental, and humanitarian consequences of technological change. Society must be empowered to participate in determining the trends of technological development, block dangerous or socially unacceptable trajectories, and ensure that production is oriented toward satisfying reasonable needs rather than increasing output for the sake of capital accumulation.

Conclusion: Industrial Policy as a Tool for Managing the Nootransition

Nootransition is not a spontaneous process determined solely by advancements in technology. It is a controlled transformation of the social order, requiring targeted efforts to create the material foundation, institutional environment, and cultural prerequisites for the transition to noonomy.

In this context, industrial policy is a key tool for managing the nootransition to create engineering and manufacturing framework for the NIS.2 – an autonomous, yet socially controlled, technosphere focused on meeting noonneeds. Redefining industrial policy from stimulating traditional economic indices to managing technological development processes, integrating science and production, and shaping the contours of public oversight over the technosphere constitutes the essence of its qualitative transformation in the era of nootransition. Here, a break with the neoliberal dogma of minimizing government involvement is taking place, and a return to the understanding of industrial policy as a strategic instrument for public goal-setting is underway.

For Russia, successfully pursuing this path means ensuring technological sovereignty and economic security, the opportunity to take a worthy place in the emerging noosociety, making a significant contribution to global civilizational transformation, and offering the world an alternative to the limitations of the neoliberal development model. The criteria for the success or failure of a strategy here become quite unfamiliar, which could prevent an outside observer from assessing the strategy's potential in a timely manner, while helping Russia gain temporary advantages and a head start in the competition for socioeconomic and social development.

Managing the nootransition must be a conscious and purposeful process. This is the key to our future, to overcoming growing civilizational challenges, and to building a society based on reason – a true noocivilization, the aspiration of the nootransition, based on the acquisition of knowledge and the profound self-actualization required for the self-regulation of human life based on cultural and ethical values. Industrial policy redefined as a tool for shaping the material basis of this noocivilization becomes a practical mechanism for embodying reason in social existence.

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