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Sergey D. Bodrunov

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THE COGNITIVE REVOLUTION: ARTIFICIAL INTELLIGENCE AS A FACTOR OF THE NOOTRANSITION

Abstract: We consider artificial intelligence as one of the most powerful technological factors of the cognitive-industrial revolution, which accelerates the increase in the knowledge intensity of production while concurrently intensifying the question regarding the goals of the societal application of this new technological power. In our studies, we note that AI, as an element of the technosphere, does not possess independent historical agency; the direction of its application is determined by social relations, the nature of property ownership, and value priorities. The distinction between algorithmic rationality and noorationality allows us to identify a civilizational crossroads: digital power is capable of leading both to technocratic dominance, cognitive inequality, and informational alienation, and to the expansion of creative space, the free exchange of knowledge, and solidarity-based creation. We link the resolution of these contradictions to the resultant force of the “quadriga of noonomy” – scientific and technological progress, the diffusion of property ownership, the socialization of society, and solidarism – whose joint action is aimed at subordinating technological power to human development. The movement toward noonomy presupposes conscious strategizing for the development of AI in the name of peace, the preservation of human control, and the limitation of the autonomization of military systems. The cognitive-industrial revolution becomes a factor of the nootransition only when knowledge turns into a public good, liberated time transforms into a space for creative self-realization, and the human being retains the status of the highest value and the subject of societal development.

Keywords: noonomy, nootransition, artificial intelligence, cognitive-industrial revolution, NIS.2, noorationality, quadriga of noonomy, solidarism, human dignity.

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维捷智慧型经济和新兴工业发展研究院 (INID) (俄罗斯, 圣彼得堡)

认知革命——人工智能是智慧型转型的影响因素

摘要: 我们认为, 人工智能是认知和工业革命中最强大的技术因素之一, 它既加速了生产知识密集度的提升, 同时也使新技术力量社会应用的目的问题更加尖锐。我们在研究中发现, 人工智能作为技术圈的组成部分, 并不具备独立的历史主体性, 也就是说其应用方向由社会关系、所有制性质

以及价值取向所决定。区分算法合理性与智慧型合理性,有助于揭示文明发展的岔路口:数字力量既可能导致技术统治、认知不平等和信息异化,也可能拓展创造空间,促进知识自由交流和团结协作。我们认为,克服这些矛盾的关键在于“智慧型经济四驾马车”的合力,这四驾马车是科学技术进步、所有权扩散、社会化和团结主义,它们协同行动的目标是将技术力量服务于人类发展。向智慧型经济转型,意味着为了维护和平、保持人类控制权并限制军事系统的自主化,有意识地制定人工智能发展战略。只有当知识成为公共利益,被释放出来的时间转变为自我实现的创造性空间,而人类仍保持其作为最高价值和社会发展主体的地位时,认知和工业革命才会成为智慧型过度的推动因素。

关键词: 智慧型经济、智慧型转型、人工智能、认知工业革命、NIS.2、智慧型合理性、智慧型经济四驾马车、团结主义、人格。

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I. Cognitive-Industrial Revolution and Human

We have entered a period when the “acceleration of acceleration” of scientific and technological progress is changing not just individual tools, but the very mode of social reproduction [Bodrunov, 2016]. Artificial intelligence is entering knowledge-intensive material production, becoming part of education and governance, and transforming the info-cognitive space.

This is a *systemic* phenomenon. Its scale is determined not by the number of operations transferred to the machine, but by the depth of changes in the human condition, the structure of needs, and the nature of social relations.

So (and this is crucial), the technological question here immediately takes on an **anthropological dimension**. Who determines the course of development? Does the individual retain the right to judgment? Does the technosphere serve the rise of humans or subordinate them to its own logic? The answer requires combining scientific analysis with moral and anthropological assessment.

Pope Francis, in his message “**Artificial Intelligence and Peace**”, expressed the key criterion with utmost clarity: “*Artificial intelligence ought to serve our best human potential and our highest aspirations, not compete with them*” [Francis, 2024a].

And we fully agree, since technology acquires social meaning only when its power is subordinated to human development and the unleashing of human creative capacities. AI is not an independent actor in historical development. It is an element of the technosphere and an instrument of scientific and technological progress, while the subject of the **nootransition** remains humans – no longer *homo economicus*, focused on profit, but a *cultured, creative human being* capable of creating knowledge and meaning [Bodrunov, 2018].

Nootransition refers to the historical movement *from economic society to noonomy*, where scientific and technological progress serves to liberate people from routine labor, develop creativity, and satisfy reasonable needs [Bodrunov, 2020; Bodrunov, 2025a].

An algorithm itself does not generate goals; it enshrines the interests and decisions of those who possess the data and determine the conditions for its application. Whoever owns the data largely directs the outcome; whoever determines the measure of effectiveness shapes the social

impact. This means that discussions of AI inevitably turn into conversations about power, ownership, and, most importantly, responsibility.

Those who *control technological power* gain the ability to direct its application and determine the distribution of the benefits and risks it creates.

“Artificial intelligence represents a true **cognitive-industrial revolution**” [Francis, 2024b]. Its essence lies in the accelerated implementation of knowledge into technology and the growth of the “knowledge” component of a product. Material production retains its basic significance, but acquires a new quality: the product becomes highly **knowledge-intensive**, production becomes **knowledge-consumptive**, and innovation becomes almost continuous. This is how the technological basis for what we call the *New Industrial Society of the Second Generation – NIS.2* – is being established [Bodrunov, 2016].

Machines increasingly perform reproductive operations, while human activity gradually shifts toward task setting, oversight, and creative exploration. Hence, the possibilities of *reducing mechanized labor* and freeing up life time for **non-mechanizable activities** emerge. This is a movement from mere productivity growth to the return of “*human to human*,” to the expansion of the space of science, culture, and creativity [Bodrunov, 2019].

The prospect of a self-acting production system is no longer an abstract hypothesis. The question is who will define its external regulatory framework, and on what principles. From the perspective of the theory of noonomy, this framework is defined by *society*, and *reasonable needs of the individual* serve as the measure of decisions.

But technology merely creates the *background*, while the course of movement is determined by social choice. Cognitive-industrial revolution creates the material and technological preconditions for the nootransition, but does not guarantee it.

Same technologies can either lead to digital technocracy or accelerate the construction of a **noosociety**, depending on the social relations, goals, and values of their application. In the former case, AI accelerates the concentration of power and enhances information alienation. In the second, it serves as a tool for the free exchange of knowledge and collaborative creativity. This is a systemic fork, also known as a “*bifurcation point*” [Bodrunov, 2025a].

Technological liberation acquires human meaning only when the gain in time is transformed into an opportunity for personal development, and higher productivity into a *common good*. Otherwise, automation vacates the workplace, but does not liberate the human.

II. Civilizational Fork: Algorithmic Rationality and Noorationality

Algorithmic rationality quickly finds a tool within a given model. **Noorationality** poses a more complex question: what human end does this tool serve and whether it is consistent with individual dignity, cultural values, and the common good. Therefore, we share the idea that “*not everything can be predicted, not everything can be calculated*” [Francis, 2024a].

The limitations of the *technocratic model* are revealed at the point when the computable is declared reasonable, and efficiency is transformed into a universal measure. **Noonomy** proposes a different type of rationality – a shift from profit and consumption maximization to reasonable formation and satisfaction of needs [Bodrunov, 2018].

This refers to needs that spiritualize humans and expand their creative capacity – **nooneeds**. Their criterial framework is created by culture. *Culture* is not a superficial adornment of an economic system, but its future imperative, its **noovalue core**. An algorithm can suggest the optimal route, but society must determine the meaning of that path.

If the current economic logic persists, digital power is accumulating faster than society can develop forms of oversight. New AI monopolies and new *asymmetries* are emerging – epistemic, economic, and political [Leo XIV, 2026]. This asymmetry divides the world into those who shape the architecture of knowledge and those who are left to make decisions that have already been constructed; simultaneously, a new layer of digital infrastructure owners is emerging, appropriating *technological and cognitive rents*.

As a result, a *cognitive barrier* arises, followed by dependence in education, work, and social choice. Technological wealth begins to coexist with cultural and moral poverty. We risk becoming “*rich in technology and poor in humanity*” [Francis, 2024c]. And — let us emphasize — the problem lies not in computing power per se. The source of the risk lies in the subordination of this power to the logic of accumulation, control, and superiority.

Overcoming this gap is linked to the resultant force of the “*quadriga of noonomy*,” which we define as scientific and technological progress, the diffusion of ownership, the socialization of society, and solidarism [Bodrunov, 2021]. *Scientific and technological progress* provides impetus, but its socio-humanitarian orientation arises through the *diffusion of ownership, socialization, and solidarism*. Diffusion here means that access to data and computational models is expanding, and research results are returned to society. Data is created through social labor and therefore requires a common or shared good treatment. Socialization brings innovation back into the realm of human development. Solidarism shifts cognitive interaction from monopolistic competition to cooperation.

This is how the *crystallization of noonomy* begins. Open *cognitive ecosystems* are emerging, where knowledge multiplies through exchange, and creative output becomes the basis for collaborative development. This is no longer a “knowledge economy” that trades in intellectual products. The law of *rising needs* acquires a new civilizational content here: the growth of knowledge is intended to expand the space of human freedom, not to multiply simulacra that replace development with consumption. This is a movement toward a *noospace* where knowledge becomes a common cognitive asset [Bodrunov, 2025b].

Along with technology, labor and its content are changing. Automation can relieve people of arduous and repetitive tasks, but free time has yet to be transformed into a space for self-actualization. To achieve this, education must be accessible throughout life, and the results of increased productivity must contribute to the development of society.

Education in the context of nootransition combines technical knowledge with humanities understanding and develops the ability to exercise independent judgment. It overcomes information alienation and prepares people for participation in cognitive ecosystems. This leads to an increase in human agency, rather than the adaptation of the individual to the pace of the machine. The human is the highest value and the subject (actor) of the nootransition. AI is designed to support non-machine-based activities where humans explore, create, and transmit culture. Information may be abundant, but wisdom is born where knowledge is combined with meaning, responsibility, and trust [Leo XIV, 2025].

III. AI for Peace: Strategizing the Nootransition

Society’s move toward noonomy cannot emerge as a spontaneous byproduct of the technology market. It requires conscious strategizing. This requires a scientifically grounded alignment of technological development with the changing nature of education and labor, and sub-

sequently, social institutions. A “proactive commitment to protect human dignity” is needed [Francis, 2024d], and this protection must be built into the system’s architecture from the design stage.

We evaluate technology not only by speed and commercial impact. More importantly, does it expand human freedom; does it make society more equal; does it strengthen trust and peace? Hence the need for proactive management capable of foreseeing long-term consequences and guiding scientific and technological progress along a humanistic trajectory. Strategizing preserves the space for initiative but changes the criteria for development: socially beneficial results take precedence over short-term gains [Bodrunov, 2020; Bodrunov, 2025b].

Pope Leo XIV, in his encyclical letter **Magnifica Humanitas**, introduces a precise concept: the disarmament of AI: “*To disarm does not mean rejecting technology, but preventing it from dominating humanity*” [Leo XIV, 2026]. We agree with this approach as well. **Nootransition** is a humanistic, not an anti-technological, project. Disarmament means removing AI from the logic of military, economic, and cognitive superiority. It means limiting the power of force in digital form and returning technology to the realm of public debate. AI should be used where human potential grows: to help heal and research, teach, preserve our common home, and support dialogue among cultures. As such, it acts as a technology of trust. With the exclusive appropriation of data and models, it, on the contrary, becomes an infrastructure for dictatorship.

The most severe test of this principle is the military sector, since “*no algorithm can make war morally acceptable*” [Leo XIV, 2026]. A machine can recognize an object and calculate an action, but moral judgment is born of conscience and personal responsibility; its foundation is the *recognition of another as a person*.

A decision that entails death or other irreversible consequences must remain under effective human oversight. And — importantly — responsibility begins long before the command to use the system is issued. It emerges at the time the task is set, continues during model training, and is embedded in the political decision on the permissibility of its use.

AI for peace requires a new culture of international cooperation. Law must curb the autonomization of weapons and the race for computational superiority. Science must strengthen open forms of exchange, and states must reduce cognitive dependence by developing their own scientific and educational infrastructure. But peace is broader than the absence of hostilities; it begins where labor retains dignity, knowledge is open, and nations participate in shaping the technological future together, not separately.

This is why solidarism takes on practical meaning. It transforms interdependence into conscious collaboration and links technological leadership with contributions to human development. It represents a shift from a culture of power to a culture of shared creation, from digital competition at any cost to responsibility for a shared future.

Our dialogue, “**Artificial Intelligence for Peace**,” could become a platform for such a synthesis. It could combine technological competence with moral and anthropological responsibility, and political economic analysis with strategizing the nootransition.

This is no longer a question of whether AI will change society. The question is what kind of society will be guided by AI. **Noointelligence** is not maximum computing power; it is an intelligence capable of limiting its own technological power for the sake of preserving humanity, society, and

the world. It is precisely this kind of intelligence that transforms the cognitive-industrial revolution from a factor of dominance into a factor of development.

The future of AI is determined by the quality of the goals we give it. The future of the noosociety is determined by our ability to make knowledge a common good, creativity a norm of human life, and solidarism a principle of historical action.

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BETWEEN TECHNO-FEUDALISM AND NOONOMY: LATIN AMERICA AND THE CARIBBEAN IN THE CONFIGURATION OF A NEW GLOBAL ORDER

Abstract: This paper examines the structural position of Latin America and the Caribbean in the context of the transformation of the contemporary world-system, characterized by the transition towards a multipolar order and the emergence of new technological paradigms. Through the analysis of techno-feudalism and noonomy theories, it is argued that the region faces a structural duality, in which its role as a provider of critical minerals for the energy transition and its persistent technological and digital dependence are highlighted. The central hypothesis holds that a regional strategy based on digital integration, regulatory coordination, and South-South cooperation could strengthen the region's bargaining power and reduce its structural vulnerabilities. The analysis is supported by empirical data on Research and Development investment, patent production, and foreign direct investment flows in digital technologies, revealing persistent asymmetries in the global innovation system in the region.

Keywords: techno-feudalism, noonomy, world order, technological dependence, South-South cooperation, Latin America, digital sovereignty.

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在技术封建主义与智慧型经济之间:新世界秩序形成时代的拉丁美洲和加勒比地区

摘要: 本文探讨了当代世界体系转型背景下拉丁美洲和加勒比地区的现状, 该转型以向多极化(多极秩序)过渡和新型技术范式的出现为特征。基于对技术封建主义和智慧经济理论的分析, 本文认为该地区正面临结构二元性: 一方面, 其作为能源转型所需关键矿产供应方的角色日益凸显; 另一方面, 其技术与数字领域的依赖性依然存在。文章的主要推断为: 基于数字一体化、协调监管和南南合作的

区域战略能够增强该地区的谈判地位,并降低其结构上的脆弱性。该分析以研发投资、专利生产投资以及数字技术领域外国直接投资流量的实证数据为依据,揭示了该地区与全球创新体系之间依然存在的失衡现象。

关键词:技术封建主义、智慧型经济、世界秩序、技术依赖、南南合作、拉丁美洲、数字主权。

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Introduction

The contemporary international system is going through a phase of systemic chaos characterized by the weakening of traditional power dynamics [Wallerstein, 2015; Arrighi, 2007] and what could be the gradual transition from a unipolar hegemony to a multipolar or polycentric configuration, implying a redistribution of economic, technological, and military capabilities between centers and peripheries [Amin, 1990]. In any case, as in previous hegemonic transitions, the established rules of the international order become contingent and susceptible to renegotiation [Friedman and Chase-Dunn, 2005], forcing states and transnational actors to redefine strategies, alliances, and forms of governance in a context of increasing fragmentation. This structural transformation deeply reconfigures the foundations of economic and technological power, generating uncertainty about the contours of the emerging global order, but also opens windows of opportunity for the renegotiation of peripheral positions in the world-system.

In this context, the Fourth Industrial Revolution and the Big Data era are defining much of the rhythms and speeds of this global transformation. The control and processing of data have become a central axis of global rivalries, fundamentally reconfiguring international hierarchies [Zuboff, 2019; Couldry & Mejias, 2019; Nye, 2020]. Technological transformation also strains the institutional configuration of the emerging new world order. In this sense, figures such as Peter Thiel [2007; Thiel & Masters, 2014]¹ advocate technological innovation, institutional disruption, and initiatives such as “autonomous zones” or projects of private sovereignty, suggesting a reconfiguration of the political order in which leadership does not emerge from democratic consensus but from strategically capable minorities within the context of technological capitalism. As Yanis Varoufakis [2023] argues, this posture reflects the emergence of what he terms “techno-feudalism,” a system in which digital platforms operate as feudal lords, extracting algorithmic rents while fragmenting state sovereignty². In contrast, Sergey Bodrunov [2020] proposes an alternative vision grounded in the noonomy paradigm, suggesting that knowledge can become the primary source of value, with an emphasis on cooperative knowledge production and the development of endogenous scientific capabilities.

This theoretical tension reflects real political options for peripheral economies that debate between the reproduction of technological dependence or the construction of digital sovereignty through investment in scientific and institutional capabilities. Latin America and the Caribbean

¹ Peter Thiel is a billionaire entrepreneur, co-founder of PayPal, and influential investor known for his libertarian-leaning views on technology and politics.

² For Yanis Varoufakis, this technofeudalism implies that traditional capital is subordinated to digital capital, while society acts as “serfs” that generate value, often unpaid, for a new dominant elite.

find themselves in a particularly vulnerable position within this global reconfiguration, especially because the countries of the region combine a historical dependence on commodity exports with new forms of digital subordination, maintaining a peripheral insertion in the new dynamics of contemporary capitalism [Cimoli, Primi, and Ferraz, 2014; Pérez, 2010]. Paradoxically, the concentration of reserves of critical minerals necessary for the energy transition and the development of advanced technologies confers upon the Latin American and Caribbean region a negotiation potential that has not been fully articulated. Therefore, the hypothesis of this paper proposes that regional agency capacity depends on the development of endogenous technological capabilities and strong digital governance institutions, which requires a strategy of South-South cooperation and a redefinition of links with the great powers in struggle and competition in the ongoing systemic chaos.

In this panorama, the objective of this work is to analyze the scientific and technological capabilities of Latin America and the Caribbean in the context of the current systemic chaos and the possible transition towards a new global order. The analysis is supported by data on investment in Research and Development, patent production, and foreign direct investment flows in digital technologies to evidence the asymmetries of the global innovation system. The text is organized into four sections. The first one accounts for techno-feudalism and noonomy as competing paradigms; the second part exposes the dual structural condition of Latin America and the Caribbean between its capacity and technological backwardness; the third part highlights the tensions in trade and technological investment in the region; the work closes with a section of conclusions.

1. Techno-Feudalism and Noonomy as Competing Paradigms

The present historical moment is inscribed in what Immanuel Wallerstein identifies as a period of structural uncertainty, characterized by the exhaustion of historical capitalism as a world-system and the terminal crisis of its mechanisms of accumulation and legitimation in force since the 16th century [Wallerstein, 2015]. This exhaustion is evidenced in the impossibility of sustaining the secular trends of the system, geographical expansion, intensification of the international division of labor, and concentration of capital [Harvey, 2003], faced with market saturation, the rise of new powers, and the systemic ecological crisis [Moore, 2015], configuring a contemporary systemic chaos that manifests itself in geopolitical conflicts, geo-economic competition between powers, and technological rivalries [Ikenberry, 2018; Allison, 2017]. As Wallerstein warns, historical hegemonic transitions do not constitute simple replacements of dominant powers, but deep reconfigurations where peripheries can experience both ascending semiperipheralization and deepening of dependence [Wallerstein, 1983], so that the emerging new order does not automatically guarantee a favorable redistribution of power but can generate fragmentation and conflicts in the absence of robust multilateral institutions. For Latin America and the Caribbean, this situation represents simultaneously the threat of dependent reproduction, but also perhaps a historical opportunity for diversification of international links [Jaguaribe, 1970].

In this framework of transition, the concept of techno-feudalism elaborated by Yanis Varoufakis [2023] allows us to understand the mutation of contemporary capitalism towards a configuration where large technological platforms operate as “digital fiefs,” replacing traditional capitalist profit with rent as the dominant form of surplus appropriation through the control of interfaces, the appropriation of data, and the imposition of fees on transactions in closed ecosystems [Varoufakis, 2023]. This model is dialectically articulated with the “Straussian moment” identified by

Peter Thiel, who recovers the political philosophy of Leo Strauss (1899-1973)¹, for whom decadent liberal societies required “great men” and extraordinary measures, even deceptive or authoritarian ones, to preserve civilizational order, thus justifying technological authoritarianism as a fatalistic response to Western decline. From this perspective, advanced surveillance technologies and biotechnologies function as a restraint (Katechon) to what Thiel calls the Antichrist, understood as a global totalitarian system based on technological stasis and bureaucratic control, thus justifying the expansion of companies like Palantir through military and intelligence contracts [Thiel, 2007].

The implications of this “Straussian” techno-feudalism for Latin America are of structural scope, as the region is configured as a peripheral space for the extraction of data and digital rents, where infrastructure financed from the centers generates critical vulnerabilities in technological sovereignty, data control, and tax flight [Varoufakis, 2023], replicating the classic asymmetry where the periphery supplies material inputs while the center controls platforms and intangible rents [Marini, 1991]. However, the systemic chaos offers strategic loopholes for the articulation of alternatives based on expanded South-South cooperation that transcends traditional mercantile logic, through the transfer of capabilities, joint construction of digital infrastructure, and development of regional institutions for knowledge governance, allowing for the negotiation of better conditions for technology transfer and market access by taking advantage of inter-hegemonic competition [Lin and Wang, 2017], provided that this transition is accompanied by institutional frameworks that articulate knowledge production and social development.

As an alternative horizon to this configuration, Bodrunov’s noonomy theory [2020] proposes a civilizational reconfiguration where knowledge constitutes the main source of economic and social value, deriving from the Greek *noos* (mind/intellect) and *nomos* (law/order) to describe an economy where data-driven and algorithmic automation processes generate value through cooperative knowledge production, transcending the mercantile logic of exchange value². This proposal does not represent mere technological change but a civilizational transformation that questions the domination of exchange value, based on principles of endogenous technological re-industrialization, construction of a knowledge society, development of sustainable bioeconomy, technological and digital sovereignty, cooperation in Investment plus Development, and regional management of intellectual property [Bodrunov, 2020], thus configuring a path to overcome the asymmetries of the world-system that demands investment in science and technology together with the creation of institutions capable of articulating knowledge and social development in an emancipatory key.

2. Dual Structural Condition of Latin America and the Caribbean

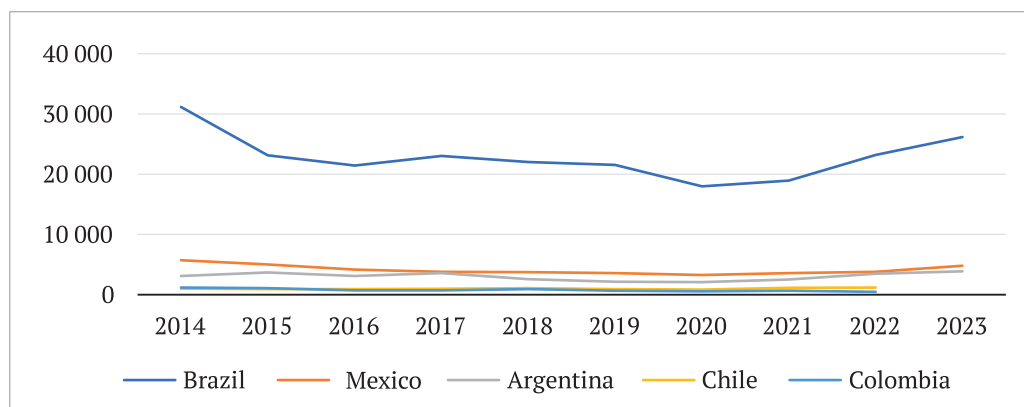
Latin America and the Caribbean occupy an ambivalent position in the contemporary global political economy. On the one hand, the region has become a critical geoeconomic actor due to its concentration of strategic minerals for the global energy transition. According to data from the Economic Commission for Latin America and the Caribbean, the region concentrates

¹ The thought of Leo Strauss centers on a critique of modernity, a defense of classical political philosophy, and the idea that political truth may need to be safeguarded by elites rather than entrusted to the masses.

² In this context, networked collective production, based on digital commons, distributed collaboration, and open Access, reduces the centrality of private property and weakens market exchange as an organizing principle. Thus, value is no longer defined by its market price, but by its social utility and capacity for collective reproduction, foreshadowing post-capitalist forms centered on the commons rather than on accumulation [Bodrunov, 2020].

approximately 60% of global lithium reserves¹, in addition to important deposits of copper, nickel, and rare earths [ECLAC, 2023]. This position confers significant negotiation potential on the region in a context where the decarbonization of advanced economies depends on access to these inputs.

However, this potential contrasts markedly with the limited scientific and digital capabilities of the region, which reinforce its external dependence. As Mario Cimoli, Annalisa Primi, and João Carlos Ferraz [2014] demonstrate in their analysis of “structural technological capabilities,” Latin America has maintained a persistent gap in terms of investment in research and development, higher scientific education, and production of innovative knowledge. This gap is the result of historical patterns of productive specialization that discourage investment in high technological content activities and the accumulation of endogenous innovative capabilities. Spending on research and development constitutes a key indicator of the level of investment in science, technology, and innovation, reflecting the financial resources that States allocate to strengthening their scientific systems and technological capabilities. Available data for the main Latin American economies reveal worrying patterns of underinvestment and regional concentration, as can be seen in the following graph.



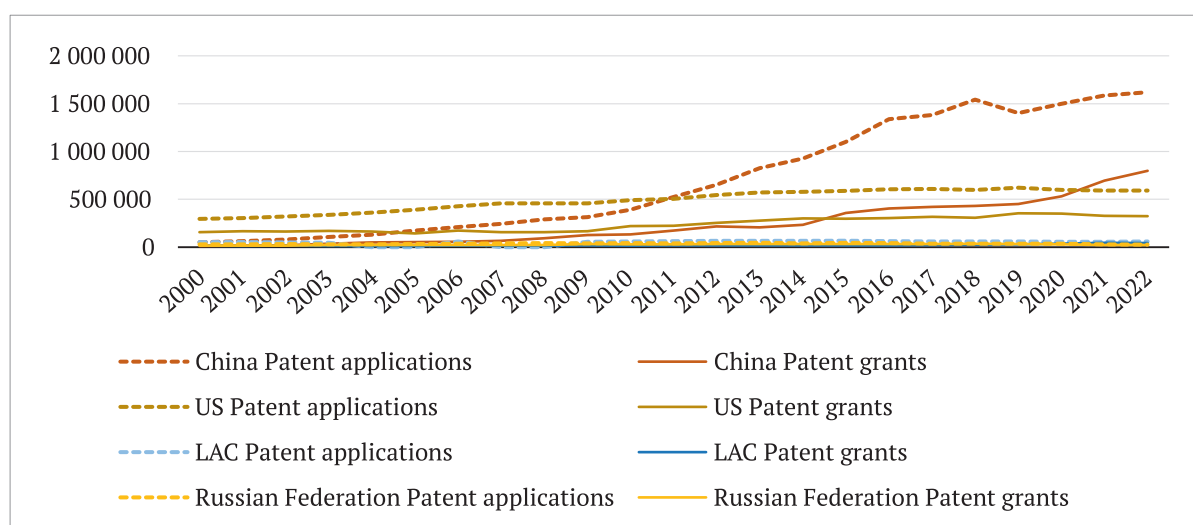
Graph 1. Research and development expenditure in dollars

Source: RICYT [2026].

Brazil concentrates most of the regional spending on research and development, representing more than 60% of the total for Latin America and the Caribbean. Mexico and Argentina follow at a considerable distance, with approximately 11% and 9% respectively. Chile and Colombia contribute around 3% each, while the rest of the region contributes approximately 12% [RICYT, 2026]. This concentration reveals a highly unequal regional structure, in addition to the fact that absolute investment levels remain significantly below international standards. While developed economies and emerging powers in East Asia invest between 2% and 4% of their GDP in research and development, most Latin American countries are below 0.5% [ECLAC, 2023]. The 2020 shock, related to the COVID-19 pandemic, also exposed the structural fiscal fragility of national science and technology systems, many of which suffered significant budget cuts that affected the continuity of research projects and the retention of scientific talent.

¹ Lithium is concentrated mainly in the Lithium Triangle, a geographical region located in the southern Andes, at the intersection of Argentina, Bolivia, and Chile.

Without sustained investment, the construction of an autonomous knowledge economy is unlikely. As Pérez [2010] argues, peripheral economies that fail to articulate their natural comparative advantages with the development of endogenous technological capabilities tend to become trapped in “dependence paths” where productive specialization is historically reinforced in low technological complexity sectors. Low investment in research and development in the main Latin American economies is reflected in the relatively reduced number of patent applications and grants, evidencing the region’s limited capacity to transform scientific investment into technological innovation. This indicator is particularly revealing when compared with countries like China and the United States, which concentrate a significantly greater proportion of global patent applications and grants, as can be seen in the following graph.



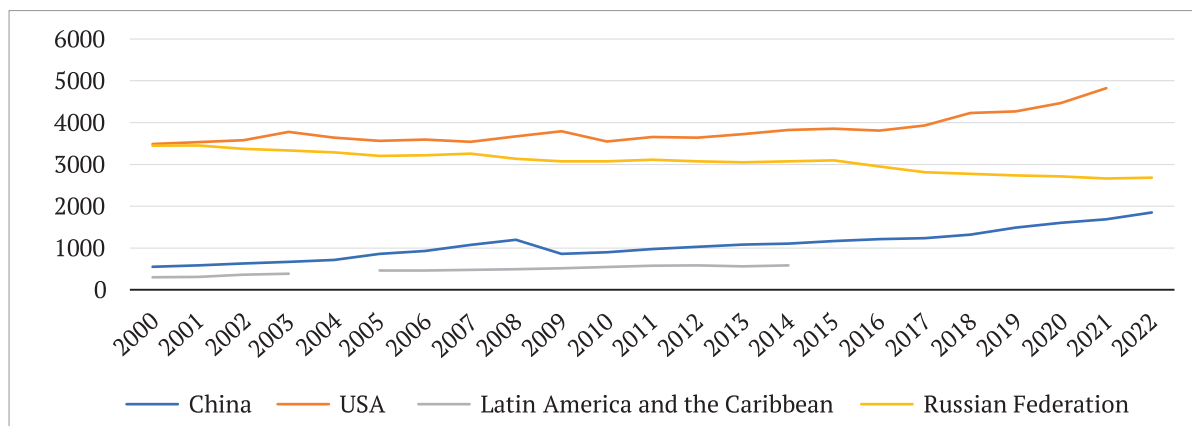
Graph 2. Patent applications and patents granted for China, the United States, and Latin America and the Caribbean

Source: WIPO [2026].

As seen in the graph, China has experienced accelerated expansion of its patent applications since 2010, currently exceeding one and a half million annual applications. The United States maintains a consistently high baseline, with hundreds of thousands of annual applications. In contrast, Latin America and the Caribbean remain marginal in intellectual property production, with fewer than 59,000 applications and 41,000 patents granted annually in the entire region [WIPO, 2026]. Brazil shows the most robust regional growth, while Argentina, Chile, and Colombia remain in relative stagnation. However, it should be said that this gap does not necessarily imply an absence of scientific capabilities. The case of Russia is illustrative, as despite having solid scientific and technical capabilities, with the second largest scientific force in the world according to the World Bank [World Bank, 2024], its model prioritizes state control and technological reproduction over the commercialization of knowledge [Moser, 2013; Lee, 2024]. This challenges the Western assumption that more patents imply greater innovation, opening the debate on technological hierarchies and the various ways of organizing national innovation systems.

So, for Latin American and Caribbean countries, the central question is not simply to increase the number of patents, but to develop innovation models appropriate to their development con-

ditions, which prioritize the resolution of specific social and productive problems over the mimicry of Western intellectual property models [Arocena & Sutz, 2010]. The number of researchers in research and development per million inhabitants constitutes another crucial indicator of a country's scientific and technological capacity, reflecting the size of the human capital dedicated to knowledge generation, innovation, and technological development, but in this indicator, Latin America and the Caribbean also show significant lags and discontinuous progress compared to global scientific powers, as can be seen in the following graph.



Graph 3. Researchers dedicated to research and development in China, the U.S., and LAC (per million people)

Source: World Bank [2024].

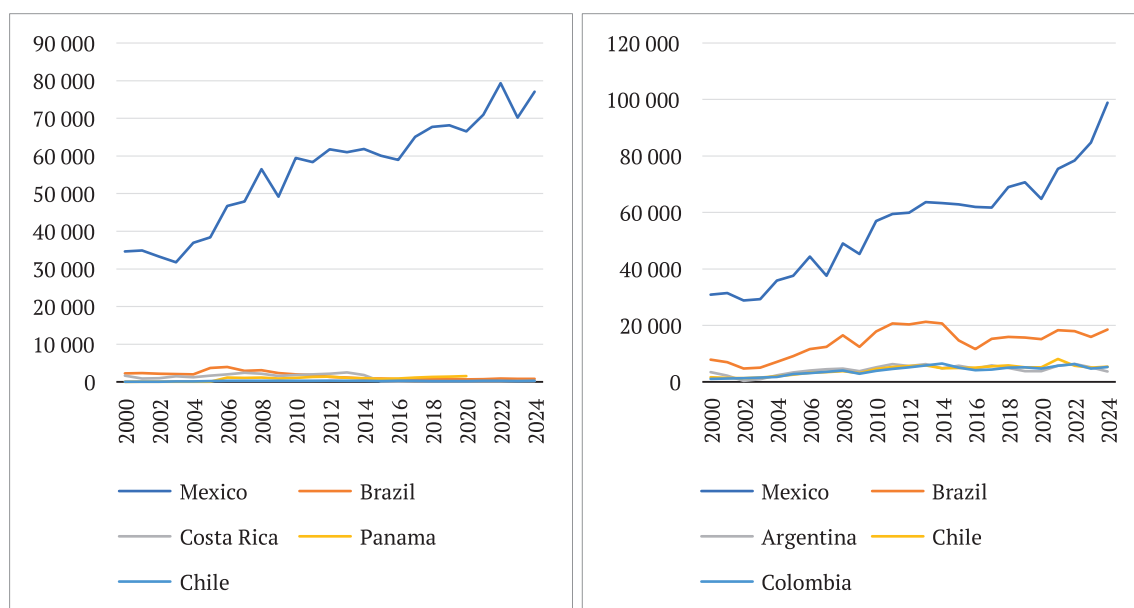
As can be seen in the graph, the United States has a higher density of researchers, closely followed by the advanced economies of Western Europe. China has achieved rapid convergence through sustained state investment, doubling its researcher density in the last decade. This expansion reflects a deliberate strategy of accumulating scientific capabilities, articulated with five-year plans for technological development [Chen and Wu, 2025]. In Latin America and the Caribbean, Argentina leads in researcher density, followed by Brazil and Mexico, but progress remains limited due to chronic budgetary constraints and weak private sector participation in research financing. The regional scientific deficit is aggravated by brain drain to Northern scientific centers, a phenomenon that has persisted despite repatriation programs implemented by some countries [Meyer et al., 2023].

Russia, despite the deceleration of its scientific growth in recent years, maintains a considerable reserve of human capital that continues to be the backbone of its research ecosystem. However, sanctions and structural restrictions that have affected the Russian scientific system have limited technology transfer to Latin America, a historical avenue of access to technological knowledge for the region during the Soviet and post-Soviet periods. In any case, the persistence of these scientific and technological capabilities suggests that for Latin America and the Caribbean, this situation is inscribed in broader structural tensions of the international system, in which the region seeks to diversify its technological partners and reduce its dependence on traditional innovation centers, but continues to face asymmetries in access to knowledge, financing, and scientific infrastructure that condition its insertion in the emerging world order.

3. Structural Tensions in Trade and Technological Investment

Historically, Latin America and the Caribbean has exported low-complexity manufactures and commodities, while importing higher value-added technological components and technology that manages productive processes and digital services that increasingly mediate economic and social activities. This asymmetry has generated persistent trade deficits in the technology sector and capital flight towards global innovation centers [Marini, 1991]. Therefore, in the current moment of systemic chaos, the Latin American and Caribbean region faces evident structural tensions in its foreign trade patterns, as the region mainly exports low-complexity goods, such as maquiladora production in Mexico, and imports software, digital services, and high-tech components, reinforcing its peripheral position and technological dependence.

Mexico dominates regional exports of information and communication technology goods, through maquiladora production, but in this manufacturing assembly model, local value added is limited and dependence on imported inputs is high [Dussel Peters, 2020]. The rest of the region participates only marginally in this trade, with some exceptions in electronic device assembly in countries like Costa Rica and Brazil. Likewise, foreign direct investment flows in digital technologies in Latin America and the Caribbean between 2005 and 2024 reflect different geopolitical and strategic priorities among the main actors, configuring a map of multifaceted technological dependence, as can be seen in the following graph.

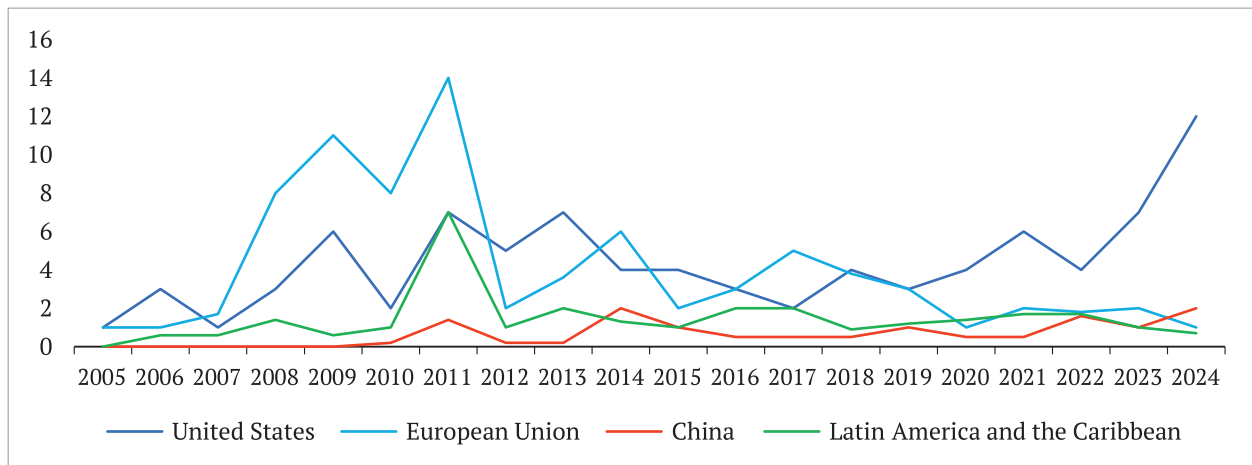


Graph 4. Exports and Imports of ICT goods, in millions of US\$

Source: UNCTAD [2025].

These figures must be interpreted with caution, as much of Latin America and the Caribbean's technological exports correspond to medium-technology goods or products assembled with imported inputs, rather than innovations developed locally [OECD, 2025]. Consequently, the region presents relatively low levels of productive complexity, as according to the economic complexity index, most Latin American economies are positioned in medium or low positions in the global ranking, below comparable Asian economies such as Vietnam or

Malaysia¹ [Hausmann et al., 2014]. The United States remains the main source of foreign direct investment in digital technologies in the region, concentrating between 60% and 90% of the annual total; this investment grew rapidly between 2005 and 2011, going from approximately 0.5 billion dollars to 7.2 billion, in parallel with the regional expansion of large U.S. technology corporations such as Google, Amazon, Microsoft, Facebook, and Uber [Monge-González, Rivera, Mulder, and Meneses, 2025; Dussel Peters, 2021], as can be seen in the following graph.



Graph 5. Amounts of announced foreign direct investment projects in LAC related to digital technologies (in billions of US\$)

Source: ECLAC [2025].

The United States maintains primacy in technological investments in the region through the expansion of Big Tech, such as Google, Amazon, Microsoft, Meta, Uber, operating in Latin American and Caribbean countries². This expansion is intertwined with the new National Security Strategy of the Donald Trump government, which is oriented towards preserving U.S. hegemony in the hemisphere [The White House, 2025, December 4], leading the United States to concentrate its attention on critical infrastructures, including digital platforms, cloud and data services, generating critical dependencies in regional digital infrastructure [Bateman, 2022]. The European Union maintains a smaller presence, but with a strong regulatory and market-oriented focus, seeking access to sectors such as renewable energies, telecommunications infrastructure, and digital financial services.

For its part, China has substantially increased its investment through the Digital Silk Road and various technological cooperation initiatives. This expansion includes telecommunications infrastructure (notably 5G), data centers, and e-commerce platforms, offering alternatives to exclusive dependence on Western suppliers [Arsentyeva, 2024; Chunzhi, 2025]. Likewise, Russia maintains selective and relatively limited technological engagement, although gradually growing in sec-

¹ Unlike Latin America, these Asian countries have advanced toward exports with higher technological content through active industrial policies, the attraction of foreign direct investment, and the gradual development of local capabilities

² China is reinforcing its technological influence in Latin America by expanding its state-owned telecommunications corporations (Huawei, ZTE, Alibaba Cloud), establishing a hardware-centric dominance over critical infrastructure, controlling 44.6% of the 5G market in Brazil and approximately 55% of 4G networks in Mexico, while extending its presence through submarine cables to the Amazon and data centers in Mexico City and São Paulo to boost AI and the regional cloud [BNamericas, 2026; D'Sola, 2024].

tors such as cybersecurity, nuclear energy, and space cooperation with specific countries in the region (mainly Venezuela, Cuba, and Nicaragua), which represents a much greater threat to the United States than that of China [Ellis, 2022, January 19; Pelcastre, 2023, January 13]. Therefore, in response to this, the United States promotes and supports ideological and political currents aligned with its interests among Latin American and Caribbean countries, with elitist visions of technological power, associated with “Straussian” interpretations of leadership and technological governance that seek to reinforce a global architecture where the control of knowledge and digital infrastructures is concentrated in a reduced number of state and corporate actors [Drury, 1997; Thiel, 2014].

The problem is that most of the regional digital infrastructure is externally financed and therefore Latin American and Caribbean countries are more vulnerable to the loss of technological sovereignty and data control. Dependence on foreign platforms for the processing of national data, cloud storage, and provision of critical digital services poses national security risks and limits the region’s capacity to develop its own digital industries [Guerra, Suárez, and Cerratto-Pargman, 2022]. These dynamics reinforce the peripheral position of Latin America and the Caribbean in the global political economy of data and a new form of digital imperialism, in which the value generated by digitalization tends to concentrate in the technological centers of the international system, reproducing new forms of dependence compatible with the logic of techno-feudalism.

Institutional discontinuity, asymmetries between countries, and limited investment in Research and Development have made it difficult to consolidate a sustained regional strategy capable of counteracting the emerging technological hierarchies in the new world order. Despite this, Latin America and the Caribbean has a significant history of South-South cooperation initiatives aimed at reducing structural technological vulnerabilities, although these efforts have been fragmented and unevenly implemented. Since the last quarter of the 20th century, regional projects in science, technology, and innovation have been tested that have sought to strengthen endogenous capabilities through research networks, scientific cooperation programs, and technological integration mechanisms. The following table, for example, summarizes the main South-South cooperation initiatives in Latin America and the Caribbean that since the 1980s have attempted to articulate themselves to reduce technological vulnerabilities among Latin American and Caribbean countries.

These initiatives, promoted by CELAC, Mercosur, the Andean Community, the Pacific Alliance, CARICOM, and SICA, cover critical dimensions such as digital infrastructure, biotechnology, renewable energies, academic mobility, and technological foresight. Although fragmented, they suggest emerging forms of regional integration based on knowledge that could be articulated into a coherent strategy within the framework of contemporary technological development. The Argentina-Brazil Integration and Cooperation Program (PICAB) constitutes the most enduring example of bilateral technological cooperation in the region, covering everything from nuclear and space projects to biotechnology and defense. Its persistence through government changes and economic cycles demonstrates the potential of South-South technological cooperation when there is sustained political will. However, the current reality shows significant tensions when articulating these schemes with other emerging powers of the Global South.

Technological cooperation with China, for example, which has been growing in the 21st century [Wise, 2020], the United States attempts to block through direct diplomatic pressures, threats of sanctions, and tariffs to restrict projects in critical infrastructure such as telecommunications,

Table 1
Initiatives of South-South cooperation in Latin America and the Caribbean
to reduce structural technological vulnerabilities.

Dimension	Initiative / Mechanism / Year	Status
Technological cooperation	Argentina-Brazil Integration and Cooperation Program (PICAB), Mercosur -- 1986	Active
Knowledge society	CELAC Action Plan -- 2022	In force
Energy transition	Caribbean Renewable Energy Initiative, CARICOM -- 2013	Implementation
Technological foresight	Technological Observatory, Pacific Alliance -- 2014	Operational
Intellectual property	Common Industrial Property Regime, Andean Community -- 2000	In force
Academic mobility	Pacific Alliance Scholarship Program -- 2013	Active
Digital infrastructure	CELAC Data Center Interconnection Network -- 2021	Under development
Space cooperation	Mercosur Space Agency -- 2019	Implementation
Biotechnology	Mercosur Biotechnology Institute -- 2003	Active
Circular economy	Andean Circular Economy Strategy -- 2021	Approved
Digital technologies	Regional Cooperation Agreement on ICT, SICA -- 2017	In force
Knowledge value chains	CELAC Strategic Value Chain Projects -- 2022	Approved

Source: Own elaboration

submarine fiber optic cables, and strategic ports [Hundman, 2026]. The United States has adopted a broad and explicit strategy to marginalize Chinese interests in the region [The White House, 2025, December 4], which has generated paralysis in some socioeconomic development projects and has forced Latin American and Caribbean countries to navigate growing tensions between the search for diversified technological cooperation and the demands of geopolitical alignment. Cooperation of some Latin American and Caribbean countries with Russia, historically important in sectors such as nuclear energy and space, has also been affected by Western sanctions and the reorientation of its geostrategic priorities towards Eastern Europe. This has reduced the margin for sustained scientific cooperation with Latin America and the Caribbean, displacing part of these interactions towards more selective or bilateral schemes.

The region shows incipient, although uneven, foundations for what could be a new political economy of knowledge. Initiatives such as Argentina-Brazil cooperation (PICAB) and the CELAC knowledge agenda demonstrate noonomic potential, to use Bodrunov's words [2020]. In fact, applying Bodrunov's theoretical categories [2020], it is possible to evaluate the state of progress of Latin America and the Caribbean towards a knowledge society, as despite the scientific and technological backwardness, it also possesses relevant capabilities in some countries, particularly in Brazil, Mexico, and Argentina, which could be the potential basis for more autonomous technological development, considering the articulation between science, industry, and policies for the transformation of knowledge into productive systems based on innovation and the transition towards a knowledge-centered economy, as shown in the following table.

As observed in the previous table, Latin America and the Caribbean would be situated in what could be characterized as an early noonomic phase, still strongly conditioned by the technological hierarchies of the international system, with persistence of capitalist and neo-developmental paradigms that perpetuate precisely the contradictions that Bodrunov identifies as fundamental

Table 2

Synthesis by noonomic categories in Latin America and the Caribbean

Bodrunov's Noonomic Principle	Identified Initiatives	Development Level
Technological reindustrialization	PICAB (Mercosur), Technological Observatory of the Pacific Alliance, Mercosur Biotechnology Institute	Medium
Knowledge society	CELAC Action Plan, Pacific Alliance Scholarships, IberCultura Viva	Medium-High
Bioeconomy and sustainability	Caribbean Renewable Energy Initiative, Andean Circular Economy Strategy, Nagoya Protocol	Medium
Technological/digital sovereignty	CELAC Data Center Network, ALADI Payment System, SICA cybersecurity cooperation	Low-Medium
R&D cooperation	PICAB, Mercosur Space Agency, Andean Telemedicine Network	Medium
Regional intellectual property	Andean Decision 486, genetic resources regulation	Medium

Source: Own elaboration

obstacles for the transition towards noonomy, as the exchange value continues to predominate over use value, the concentration of knowledge as merchandise, and the subordination of technological development to the logic of capitalist accumulation [Bodrunov, 2020]. It should be remembered that noonomy is not merely a technological development model, but a new civilizational paradigm oriented towards cognitive sovereignty and the social management of knowledge.

Therefore, the reinforcement of Latin American and Caribbean South-South cooperation schemes has the potential to promote a “geopolitical cognitive disconnection” that, in line with Bodrunov, would allow us to imagine an inclusive and plural globalization. This vision is particularly convergent with the Global Development Initiative promoted by China, which proposes an alternative international order capable of responding both to contemporary structural crises and to the aspirations of an interconnected humanity [Vadell and Staiano, 2025], in contrast with the hierarchical and exclusionary approaches that have historically sustained the traditional liberal order directed from the West [Lascurettes, 2020]. Here it is important to distinguish between international cooperation processes in Latin America and the Caribbean that have the potential to be vectors of structural transformation and those that reproduce historical logics of dependence, as illustrated in the following table.

The comparison of Latin America and the Caribbean cooperation schemes in strategic areas reveals fundamental differences. While the mechanisms promoted by China and the BRICS tend to emphasize the construction of physical and digital infrastructure, with technology transfer processes that, although implicit, are not always formally institutionalized, the agreements promoted by Western actors prioritize trade openness, regulatory standards, and intellectual property protection. This latter approach tends to restrict the margin for maneuver for the development of autonomous technological capabilities in peripheral economies.

Therefore, Latin America and the Caribbean finds itself at a geostrategic crossroads that debates between the diversification of international links, widely recommended by the literature on dependence and autonomy [Jaguaribe, 1979], which offers potential to negotiate better condi-

Table 3

Main cooperation frameworks between Latin America and the Caribbean and the BRICS, the United States, and the European Union in strategic development areas

Agreement / Mechanism (Year)	Key Areas	Status
Belt and Road Initiative (2013) [participation depends on the country]	Infrastructure, energy, digital connectivity	Variable
New Development Bank (2014)	Infrastructure financing, sustainable development	Active
China-CELAC Forum (2015)	Technological cooperation, development projects	Active
Treaty between Mexico, the United States, and Canada (2020)	Trade integration, industrial supply chains	Active
EU-Mercosur Association Agreement (2019, political agreement)	Trade, regulatory cooperation	Not in force
Horizon Europe (2021) [open participation framework] (CELAC-EU)	Scientific research, innovation	Under implementation

Source: Own elaboration

tions, and the risks associated with global fragmentation, typical of systemic chaos, that leads peripheries to assume increasingly higher transaction costs associated with non-alignment. South-South cooperation with China, Russia, and other emerging powers must evolve towards shared technological capabilities and regional governance. This implies going beyond infrastructure financing towards the joint construction of scientific capabilities, effective knowledge transfer, and the development of regional technological standards that preserve decision-making autonomy.

Conclusions

In the current context of systemic chaos, advanced technologies have become a central axis of the debate on structural reconfiguration, posing fundamental questions about the nature of the emerging new world order. The discussion tends to bifurcate between the transformative potential of these technologies and the risk that they will deepen existing structural inequalities. From this perspective, Bodrunov argues that the expansion of artificial intelligence, digitalization, and knowledge-based economies could pave the way for new forms of socioeconomic organization centered on creativity and human development, configuring what he calls a noonomy era [Bodrunov, 2020]. In contrast, Thiel and Masters [2014] interpret technological innovation as a deeply disruptive factor of the contemporary global economy, emphasizing that the concentration of market power in strategic sectors intensifies geopolitical competition and reinforces the need, from the Western perspective, to maintain control over emerging technologies.

Therefore, Varoufakis warns that the growing concentration of technological power in large corporations and digital platforms could reinforce techno-feudal type dynamics, in which access to digital means of production is monopolized by hegemonic actors capable of extracting rents from global digital ecosystems [Varoufakis, 2023]. This trend suggests that the emergence of a new global order is developing in a context of systemic chaos, characterized simultaneously by profound technological transformations, growing geopolitical tensions between great powers, and the weakening of traditional mechanisms of global governance [Arrighi, 2007]. For Acharya [2014], these dynamics, in addition to constituting symptoms of the relative decline of the inter-

national order led by the United States, also account for the transition towards a more multipolar configuration, in which greater plurality of actors is observed, but also growing conflicts and global fragmentation.

In this scenario, advanced technologies gain importance as drivers of economic change and strategic instruments of power and interstate competition, which can redefine the hierarchies of the international system and reconfigure global leadership dynamics [Thiel, 2007]. Within this framework of structural transformation, Latin America and the Caribbean continue to occupy a structurally limited position due to persistent gaps in scientific research, technological innovation, and digital infrastructure, which places the region in a peripheral position with respect to the main centers of intellectual and technological capital accumulation. Consequently, the future trajectory of the region will depend less on the simple global diffusion of technologies and more on the capacity of States and regional mechanisms to articulate coherent strategies of scientific, industrial, and digital development that allow avoiding the reproduction of historical patterns of structural dependence.

The absence of coordinated regional strategies in matters of digital governance, investment in knowledge, and South-South cooperation reduces the region's margin of maneuver, increasing the risk that its insertion in the international system continues reproducing patterns of technological dependence and peripheral specialization. In this context, it is crucial for Latin American and Caribbean countries to advance towards higher levels of investment in research and development, strengthen their digital sovereignty, articulate productive strategies around critical minerals, and consolidate regional institutionality through expanded South-South cooperation processes, which could constitute a way to take advantage of the window of opportunity opened by the current moment of systemic chaos. Otherwise, the emerging technological order runs the risk of reproducing new forms of structural dependence. Although, if such transformations are strategically articulated, they could lay the foundations for a deeper structural change and even open the possibility of a transition towards the noonomy proposed by Bodrunov [2020] as an alternative horizon to the contradictions of contemporary capitalism.

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NOOPOLIS AS A STRATEGIC RESPONSE TO THE CHALLENGES OF GLOBAL COMPETITION FOR KNOWLEDGE IN THE ERA OF NOONOMY

Abstract: This article examines noopolis as a new form of urban space organization in the context of the emergence of noonomy. It is shown that the accumulation of technological solutions within the smart city model does not ensure a transition to a higher quality of urban life, as the development of smart cities is accompanied by a growing digital divide, focusing exclusively on practical, economic functionality at the expense of comfort, ecology, and the social environment, and achieving development goals through technology, engineering solutions, and digital systems. Efficiency becomes the primary criterion for success, and residents are viewed as users who must adapt to the system. The concept of noopolis is explored as a qualitatively different type of urban system, in which knowledge, culture, science, public intelligence, and the reproduction of human potential become the fundamental sources of governance. The article interprets noopolis as the spatial basis of noonomy, an environment in which the very nature of social reproduction is transformed: from the production of things to the production of knowledge, cultural meanings, social connections, and conditions for human development.

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智慧型城市是对智慧经济时代全球知识竞争挑战的战略回应

摘要: 本文探讨了在智慧经济形成背景下作为城市空间组织新形式的“智慧型城市”。文中指出, 在智能城市模型框架内积累技术解决方案并不能确保城市生活质量的提升, 因为智能城市的发展伴随着数字不平等的加剧, 只注重实用性和经济功能而牺牲了舒适度、生态与社会环境, 且发展目标的实现完全依赖于技术、工程解决方案和数字系统。效率成为成功的主要标准, 而居民则被视为必须适应系统的用户。本文探讨了“智慧型城市”概念, 将其视为一种本质上截然不同的城市系统, 其中知识、文化、科学、社会智慧以及人类潜能的再生产成为管理的基本要素。本文将“智慧型城市”视为智慧经济的空间基础, 即社会再生产本质发生转变的环境: 从物质生产转向知识生产、文化创作、社会关系构建以及个体发展条件创造。

关键词: 智慧型城市、智慧经济、智慧圈、人力资本、城市发展、知识经济、智能城市、社会智能、可持续发展。

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Introduction

The modern city is undergoing a profound transformation. Until recently, urban modernization was primarily focused on digitalization through the implementation of platform services, intelligent transport systems, sensor networks, data processing algorithms, and monitoring systems. However, the deeper the modern city becomes embedded in its digital shell, the more clearly its developmental contradictions emerge: technological saturation in itself does not yet create meaningful development, social cohesion, or a new quality of human life. We have learned to see the city better, but we do not always understand it better. We have learned to make decisions faster, but we have not necessarily become wiser in choosing our goals. This is precisely where the true scientific problem begins.

Today, the city can no longer be described merely as an administrative unit, a territory with a high concentration of population and capital, or a set of infrastructural systems. The modern metropolis represents an intricate socio-economic system where flows of energy, information, capital, symbols, cultural practices, institutions, and human expectations converge and intertwine. If this is the case, urban development can no longer be evaluated solely by classical growth parameters. A city cannot be considered successful simply because it transports faster, collects more efficiently, gathers more effectively, or provides services more conveniently. While these indicators are necessary, they fail to answer the fundamental question: what exactly does human life become in such an environment? Does it become richer, freer, more cultured, or more meaningful? Does such a city expand the space for human development, or does it do an opposite thing – merely turn the individual into a more adapted element within a perfectly tuned system?

This is precisely why a shift from a technocratic model to an anthropocentric one is gaining momentum in contemporary urban management theory and practice [Shushunova, 2024, p. 271]. Increased attention is being paid to human capital, the quality of the social environment, sustainability, participatory institutions, urban knowledge, cultural saturation, and – most importantly – to the very goal-setting of management itself. The idea is gradually coming to the fore that technology should not be a source of pride in itself, but rather a higher-order tool – a tool for harmonizing the development of society, the economy, and nature. This implies that the city of the future should no longer be viewed merely as a smart city, but as a more complex form: the noopolis.

The concept of the noopolis allows us to transcend the dichotomy between the “digital” and “non-digital” city. A noopolis does not represent a rejection of technology; rather, it represents the subordination of technology to the goal of creating an urban environment in which knowledge, science, culture, and technology serve not themselves, but the comprehensive development of the individual, collective intelligence, and the harmonious reproduction of nature and society. It is not simply a “city of knowledge,” a “sustainable city,” or a platform for the creative economy.

It is a city where science, education, culture, collective thinking, open knowledge, and the environmental responsibility of residents become the internal logic of the entire system. In other words, a noopolis is a city where development is subordinated not to the acceleration of urban economic processes as such, but to the development of the human being and collective intelligence [Castells, 2010, p. 99–101].

This understanding of the city is based, on one hand, on the Russian intellectual tradition associated with V.I. Vernadsky's teachings on the noosphere, and on the other, on modern economic thought, primarily the theory of noonomy by S.D. Bodrunov. V.I. Vernadsky demonstrated that humanity is entering a phase of development where scientific thought and intelligent activity become a geological force of planet scale [Vernadsky, 1991, p. 148]. In other words, humanity has reached a stage of development where the collective scientific thought and activity of people have become a factor capable of transforming the biosphere on a global, planet scale. He termed this stage the noosphere – the “sphere of reason.”

S. D. Bodrunov, expanding this idea from a political-economic perspective, substantiates society's movement toward noonomy: a stage in which knowledge, culture, creativity, and human development begin to displace the narrow logic of things production and market utilitarianism [Bodrunov, 2019, p. 9].

Noonomy, as a new stage of social development, marks a historical shift where knowledge, creativity, education, culture, and comprehensive human development start to supplant a strictly market-driven and utilitarian logic of economic management. In this context, the noopolis acts as the spatial expression of the noonomy – as its territorial and institutional form. Within the noopolis, it becomes possible to transform the city from a space of capital accumulation into a space for cultivating collective intelligence. This represents an urban organization in which the production of knowledge, collective intelligence, human capabilities, and cultural codes becomes more important than the mere accumulation of services and physical infrastructure. Consequently, the question of the noopolis is not only an urbanistic issue but also a political-economic one. This reflects an understanding of a new type of social reproduction and the urban environment that corresponds to it.

Therefore, the study of the noopolis has not merely theoretical, but also practical meaning. This is not about constructing a utopia, but rather about identifying existing trends that provide a new perspective on the development trajectory of modern metropolises. Currently, several world cities exhibit elements of urban environmental planning that cannot be reduced to the standard logic of a Smart City and increasingly indicate the emergence of a different development model. Analyzing these elements allows for a better understanding not only of the city's future but also the future of the economy itself.

This defines the objective of the present article: to demonstrate that the noopolis should be understood as the spatial form of the noonomy, and to identify, through specific urban examples, those elements that already suggest movement in this direction.

Research Methods

Methodologically, this work proceeds from the premise that a city cannot be analyzed as a mere sum of sectors, functions, and services. Such a perspective proves insufficient for capturing contemporary urban dynamics. Instead, the city must be viewed as a holistic reproductive system, within which economic, cultural, ecological, technological, and political processes are far more

closely intertwined than conventional sectoral analyses suggest. For this purpose, a systems approach is combined with political-economic, and comparative-institutional approaches in this article.

Systems approach allows for viewing the city not as a set of autonomous subsystems, but as an organism where changes in one element inevitably affect others. This is particularly crucial for analysis of the noopolis: transport, digital infrastructure, education, governance, and ecology cannot be considered in isolation, as it is the specific manner of their integration that forms a qualitatively new type of urban integrity.

Political-economic approach is necessary to avoid diluting the problem within fashionable “digital transformation” rhetoric. The question of the city is always a question of the mode of social reproduction. When technologies change, it is not just tools that evolve, but also the relationships between people, between labor and knowledge, between society and nature, and between government and residents. Therefore, the noopolis interests us not as an improved administrative model, but as a space where the dominant logic of development itself is transformed.

Comparative-institutional approach is utilized to analyze the practices of various metropolises. The cities selected for this study are significant not because they rank as “the best” in any universal rating, but because each demonstrates distinct yet illustrative forms of departing from a strictly technocratic model. In one instance, this manifests as cooperation between science, administration, and citizens; in another, as the combination of digital governance with mediation and participation institutions; and in a third, as the construction of open urban digital infrastructure as a public good. It is within these differences that the empirical meaning of the noopolis concept is revealed.

The conceptual and theoretical analysis of works by V.I. Vernadsky, S.D. Bodrunov, D. Bell, M. Castells, T. Schultz, G. Becker, and others has allowed this research to be integrated into the logic of evolving social thought – progressing from notions of post-industrial and information societies to an interpretation of modernity in terms of noosphere and noonomy.

The empirical basis of this article includes materials from official urban platforms, documentation on citizen participation in metropolitan management, and the websites of urban innovation clusters and open data services. The use of these sources is critical not only for reasons of verifiability; it allows for an analysis that moves beyond the external image of cities to examine institutionalized mechanisms – the real, rather than merely declared, elements of the transition to a new model.

Theoretical Foundations of the Noopolis Concept

The Noopolis is not merely a variety of the smart city; it is a distinct historical form of urban organization. This necessitates a shift in research approaches to study of the city. While most literature on cities of the future focuses on digital efficiency, environmental sustainability, or innovation capacity, this article shifts the focus to what can be termed the transformation of the city’s social function. The Noopolis is understood as an environment in which knowledge, culture, science, and human development are not external factors of the economy but its internal drivers of development.

The novelty lies in the emphasis that, within a noopolis, the object of management includes not only the flows of transport, energy, water, and data, but also the conditions for the reproduction of collective intelligence. In other words, it is not simply about managing the “urban

machine,” but about organizing the urban critical thinking. This perspective reveals that the contemporary crisis in urbanism is linked not only to ecology or infrastructure but to the fact that cities are often poor in social and cultural content, even while being rich in technological solutions.

It is impossible to understand the noopolis if the city is viewed merely as a technical device. The city has never been a mere aggregation of buildings, roads, pipes, and regulations. Even an industrial city—which might seem closest to a mechanical metaphor—was, in reality, a far more complex form. It organized not only production but also a way of life, a hierarchy of time, the rhythm of labor, cultural discipline, modes of socialization, and even a specific personality type. This is even more applicable to the modern city. The more complex society becomes, the more evident it is that the city is not merely a background for economic processes, but the form of their historical existence.

This is precisely why the concept of noopolis demands a civilizational approach rather than a technical one. Its original sources are to be found in V.I. Vernadsky’s theory of the noosphere. The noosphere is the stage of biosphere development in which the intelligent activity of humanity becomes the determining factor of its transformation [Vernadsky, 2013, p. 17]. However, a crucial point must be made: this is not merely about the accumulation of knowledge. The reason begins to change the world not as a sum of private efforts, but as an organized, historically significant force. Science, communications, technology, new energy sources, and global connections – all of these restructure the very fabric of human existence and raise the question of reason’s new responsibility toward the world.

Translating this thesis into the urban dimension reveals that modern cities are, in essence, the nodes of noosphere concentration. There are vast volumes of knowledge, technology, organizational forms, cultural codes, and social interactions compressed into a single space within these nodes. Yet, at the same time, it is within the city that the contradictions of this new era are most acute: environmental overload, social inequality, digital segregation, managerial opacity, the collapse of shared meanings, loneliness, and a deficit of time and attention. In other words, the city becomes a spatial node where reason is simultaneously empowered and at risk of self-destruction. Therefore, a city in the noosphere is not merely a city with a high concentration of scientific and educational institutions. It is a city where reason becomes the organizing principle of the system. It is not a trendy addition or a superstructure atop the administrative machine, but the foundational principle itself. And this is where the concept of the noopolis emerges. A noopolis is a stage of urban development in which management is built neither on the automatic reproduction of established interests nor on the blind optimization of flows, but on the scientifically and socially meaningful coordination. It is oriented toward the long-term consequences of decisions, the quality of life of its residents, the cultural and ecological reproduction of the environment, and the formation of a collective capacity within urban communities to think and act strategically rather than situationally.

However, the theory of the noosphere alone is insufficient. While it defines the scale, it lacks full political-economic certainty. This is where S. D. Bodrunov’s theory of noonomy comes into play. In this concept of economic development, modern society is passing a historical milestone: productive forces, based primarily on knowledge and new technologies, are increasingly undermining the old logic of the economy as a system focused on commodities, value, resource scarcity, and the subordination of human development to external economic expediency. This creates both the possibility and the necessity for an alternative mode of social development, where knowledge,

creativity, culture, and human development take on priority significance [Bodrunov, 2024, p. 17]. In this sense, noonomy is not merely a theory of the “knowledge economy.” It is a much deeper thesis: knowledge ceases to be just a factor for increasing productivity within the old economic system; it becomes the foundation for a new quality of social existence. Instead, it becomes the foundation for a new quality of social existence. The very function of the economy changes: it must work not for the endless expansion of the commodity form, but for the development of human capabilities and the creation of conditions for the full disclosure of the individual’s personality [Bodrunov, 2022, p. 37]. This leads to a simple but crucial thought: if the nature of reproduction changes, its spatial form must also change. This form is the noopolis.

In other words, the noopolis is a city that corresponds to the noonomy. It does not merely serve it from the outside; it expresses its internal logic. If the industrial city was built around the factory, the warehouse, the railway, and quarters for disciplined workforce; if the post-industrial city was built around the office, the service sector, the university, the financial center, and platform infrastructure; then the noopolis is built around the reproduction of collective intelligence. Its center consists not just of “objects of knowledge,” but the very environment where knowledge is generated, exchanged, criticized, practically applied, and socially distributed.

It is crucial here not to fall into the illusion that this refers only to universities, technology parks, and startups. That would be too narrow. A noopolis is not a technopolis or a campus-city. Science and education cease to be a “sector” there. They become the organizing principle for the entire environment. The library, the research lab, the cultural center, the public space, the civic platform, the open database, the medical network, the system of lifelong learning, and the ecosystem of urban experiments – all of these form a single cognitive infrastructure. The metropolis begins to thrive by developing not only its transport infrastructure, energy efficiency, and budget optimization, but also by exchanging meanings, competencies, project ideas, and interdisciplinary connections.

In this regard, the concept of the noopolis builds upon classical works regarding post-industrial and information society. As early as the 1970s, Daniel Bell pointed out that knowledge and theoretical information were becoming the central resources of a new social structure [Bell, 2004, p. 145]. Later, M. Castells demonstrated that in the network society, information flows and networked forms of organization begin to determine economic and social dynamics [Castells, 2000, p. 82]. However, it is here that noonomy takes the next step. It does not limit itself to merely recording the increasing role of knowledge. Instead, it raises the question of how the very goal of social development changes when knowledge, creativity, and culture become its primary content.

This leads to a new understanding of human capital. In the works of T. Schultz and G. Becker, human capital was viewed as a stock of knowledge, skills, education, and health that increases future income and productivity. This was a fundamental step in economic thought, as it moved the individual beyond the role of a mere labor bearer. However, despite its progressive nature, this concept remained within an instrumental framework: human education and development were justified primarily through future economic returns. For the noonomy and the concept of the noopolis, this is no longer sufficient. Human capital must be understood more broadly – as a form of human development itself and as a social goal, rather than just an economic resource [Schultz, 1971, p. 78; Becker, 1962, p. 12].

A fundamental shift is taking place. In the noopolis, the city no longer invests in the individual solely to boost territorial competitiveness or the tax base. It invests in the individual because

human development becomes the core purpose of social reproduction. Education in such a system is not a supplier of diplomas or a factory of competencies tailored to current market demand. It is a continuous process of forming the capacity for critical thinking, cooperation, creativity, and responsible participation. Culture is not a leisure sector, but a mechanism for the production of meanings and social connectivity. Healthcare is not just treatment, but a vital condition for full human development. Open data does not just provide data for apps, but creates an environment of transparency, participation, and collective understanding of the urban reality.

This leads to a new logic for evaluating the city. If we continue to measure a city's success solely through GRP, investments, real estate values, transport speeds, or the number of startups, we inevitably remain within the old rationality. The noopolis requires different indicators, even if they are currently less familiar. How effectively does the city expand access to lifelong learning? How well does it bridge the gap between science and everyday life? How well does its environment facilitate interdisciplinary contact? Does it successfully include the elderly and residents with disabilities in its digital and cultural ecosystem? Does it work to lower cognitive barriers? Does it create spaces not just for consumption, but for critical thinking? These are the authentic questions of the new urban development.

The noopolis, therefore, transforms not only the object of management but also the very type of rationality underlying urban policy. The traditional city was managed through the control of material, resource, financial, and information flows. Management was reduced to their distribution, accounting, regulation, and standardization. The smart city added algorithms, digital dashboards, and real-time analytics to this mix. The noopolis goes further. Its primary object of management is not the flow itself, but the society's capacity to rationally organize its own development. This means that governance must work with trust, attention, participatory institutions, the cognitive accessibility of the environment, the cultural complexity of space, and the dialog between science and citizens.

This introduces another vital aspect: attention as a resource. In the industrial city, the primary deficits were labor time and energy sources. In the post-industrial city, it was access to information and mobility. In modern society, attention has become the scarce resource. A city may be superbly digitalized, but if it overwhelms the individual with noise, signals, interfaces, intrusive advertising, endless transactions, and fragmented solutions, it exhausts the capacity for conscious action. A noopolis must not only disseminate knowledge but also preserve the conditions for focus, comprehension, and collective thinking. In this sense, it must be more than just high-tech; it must be cognitively ecological.

Finally, we must remember that a noopolis is a "living" city. In V.I. Vernadsky's framework, the noosphere cannot exist without the biosphere. Consequently, a noopolis cannot be a machine that merely consumes resources and exports waste. Its maturity is defined by its ability to reduce the entropy of its own system: developing circular processes, transitioning to cleaner energy, reducing redundant material flows, and designing an environment that supports health rather than destroying it. But again, this is not just a matter of developing technical systems and technology. In a noopolis, ecological rationality is a function of culture, knowledge, and collective responsibility. Environmental policy, therefore, is not a separate area of policy but a characteristic of the entire system.

The noopolis can thus be defined as a stage of urban development where science, knowledge, culture, human development, environmental responsibility, and participatory institutions merge

into a single logic of management and reproduction. It is a city where technology does not disappear but takes its proper place – as a tool. It is a city where the economy is not abolished but ceases to be an end in itself. It is a city where reason is not an external reflection upon urban chaos, but the internal principle of its organization.

The Noopolis and Overcoming the Limitations of the Smart City

To be fair, it must be acknowledged that the Smart City concept has played a historically positive role. It broke the inertia of old bureaucratic approaches to municipal management and forced a fresh look on data, feedback loops, and the integration of urban systems. It allowed us to view the city as a dynamic entity rather than just a set of static reports. Thanks to this concept, it became possible to work far more precisely with transport, utility networks, urban safety, load balancing, and numerous other sectors [Song, 2023, p. 170].

However, the smart city has an internal limit to its development, and that limit is reached where efficiency replaces development. The smart city is very good at answering the question: “How can we make it faster, more accurate, cheaper, or more convenient?” But it is much weaker at answering the question: “Why?” One can perfectly optimize traffic flows without reducing the alienation between neighborhoods. One can collect colossal volumes of data without creating public transparency in the city’s management system. One can provide a resident with dozens of digital services while failing to let them participate in strategic decision-making. One can reduce waiting times and increase transaction density without moving any closer to a more mature, cultural, and sustainable urban life [Chang, 2018, p. 17].

That is why the noopolis should not be understood as “Smart City 2.0.” It is not simply the next version of the same product; it is an entirely different logic. In the smart city, technology often sets the framework within which comfort, sustainability, and participation are subsequently discussed. In the noopolis, it is the other way around: first, a social goal is defined – oriented toward human development, collective intelligence, and cultural and ecological integrity – and only then does technology find its place within that system.

From this perspective, the difference between a smart city and a noopolis is the same as the difference between calculative efficiency and reason. Calculative efficiency can be extremely high without leading to genuine development. Reason, however, implies the ability to see the whole, to account for long-term consequences, and to maintain a moral and cultural horizon without dissolving into immediate gain. The noopolis is an attempt to transform the urban system from a calculative mode to a mode of reason.

The Emergence of Noopolises

Analysis of the development of global metropolises reveals that elements of the noopolis already exist. While they do not yet form a finished model, they are forming a recognizable concept.

Copenhagen, for instance, is significant for analysis primarily because its innovativeness is built not as a showcase of technology, but as a form of cooperation. The Copenhagen Solutions Lab explicitly describes itself as an incubator that develops and implements solutions in partnership with businesses and research institutions in the interests of urban development¹. It operates on the principle of an integrated space for science, administration, and practical experimentation rather than a closed expert machine. Equally illustrative is the Copenhagen Citizens’ Assembly,

¹ Copenhagen Solutions Lab. Official site. 2026. URL: cphsolutionslab.kk.dk (accessed on: 19.04.2026).

where a representative group of residents discusses the city's future and develops recommendations¹. This is an institutionalized form of involving citizens in meaningful strategic discussion rather than a simple public opinion poll. Furthermore, Innovation District Copenhagen demonstrates that an innovation environment is understood as a territorial ecosystem. It unites over 500 companies and approximately 40,000 researchers, students, and employees in a shared space of interaction². All this gives us the reason to speak of Copenhagen as a city where knowledge is gradually becoming the very fabric of urban life, rather than remaining the exclusive property of isolated institutions.

Seoul represents a different trajectory toward the noopolis. Of particular interest here is the combination of high-tech urban infrastructure with mechanisms for participation and mediation. An analysis of official city websites shows that the participatory budgeting system has been operational in Seoul since 2012, ensuring the stable inclusion of citizen proposals in the budgetary process over several years³. The mere fact that this practice has been institutionally established means the city has begun to view the resident not just as a service recipient, but as a co-participant in the distribution of public resources. Even more importantly, Seoul has created a unique conflict management system: the city recognizes conflict not as a "failure" to be quickly suppressed, but as an inevitable element of a complex society that requires procedures for coordination and mediation⁴. Even the implementation of IoT solutions and digital monitoring tools is presented not merely as a means of control, but as a way to enhance public safety and the quality of the urban environment⁵. Thus, Seoul demonstrates a vital point: noopolis elements can grow even from a highly digitalized urban environment, provided that technology does not replace social logic but is instead integrated into it.

The example of Barcelona most vividly illustrates how technology can serve urban humanism. The Decidim platform is positioned as a free, open, and secure technology for citizen participation; in official documentation, it is explicitly referred to as an infrastructure for the common good⁶. This is a crucial formulation: a digital platform is understood not as a private service or a tool for administrative mobilization, but as a public good. The Barcelona City Council's open data portal (Open Data BCN) maintains a vast catalog of open datasets, making information accessible for public use⁷. Similarly, the Sentilo platform is defined as an open-source platform for sensors and actuators, designed for openness and seamless interactions⁸. In other words, the very architecture of the city's digital environment is built on compatibility and openness rather than enclosure. Finally, the 22@Barcelona district is not merely an innovation hub, but an example of how research and entrepreneurial activity can be embedded into the living fabric of the city, rather than being isolated within a corporate enclave⁹. The example of Barcelona is particularly

¹ OI DP. Copenhagen Citizens' Assembly. 2024. URL: oidp.net (accessed on: 19.04.2026).

² Innovation District Copenhagen. Official site. 2026. URL: innovationdistrictcopenhagen.dk (accessed on: 19.04.2026).

³ Seoul Metropolitan Government. Participatory Budget System. 2026. URL: world.seoul.go.kr (accessed on: 19.04.2026).

⁴ Seoul Metropolitan Government. Introduction to Conflict Management of Seoul. 2016. URL: english.seoul.go.kr (accessed on: 19.04.2026).

⁵ Seoul Metropolitan Government. Voluntary Local Review 2025. URL: gold.uclg.org (accessed on: 19.04.2026).

⁶ Decidim. Official platform documentation. 2026. URL: decidim.org (accessed on: 19.04.2026).

⁷ Open Data BCN. Barcelona open data service. 2026. URL: opendataajuntament.barcelona.cat (accessed on: 19.04.2026).

⁸ Sentilo. Official site. 2026. URL: sentilo.io (accessed on: 19.04.2026). 22@Barcelona, the innovation district.

⁹ Barcelona, 2009. URL: bcnroc.ajuntament.barcelona.cat (accessed on: 19.04.2026).

important because it highlights the core principle: technology should not replace the citizen, but rather expand the field of their meaningful participation.

Individual elements of the noopolis can also be observed in Moscow. While they have not yet coalesced into a comprehensive model, the trend is clear. The expansion of green spaces represents more than just landscaping; it is the formation of the city's ecological backbone. Similarly, the modernization of public transport impacts more than just convenience – it improves air quality, reduces noise levels, and enhances connectivity of districts. Improving the availability of social services is also part of the broader mission to enhance the quality of life. In recent years, Moscow has successfully implemented projects to create a comfortable urban environment. Active projects to develop pedestrian infrastructure and improve public spaces are currently underway. The city is also actively integrating digital solutions into transport, healthcare, and urban services. A notable example is the data-driven traffic management system, where flows are regulated based on real-time sensor data rather than rigid schedules. The “Active Citizen” platform represents an attempt to embed resident feedback into the decision-making process. While not always perfect, the principle itself is significant: the city is moving away from viewing citizens as passive service recipients. Furthermore, a unified digital system has been implemented across the healthcare sector. This system enables the coordination of medical institutions, reduces waiting times, and increases the access to care. Collectively, these solutions demonstrate a shift from fragmented digital services toward an integrated management system. However, they still largely rely on technological solutions. This is neither good nor bad; rather, it reflects the transitional nature of the current stage. Moscow is moving toward a more complex model, but the final transition is still ahead.

Currently, none of the metropolises examined can be considered a noopolis in the full and final sense; they are instead proto-noopolises. Each of them faces its own limitations, contradictions, zones of exclusion, and remnants of old management logic. However, the important point is this: they all prove that a move toward a new developmental model for the metropolis is possible. Moreover, this transition does not begin with the purchase of a new platform or the deployment of another set of sensors. It begins at the point where the city ceases to view itself merely as a service mechanism and starts to understand itself as an environment of collective reason.

Analysis of research results

The obtained results lead to a vital methodological conclusion. A noopolis cannot be found using formal checklists. It cannot be defined by a simple set of attributes, such as the presence of “open data,” “advanced digital infrastructure,” “sustainable transport,” or “citizen participation.” All these elements can exist in a city that remains deeply embedded in the old economic and administrative logic. A noopolis emerges only when both the toolkit and the very meaning of urban policy undergo a fundamental shift.

This is perhaps the most difficult challenge for management practice. It is easiest to modernize urban services; it is far harder to change their underlying goals. It is simpler to implement a feedback platform; it is far harder to transform it into a real mechanism for collective thinking. It is easier to speak of human capital as a territory's competitive advantage; it is far harder to acknowledge that human development must become the goal itself, rather than a mere means. But without this transition, the noopolis is impossible.

Here, S.D. Bodrunov's theory of noonomy becomes indispensable, as it demonstrates that the problem of the city of the future is not reduced solely to improving the mechanisms of municipal

management. The question is broader: in what direction is the entire system of social reproduction moving? If knowledge, culture, creativity, and human development are indeed becoming the central content of the new post-industrial era, then the city is obligated to restructure itself accordingly. It must cease to be a mere container for labor, capital, and services; instead, it must become an environment for cultivating collective intelligence. In other words, the noopolis is not merely a new urban model. It is a form of civilizational transition.

A noopolis should be understood as a qualitatively new type of urban system emerging under the transition to a noonomy. It is neither a simple modernization of the smart city nor a mere combination of the “sustainable city” and the “knowledge city.” Its uniqueness lies in the fact that knowledge, science, culture, human development, public participation, and environmental responsibility form the internal foundation of its management and reproduction. The noopolis emerges not as a neutral space for economic activity, but as a form of organizing collective reason and a spatial basis for a new quality of social life.

The transition to a noopolis is a fundamental shift in the logic of urban policy. The focus moves beyond mere efficiency toward human development; beyond the management of flows toward the cultivation of conditions for thinking, participation, trust, and cultural growth; and beyond digitalization for its own sake toward the subordination of technology to socially significant goals.

The analysis of Copenhagen, Seoul, Barcelona, and Moscow demonstrated that individual elements of the noopolis already exist in modern practice. This is evident in the institutionalization of citizen participation, open digital infrastructures, the integration of science into urban governance, the development of innovation districts, and the alignment of technology with the public good. Yet, the most significant takeaway from these examples is not the toolkit itself, but the shifting logic: the city is learning to perceive itself not as a “machine for people,” but as an environment for the development of reason.

This is perhaps the primary conclusion. The future of the city does not depend on the quantity of smart solutions. It depends on whether the city can become a space where technology serves people rather than things, development rather than control, and the long-term, rational history of urban communities rather than short-term gain. In this sense, the noopolis is not merely a vision of the city of the future – it is a vision of a more mature civilization.

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THE DOMESTIC ECONOMY IN THE CONTEXT OF NOOTRANSITION: EMPIRICAL EVIDENCE AND PRACTICAL IMPLICATIONS

Abstract: The article examines the key parameters of the nootransition as a process of transformation of the socio-economic system, focusing on changes in the nature of labour and forms of ownership. The focus is on the concept of the aromorphosis of labor as an indicator of the transition from the industrial-market system to a non-economic way of satisfying reasonable needs based on creativity, culture, and personal development. A system of empirical indicators is proposed that reflects the depth and direction of the nootransition in the Russian context: the transformation of the structure of labour, forms of employment, motivation to work, the spread of creative activity, and the diffusion of property. Based on the analysis, it is concluded that Russia is in a transitional stage between the second and third phases of the global nootransition, demonstrating partial labour and institutional transformation while retaining the fundamental features of the industrial system.

Keywords: aromorphosis, economics, creativity, labour, noonomy, nootransition, knowledge.

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智慧型转型过程中的俄罗斯经济状态——指标的实证和实践

摘要: 本文探讨了作为社会经济体系变革过程的智慧型转型的关键指标, 重点关注劳动性质和所有制形式的变化。主要探讨了劳动模态这一概念, 将其视为从工业-市场体制向非经济方式满足合理需求的过渡指标, 这种方式基于创造力、文化和个体发展。文中提出了一套反映俄罗斯当前社会背景下智慧型转型深度与方向的实证指标体系: 劳动结构的转型、就业形式、劳动动机、创造性活动的普及, 以及所有权的扩散。基于所进行的分析, 得出结论: 俄罗斯正处于全球智慧型转型第二阶段与第三阶段之间的过渡阶段, 在保留工业模式基本特征的同时, 展现出部分劳动和制度转型。

关键词: 模态、经济、创造、劳动、创造力、智慧经济、智慧型转型、知识。

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Introduction to the Problem

Modern global economy is experiencing a period of profound and multidirectional transformations, encompassing not only production and technological aspects but also socioeconomic and cultural ones. Among the most pressing challenges facing humanity are growing inequality, a crisis in the content and meaning of labor, the dehumanization of production processes, the dominance of short-term financial interests over long-term development, and so on. These phenomena exacerbate the need to search for alternatives to the current model of economic growth, based on profit, overconsumption, and exploitative logic.

In this context, the need to develop a new paradigm - one focused not on quantitative indicators, but on the development of human qualities, the advancement of knowledge, cooperation, and the creative intensity of labor - is becoming increasingly pressing. In the Russian political-economic school, this approach has received conceptual form of the theory of noonomy and the associated phenomenon of nootransition - a qualitative shift from industrial-market logic to a (post-)market, human-centered way of life.

However, this approach is still in the process of theoretical and methodological understanding and development: a unified system of notions is lacking, and methodological and empirical tools for assessing ongoing changes are poorly developed. Verifying the nootransition stage in relation to specific national economic systems poses particular challenges. It is insufficient to consider quantitative indicators alone (e.g., GDP level, employment) – we need to consider nationally specific parameters of social relations, the nature and content of labor, the logic of reproduction, etc.

In this regard, based on the above, it can be concluded that the problem of developing a system of empirical indicators representing the depth and direction of nootransition in the domestic economic system, drawing on the theory of noonomy, comprises a significant research problem relevant to the modern field of social sciences and requiring comprehensive elaboration and substantiation.

Literature Review on the Research Problem

The issue of nootransition and the associated transformation of the nature of labor is crucial in contemporary Russian political and economic thought. The foundations of the theory of noonomy were laid by S.D. Bodrunov, who defined it as a qualitatively new model of reproduction focused on knowledge, creative labor, and social cooperation. According to his interpretation, noonomy is “a non-economic way of organizing the economy to meet needs, which is implemented by humans who have gone beyond material production” [Bodrunov, 2019, p. 9]. It is emphasized that “noonomy is a qualitatively new, non-economic social system, on the path to which all the basic institutions of the existing economy - private ownership, money, etc. - are removed, and humans become individuals focused on non-simulative needs and self-improvement” [Buzgalin, Kolganov, 2020, p. 9].

An important area of understanding noonomy is the critique of market restrictions on creative labor, as shown in the works of A.V. Buzgalin. The author notes: “The real foundations of the

genesis of post-capitalist relations are the progress of labor that is creative in its content and the relations that arise on this basis, including: 1) relations of the creation of unlimited public goods, taking the form of everyone's ownership of everything; 2) relations of individual development through labor, which acquires the status of a need; 3) relations of co-creation" [Buzgalin, 2022, p. 100]. This means that noonomy is based not on the commodity nature of labor, but on its ability to be an expression of freedom, self-actualization, and social utility.

L. A. Bulavka-Buzgalina continues this idea, emphasizing the alienation of creativity in market culture. It is articulated that the market system not only alienates the artist's work but also subjugates the process of inspiration and the creator's inner nature: "Now, not only the artist's creative output is becoming a commodity, but also their creative intentions, their authorial ideas, and even what is called the creator's 'soul' or 'inspiration.' ... Thus, the artist becomes a function of the brand market" [Bulavka-Buzgalina, 2021, pp. 12-13].

The problem of labor transformation in the context of digitalization is addressed in the study by M.V. Grechko and S.E. Sevikyan. The authors point out that automation eliminates routine tasks and promotes meaningful activity, but simultaneously exacerbates forms of alienation. Thus, digital capitalism intensifies exploitation through the extension of working hours, the rhythmization of labor, and the subordination of creative activity to algorithmic logic [Grechko, Sevikyan, 2023, p. 310]. In this context, labor truly takes on a dual dimension - as a factor of emancipation and as an object of digital control.

The political and institutional aspects of labor's transformation are represented in the research of international scholars. For example, A. Freeman writes about the fundamental role of creative labor in the modern economy. It has been noted that it is in combination with information and communication technologies that creative labor becomes a source of marketable products whose value is based on uniqueness and a non-mechanical nature. He emphasizes that creative labor is not mechanical labor, which, in combination with ICT, creates a mass market for products that embody the utility of uniqueness [Freeman, 2020, p. 26].

The Club of Rome made a significant contribution to the development of alternative economic paradigms, beginning with its first report, *The Limits to Growth* (1972). Subsequent publications, including *Come On! Capitalism, Short-Termism, Population, and the Destruction of the Planet*, emphasize the need for sustainable development, a reassessment of economic goals, and the limited nature of natural resources. The focus is not on quantitative growth, but on the quality of development, oriented toward the long-term viability of the system [von Weizsäcker, 2018].

Thus, both domestic and foreign scholarly traditions are moving toward rethinking the nature of labor, development goals, and the criteria for progress. In Russian political economic thought, this trend is expressed in the theory of noonomy and nootransition, which emphasize a shift in goal-setting: from consumption and profit to knowledge, creativity, and self-actualization.

However, it's important to emphasize that the domestic scholarly tradition still lacks a robust methodology for verifying the nootransition at the empirical level. Furthermore, indicators capturing the aromorphosis of labor as a key element of the new order are poorly developed. In this context, the goal of this research is not only to theoretically understand noonomy but also to develop measurement tools for the practical analysis of the current state of domestic economy during the nootransition.

Methods and Approach

This research draws on the tradition of critical political economy, and noological and institutional approaches exploring the connections between the transformation of labor, the development of productive forces, and the shift in socioeconomic structures. The aim of this paper is to determine the position of the Russian economy on the trajectory of nootransition through an analysis of relevant indicators. The object of this research is the modern Russian socioeconomic system, both retrospectively and prospectively. The subject of the research includes the aromorphosis of labor and the diffusion of ownership as the basic empirical markers of the nootransition's stages.

The choice of research tools is determined by the nature of the research problem being addressed. For the purposes of this research, these include the following:

- the theory of noonomy, which serves as the methodological basis for the research, allows us to present the aromorphosis of labor and the nootransition as interconnected processes of transforming social and labor relations;
- a content analysis of academic publications and identification of the most frequently encountered interpretations of the concepts of “nootransition” and “aromorphosis of labor” in domestic and international literature;
- structural and institutional analysis aimed at identifying the characteristics of employment patterns and their compliance with the criteria of labor aromorphosis and the stages of nootransition;
- statistical analysis, including the interpretation of data from Rosstat and analytical centers.

Thus, the methodological basis of this paper allows us to link the theoretical and conceptual analysis with the empirical examination of the transformation of labor and forms of ownership in the domestic economy, which ensures the comprehensive nature of the research.

Nootransition and Aromorphosis of Labor: Substantive Determination

The transition to a new social order based on knowledge, cooperation, creative motivation, and creative employment is becoming increasingly urgent in the face of growing tensions between existing forms of labor and productive forces. This process has been termed in academic literature as the nootransition, representing a profound transformation of the socioeconomic foundations of development.

Before presenting the author's reflections on the logic and trends of nootransition, it is necessary to define the conceptual definition of this phenomenon. It should be noted that in the modern epistemological field of economic science, various interpretations of the concept of “nootransition” coexist, making its formal and unified definition challenging (Table 1).

Application of the concept of “nootransition” in the epistemological field of economics reveals a plurality of approaches, representing both (1) differences in theoretical foundations and (2) analytical priorities, i.e., from macroeconomic structures to the transformation of labor motivation and social reproduction goals.

The possibility of an objective, scientific understanding of the concept under study allows us to assert that, substantively, noonomy is associated with a transition to a non-economic method of satisfying reasonable needs based on creativity, culture, and personal development. In S.D. Bodrunov's idea, the transition to knowledge-intensive material production is viewed as a prerequisite for the nootransition. However, knowledge-intensive production in itself does not yet signify the emer-

Table 1
Qualitative Analysis of Definitions of “Nootransition”

AUTHOR	ASPECTS ON WHICH THE RESEARCHER FOCUSES
S.D. Bodrunov	Nootransition as a transition from an industrial and market order to a (post)market system based on meaning-centric development, cooperation and the satisfaction of non-material human needs. The transition to a “human-centric model” is called the nootransition.
A.V. Buzgalin	The connection between the nootransition and the evolution of labor itself is emphasized: from alienated and coercive to creative and meaning-making. Labor becomes an individual need which forms the foundations of post-capitalism.
M.V. Grechko	A combination of qualitative changes in the system of social development, the goal of which K. Marx called “the other” side of material production and social relations. The means of achieving this state is the transformation of the content of labor, which, from necessity, becomes a motive and a need realized through creative activity.
V.V. Arkhipova	Nootransition is seen as a turning point in the development of a noosociety based on knowledge, noovalues, and solidarism; it is associated with the transition to a new world economic order - an integral one.

Source: authors.

gence of noonomy: “Noonomy refers to a non-economic way of organizing the economy to meet needs, which is implemented by humans who have gone beyond material production” [Bodrunov, 2019, p. 9]. Consequently, in its final phase, noonomy is marked by a non-economic way of organizing the economy and represents a qualitatively new stage of social development, which allows it to be meaningfully distinguished from the knowledge economy (as a stage in the development of the post-industrial economy). In this research, we will adhere to this understanding of noonomy, viewing the nootransition as a process of creating the prerequisites for the emergence of a “human-centered” system of economic organization.

In all interpretations, labor is the central “node” of the nootransition. Its qualitative change becomes both an indispensable prerequisite and an empirical indicator representing the dynamics of this process. In this context, the concept of “aromorphosis of labor,” introduced into scholarly discourse by S. D. Bodrunov, takes on particular significance. Bodrunov defines the aromorphosis of labor as a quantum leap in the structure and content of work activity, consisting of a transition from routine, standardized, and alienated forms of employment to activity imbued with knowledge, meaning, social relevance, and personal motivation. Such labor not only ensures the reproduction of material wealth but also becomes a means of human self-actualization, a source of cooperation, development, and the creation of a new social order. Moreover, the aromorphosis of labor, together with the diffusion of ownership, act as the basic markers of the nootransition’s stages.

Aromorphosis of Labor and Diffusion of Ownership as Indicators of Nootransition

Within the logic of noonomy, labor becomes a *means* of development for both the individual and society as a whole. This directly correlates with the idea of “inverting” Maslow’s hierarchy: while basic needs (survival, security) dominated in the industrial era, digitalization and basic abundance are leading to a return to higher levels: self-actualization, creativity, and so on. In noonomy, people work not for income, but for meaning, development, and contribution to the

common good. Consequently, the structure and content of labor become the criterion for determining how close society has come to a noonomic way of life.

Some researchers demonstrate that key sectors of noonomy (education, science, culture, healthcare, IT, project work) are marked by high levels of non-routine, cognitive, and creative workload [Grechko, Pleshivtseva, 2024, p. 161]. They require initiative, collaboration, interdisciplinarity, and the ability to reflect and make moral choices; they require internal motivation and intellectual engagement. Therefore, employment growth in these sectors and structural changes are not a secondary aspect, but a primary marker and characteristic of the state of nootransition.

However, aromorphosis of labor is impossible without the quality of the production environment. If the education system continues to reproduce routine skills, and the work culture and established model of industrial relations reward compliance over initiative, then formal employment indicators in creative industries will not signal a transition. This is why guarantees of freedom and autonomy in work, support for self-employment and freelancing, and the development of a co-creative environment rather than a corporate hierarchy are so important.

Thus, the aromorphosis of labor is not a linear process, but a shift in the system of productive forces and production relations, which can be accelerated or blocked depending on state priorities and the development goals of business and society. In this sense, it is not the growth of information technology (IT) industries or creative employment per se that is an indicator of the nootransition, but the extent to which such forms of labor become the norm and a meaningful development goal.

Consequently, labor, within the logic of noonomy, serves a dual function: on the one hand, it serves as an indicator of profound transformation; on the other, it is a system-forming mechanism for the establishment of a new social order. As long as labor remains alienated, routine, and impersonal, we can speak of the nootransition only as a potential. Only when labor becomes a space for freedom, creativity, and solidarity is the realization of a (post)market, human-centered order possible.

The solution to this research problem will ultimately depend on a theoretical understanding of available empirical data. The synthesis and analysis of this data allowed the authors to present key indicators representing the aromorphosis of labor in the context of nootransition, and to characterize them and determine their practical significance for assessing the current state of labor in the Russian socioeconomic system (Table 2). First, however, let's provide a methodological explanation.

To empirically assess the position of the Russian economy within the coordinates of the nootransition, we use indicators representing key transformations in the practice of social production, identified in S.D. Bodrunov's original concept. These include the spread of knowledge-intensive production, the transformation of labor structure, the development of new forms of employment, and the diffusion of ownership. The selection of this list of indicators is motivated by the fact that their changes reveal the prerequisites for the transition to noonomy in practice. Ultimately, this allows the presented indicators of labor aromorphosis to be used as empirical markers of the stages of nootransition.

Next, we will conduct a more detailed analysis of the presented indicators of labor aromorphosis in the context of nootransition in the domestic socio-economic system.

Knowledge intensity of labor. It is one of the key indicators for assessing the extent to which an economy is approaching a noonomic order. This concept refers to the proportion of work ac-

Table 2

Systematization and characteristics of basic indicators of labor aromorphosis in the context of nootransition in the domestic socio-economic system

Indicator	Description
Knowledge intensity of labor	Expressed as the share of GVA generated by sectors dominated by knowledge and intellect (education, IT, science, culture). It indicates the extent to which the economy relies on knowledge and intellect for its development, rather than on outdated industrial production
Transformation of labor structure	A comprehensive indicator that includes 1) creative component of the labor process, which is assessed by the share of people employed in creative, knowledge-intensive occupations and serves as an indicator of the transition from routine work to co-creation, self-actualization, and cognitive autonomy. 2) Routine work represents the share of employment associated with standardized and algorithmic operations susceptible to automation. This indicator allows us to identify the prevalence of forms of employment that do not require high cognitive or creative engagement, and thereby assess the lag or progress in the transition to noonomy
New forms of employment	This is an indicator of flexibility, decentralization, and agency of labor. The growth of these forms indicates an institutional restructuring of the social order
Diffusion of ownership	This indicator represents the emergence and spread of new forms of ownership and co-ownership. It signifies qualitative shifts in labor organization and a reduction in the degree of alienation; it demonstrates the extent to which the ownership system promotes cognitive cooperation and the communal nature of labor

Source: authors

tivity dominated by cognitive, analytical, and research functions, based on systemic knowledge and a high level of education. To quantify this parameter, the share of Gross Value Added (GVA) generated by knowledge-intensive industries - such as education, healthcare, culture, high-tech manufacturing, and scientific research - is used. The growing contribution of these industries to GVA indicates that the economy is increasingly based not on industrial production technologies, but on knowledge as its primary resource. This, in turn, is a direct evidence of a deepening nootransition and aromorphosis of labor, i.e., a transition to creative, intellectual, and socially beneficial activities. Let's look at the GVA indicator by sector of the domestic economy, according to Rosstat data (Figure 1).

According to the data, the bulk of GVA in Russia in 2024 was generated by sectors such as wholesale and retail trade, manufacturing, mining, and real estate operations. These sectors account for almost 50% of gross value added. At the same time, the most significant sectors from a noonomic perspective (education, healthcare, scientific and technical activities) collectively generate less than 15% of GVA.

Accordingly, this disproportion shows the persistence of an industrial-market development logic where reproduction and raw materials industries remain the key priority, while human-centered and knowledge-intensive sectors are underfunded and secondary. This indicates an imbalance in the structure of the economy, which complicates the implementation of nootransition and the establishment of a new model focused on creative work, education and culture.

1. Transformation of labor structure. Transformation of labor structure is a comprehensive indicator representing the dynamics of the ratio of routine and creative employment in the

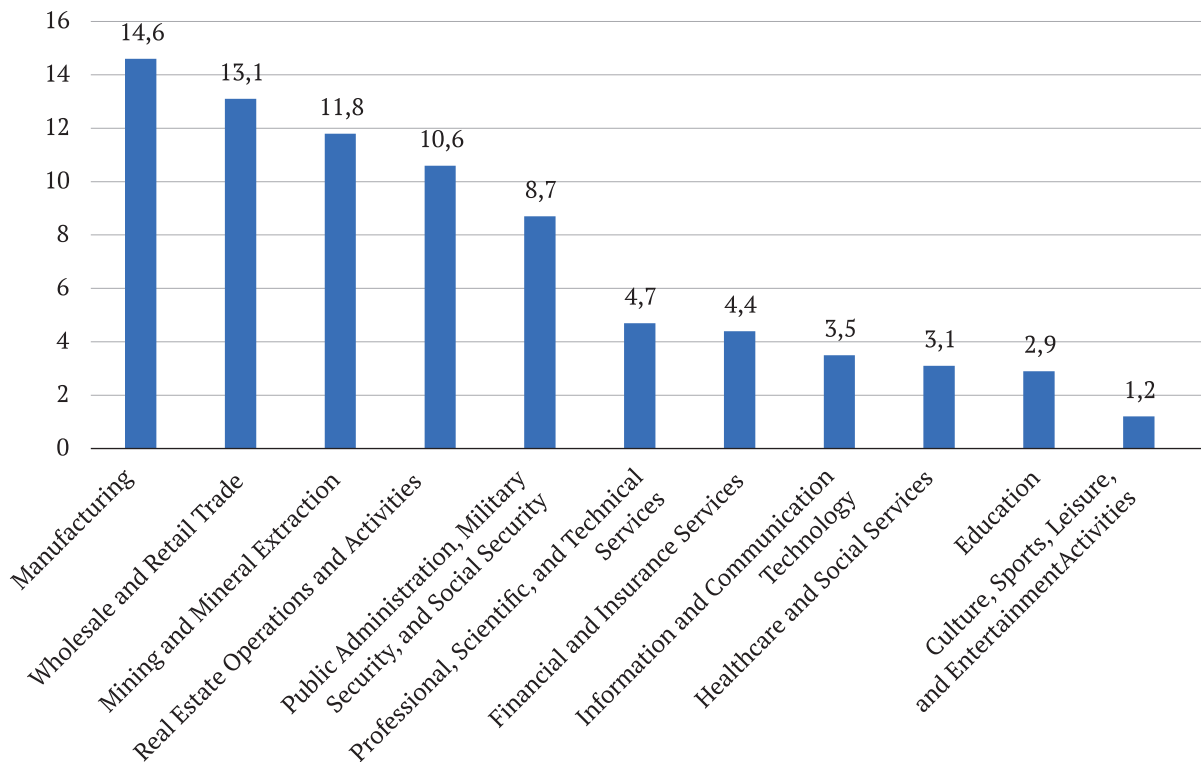


Fig. 1. Gross value added by sectors of the Russian economy in 2024, %.

Source: adapted from: Socio-economic situation in Russia in 2024. Access mode: <http://ssl.rosstat.gov.ru/storage/mediabank/osn-12-2024.pdf> (Accessed on: 15.06.2025).

economy. This indicator characterizes a qualitative shift in the content of labor activity: from the predominance of standardized, reproducible functions to the proliferation of creative, cognitive, and meaning-making work. This process directly represents the aromorphosis of labor as a marker of nootransition.

An important indicator of the aromorphosis of labor and Russia's transition to noonomy is the share of employment in industries focused on creativity, intellectual creation, meaningful design, and cultural reproduction¹.

Conceptually, this shift corresponds to the logic of aromorphosis as an evolutionary leap: labor is transformed from a coercive and alienated process into a form of self-actualization, intellectual autonomy, and meaningful contribution to the common good. Let's look at Rosstat data on the structure of employment by type of economic activity (Figure 2).

An analysis of employment structure by economic activity in Russia, based on Rosstat data, allows us to characterize the current state of labor aromorphosis and identify the extent of creative employment. Among all economic sectors, sectors with high cognitive and creative workloads include education, healthcare, professional, scientific, and technical activities, arts, entertainment and recreation, as well as information and communications.

¹ Note: it is important to distinguish between the creative nature of labor, which can be present in various sectors (for example, education or healthcare), and employment in creative industries as specialized sectors of the economy that produce original, cultural, digital, and design products. Thus, the growth of creatively oriented employment, in a broad sense, represents structural transformation of labor: from routine, algorithmically reproduced work to co-creative work where the outcome cannot be pre-programmed.

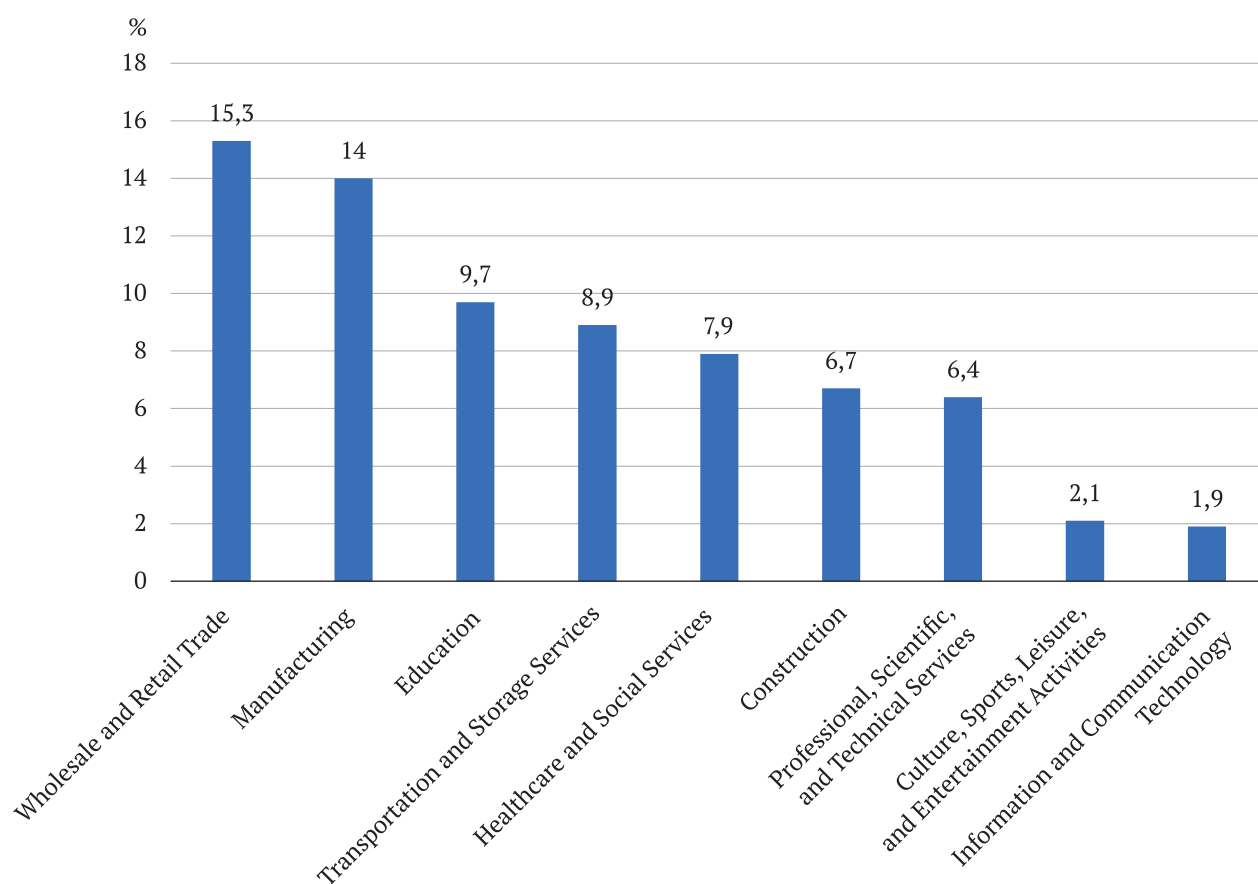


Fig. 2. Structure of employment by type of economic activity in Russia in 2023, %.

Source: adapted from: Labor Force, Employment and Unemployment in Russia 2024. Access mode: http://ssl.rosstat.gov.ru/storage/mediabank/Rab_sila_2024.pdf (Accessed on: 15.06.2025).

A significant indicator of qualitative changes in the labor structure is the growth of employment in the creative economy. According to the HSE report *Russia's Creative Sector in Figures: 2024*, the share of people employed in the creative sector currently amounts to approximately 6.2% of the total workforce. Notably, the employment structure in this sector exhibits a pronounced cognitive and educational focus: 32.5% of workers are young professionals, and 56% are educated at university level. The growth rate of added value in Russia's creative economy in 2023 was 1.7 times higher than the national average, further demonstrating its dynamism¹. According to forecasts, the share of creative industries in GDP could reach 6% by 2030, compared to the current 3.5%².

Thus, industries with a high cognitive and creative workload collectively account for approximately 32% of all employment. However, not all of these sectors are equal in terms of creative freedom and intellectual autonomy. More narrowly defined creative and knowledge-based industries, where labor is directly focused on generating new knowledge, cultural meaning, and innovation, include professional, scientific, and technical activities; arts, entertainment and recrea-

¹ Institute of Statistic Studies and Economics of Knowledge, Higher School of Economics at National Research University Russia's Creative Sector in Figures: 2024 URL: <https://issek.hse.ru/news/996745368.html> (accessed on: 23.07.2025)

² Free Economy. No. 33, January–March 2025, pp. 102 – 109.

tion; and information and communications.¹ Collectively, these sectors account for only 10.4% of employment, indicating that the creative component of labor in the domestic economy remains low, despite isolated pockets of growth. This contrasts particularly with sectors of the traditional economy, where employment is significantly higher: wholesale and retail trade – 15.3%, manufacturing – 14%, transportation and storage – 8.9%, and construction – 6.7%. These four sectors characterized by a high degree of routine, repetitive work operations, and the functional alienation of labor collectively account for approximately 45% of the workforce. They are primarily focused on material production, trade and intermediary operations, logistics, and sales; that is, they reproduce the logic of the industrial order, which is incompatible with the noonomic paradigm.

This ratio of creative and routine employment indicates that the aromorphosis of labor in the domestic economy has not yet acquired a systemic nature, despite the essential role played by IT, science, arts and education in the transition to noonomy. Spatial and organizational concentration also remains substantial: employment in creative industries is concentrated in megacities, meaning creativity is predominantly urban, thereby creating the so-called phenomenon of spatial “creative inequality.” At the same time, the forms of labor themselves often retain characteristics of salaried, vertically organized employment. According to HSE data, employment growth in creative industries in Moscow was 24.4%, in St. Petersburg it was +10.7%, in urban districts with populations over 1 million the growth was 9%, and in less urbanized areas, the same figure maintained at +3.9–4.5%².

Thus, the current employment structure demonstrates an imbalance between the traditional and creative components of labor process. Russian economy operates within the framework of an industrial-market development model where creativity, knowledge, and culture have a supporting role in the development process. To launch a sustainable mechanism of nootransition, it is necessary not only to quantitatively expand employment in creative industries but also to qualitatively transform the system of social relations: reducing bureaucracy, developing flexible forms of employment, and supporting autonomy and interdisciplinary creativity.

Directly related to the indicator of labor aromorphosis is the indicator of routineness of labor operations in the economy. The transition to noonomy is impossible without profound transformations in the structure of labor, primarily through the displacement of routine and repetitive tasks and their replacement with cognitive, creative, and cooperative activities.

The paradigm of labor aromorphosis allows for a new perspective on the structure of employment not only in terms of industries or skill levels, but also in terms of the nature of work tasks. We can distinguish the following:

- routine manual tasks (physically repetitive actions (cleaning, packing, machining));
- routine cognitive tasks (predictable mental actions (filling out reports, checking data, entering information));
- non-routine cognitive tasks (analysis, planning, people business, creativity);
- non-routine physical tasks (interaction with objects in a non-standard environment (medicine, care, repair)).

¹ Note: Education and healthcare are undoubtedly areas where knowledge and people play an essential role, but only a portion of this employment exhibits the characteristics of a true aromorphosis of labor - a high degree of autonomy, meaningful motivation, and creative freedom.

² Institute of Statistic Studies and Economics of Knowledge, Higher School of Economics at National Research University, Creative Sector in Russia Shows Concentrated Growth. URL: <https://issek.hse.ru/news/913623863.html> (Accessed on: 23.07.2025)

To assess the structure of labor by task type in Russia, one can refer to the data presented in the following studies. This study by E.A. Edinak, based on domestic statistics, presents the employment structure by skill level. As of 2017, highly skilled workers (managers, specialists) made up only 31% of the workforce (approximately 22.5 million people), semi-skilled workers made up 45%, and low-skilled workers made up 27%. Moreover, a significant proportion of workers are concentrated in industries with a high level of routine: trade, manufacturing, and services. Education and healthcare, the pillars of noonomy, account for only about 30% of highly skilled employment [Edinak, 2021, p. 60].

However, skill level is only an indirect measure. A more insightful picture is provided by a study by V.E. Gimpelson and R.I. Kapelyushnikov, who calculated the Routine Task Intensity (RTI) index based on an analysis of 421 occupations. The results show that the total share of jobs dominated by routine tasks is small, amounting to just over one-tenth [Gimpelson, Kapelyushnikov, 2022, p. 39].

However, this doesn't automatically mean the dominance of creative work. On the contrary, the study shows that routine cognitive functions retain a high share in mid-skilled occupations, especially among office workers. For this group, the routine index approaches +0.7, making them both the most vulnerable to automation and the most disconnected from development objectives.

Overall, despite rising educational levels, the structure of tasks in the domestic economy remains predominantly routine, and therefore incompatible with the value-based and functional logic of noonomy. This leads to an important conclusion: low formal level of routine (10-20%) precludes the possibility of labor aromorphosis, as most tasks remain predictable and algorithmically driven, creative analytical functions are not integrated into the production culture, and routine actions are performed under conditions of organizational freedom and administrative control.

Thus, to trigger the aromorphosis mechanism as a systemic process, an increase in the share of employment in industries with high cognitive and creative loads is required. Furthermore, the economy's dependence on sectors with highly repetitive tasks (trade, transportation, low-skilled services) must be reduced. Empirically, the threshold required to trigger the aromorphosis mechanism can be provisionally defined as achieving a predominance of non-routine cognitive tasks at the level of 50% of the working population, with a simultaneous reduction in the role of routine cognitive operations in the office and administrative area.

2. New forms of employment. The current stage of labor transformation is accompanied not only by changes in its content but also by shifts in organizational forms. The emergence of new forms of employment (NFE) such as self-employment, freelancing, remote and flexible work, project-based employment, etc. represents the decentralization and individualization of work, increases autonomy, expands the scope for choice, and potentially brings work closer to a state of co-creation.

Unlike traditional wage labor based on hierarchy, subordination, and alienation, new forms of employment allow workers to independently manage the content, rhythm, and scope of their work. It is this shift (from execution to initiation, from orders to projects) that makes them a potential marker of the aromorphosis of labor. As is well known, the theory of noonomy interprets labor as an internal need, a form of meaningful participation in society, and not just a means of earning income. New forms of employment offer specifically these opportunities.

Self-employment formalized under the special tax regime "Self-Employment Tax" (SET), has become the most developed form of employment in Russia. According to the Federal Tax Ser-

vice, as of March 2025, 13.02 million self-employed individuals were registered in the country¹. The year-over-year increase was over 30%, indicating a significant shift away from formal employment and toward professional autonomy. It's important to emphasize that the majority of self-employed individuals are specialists in services, teaching, digital consulting, design, and crafts - areas where knowledge, skill, and individuality predominate.

Another common form of employment is freelancing which encompasses casualisation, project-based and contract work. By 2023, there were approximately 19 million people in Russia employed in project-based and freelance work, representing approximately 18–20% of the gainfully employed population². Freelancing is particularly prevalent in IT, design, translation, education, and online services, making it an important indicator of flexibility and cognitive focus of labor. Moreover, freelancing represents a form close to (but not quite the same as) the logic of self-organized, creatively motivated labor described in post-market theories.

Finally, in the context of digitalization and post-pandemic employment restructuring, remote and flexible work arrangements are rapidly developing. According to the Russian Public Opinion Research Center, in 2024–2025, approximately a quarter of all employed people in Russia had experience working remotely³. Such forms significantly expand individual control over work time, rhythm, and the content of activities, which enhances agency and can be considered an important element of the noonomic order.

However, it is important to stress that not all new employment is advanced in its content. For example, so-called platform employment, although formally disrupting the structure of conventional employment, in reality remains highly algorithmic, alienated, and routine. In such settings, workers report not to a manager but to an algorithm, do not control the outcome, but merely perform tasks according to strict regulations. This is more of a digital form of routine, subordinated labor than a step toward noonomy, and therefore cannot be considered a manifestation of labor aromorphosis.

Furthermore, it should be noted that not all new forms of employment can be unambiguously classified as manifestations of labor aromorphosis. Despite their apparent flexibility and digital nature, many of them are accompanied by alienation, a lack of institutional guarantees, and increased control and rhythmization. Thus, some of these forms are hybrid in nature, combining elements of autonomy with features of digital routine⁴. This requires clarification: within the framework of labor aromorphosis, only those forms that provide agency, creative self-actualization, and meaningful motivation can be considered relevant.

Thus, new forms of employment, while maintaining certain conditions, can act as markers of nootransition, as they allow for moving beyond the vertical labor organization, enhance the meaningful and substantive richness of work, and create the basis for project-based, autonomous, and socially beneficial activities.

¹ Rusbase (2025). Federal Tax Service: The number of self-employed in Russia has exceeded 13 million people for the first time. URL: <https://rb.ru/news/chislo-samozanyatyh-2025/> (accessed on: 17.06.2025).

² Inclient (2025). How many freelancers are there in the world? URL: <https://inclient.ru/freelance-stats/> (accessed on: 17.06.2025).

³ Russian Public Opinion Research Center (2025). Remote work as the new normal. URL: <https://wciom.ru/analytical-reviews/analiticheskii-obzor/rabota-iz-doma-kak-novaja-norma> (accessed on: 17.06.2025).

⁴ Note: For the purposes of this research, autonomous forms of employment include independent freelancing, self-employment in intellectual and professional services, and project-based employment which presupposes a high level of worker autonomy. Accordingly, pseudo-autonomous (or quasi-autonomous) forms of employment include platform employment (couriers, aggregator drivers, etc.), where formal autonomy is combined with a high degree of algorithmic and organizational control.

3. Diffusion of ownership. Diffusion of ownership represents the emergence and spread of new forms of ownership and co-ownership, such as sharing, quasi-private models, platform forms, and collective ownership of intellectual deliverables. This indicator allows us to capture shifts in the system of social relations accompanying the transformation of labor in the context of the transition from industrial-market model to post-market economy.

New forms of ownership are creating a fundamentally different “envelope” for labor. In the context of sharing and platform economies, labor is increasingly carried out within the framework of co-ownership of deliverables, collective use of resources, and soft collectivism. This is expressed, for example, in the spread of shared ownership practices for intellectual property (open source), the development of co-ownership models for production assets on platforms (e.g., crowdfunding projects), and the increasing share of sharing services where users simultaneously act as consumers and participants in the value creation process. Thus, new forms of ownership facilitate the expansion of cooperative practices, reduce the degree of alienation of labor, and strengthen its meaning-making function.

According to RBC, Russian sharing economy market was valued at 770 billion rubles in 2019¹. The most rapidly growing segments are car sharing, short-term housing rentals, and shared vehicles, representing a sustained interest in shared forms of resource ownership and use. Recent survey data presented in a study by Tele2 and Mobile-Review show that 57% of Russians aged 18-35 have used sharing services at least once, and 23% do so regularly². These figures evidence the gradual emergence of a new model of ownership based on the principles of shared access, functional use, and reduced exclusivity of ownership. This can be seen as one of the signs of institutional transformation of working conditions as part of the nootransition.

Crowdfunding and crowdlending practices representing the proliferation of collaborative models of project creation and financing further demonstrate the transformation of ownership relations and labor organization. These forms of resource co-ownership involve collective investment, in some cases with the distribution of rights or income from deliverables, making them relevant for analyzing the stages of nootransition. According to BusinesStat, between 2020 and 2024, the Russian crowdfunding market's turnover grew from 7 billion to 53 billion rubles, an increase of more than sevenfold³. Furthermore, according to the Central Bank of the Russian Federation, over 22.8 billion rubles were raised through crowdfunding platforms in 2023, supporting the growing interest in collective financing in real economy⁴.

The data presented demonstrate a trend toward the spread of collective governance and resource distribution mechanisms that mediate labor and create new institutional forms of interaction between actors. Thus, crowdfunding and crowdlending can be viewed as markers of the diffusion of ownership and the establishment of a soft collectivist logic in the context of transformation.

Diffusion of ownership in modern conditions highlights the contradictory nature of nootransition processes. On the one hand, the consideration of sharing models and collective ownership

¹ RBC. Trends (2020). Economy of Sharing in 30 Facts and Figures. URL: <https://trends.rbc.ru/trends/sharing/5ddb3279a7947b01be74c19> (accessed on: 25.06.2025).

² Mobile-reiew (2024). Interesting statistics about sharing services in Russia from Tele2. URL: <https://mobile-review.com/all/news/interesnaya-statistika-o-sheringovyh-servisah-v-rossii-ot-tele2/> (accessed on: 26.06.2025).

³ BusinesStat (2025). Analysis of the crowdfunding market in Russia in 2020-2024, forecast for 2025-2029. (Demo version), p. 8. URL: https://businesstat.ru/images/demo/crowdfunding_russia_demo_businesstat.pdf (accessed on: 24.06.2025).

⁴ Jetlend (2024). Central Bank statistics on crowdlending and crowdfunding for 2023. URL: <https://jetlend.ru/blog/v-2023-godu-rossijskie-kompanii-privlekli-cherez-kraudlending-22-8-mlrd-rublej-tsb/> (accessed on: 21.06.2025).

of labor deliverables predetermine the development of soft collectivist practices that facilitate the development of cognitive collaboration. On the other hand, many platform models retain characteristics of alienated labor: participants do not receive rights to the products of their work and operate within strictly regulated digital ecosystems.

Thus, the diffusion of ownership can be viewed as a significant institutional indicator of nootransition, representing the depth and trend of transformations in ownership relations and labor conditions. The emergence of new forms of co-ownership and shared use of resources indicates the growth of cooperative nature of labor and the strengthening of cognitive cooperation as prerequisites for the establishment of a (post)market, noonomic order where knowledge and intellectual deliverables are considered as common goods, and not as an item of individual private property.

Discussion of Findings

The analysis above allows us to draw substantiated conclusions about the nature and extent of labor aromorphosis in contemporary Russian economy in the context of determining the potential for possible nootransition. The identified indicators represent key areas of labor transformation in the (post)market context.

Overall, there are isolated local shifts consistent with the logic of labor aromorphosis: the share of employment in creative and project-based areas is growing, the number of self-employed individuals is increasing, the presence of education and IT in the labor structure is expanding, and new forms of ownership are emerging. However, these processes have not yet acquired a systemic, institutionalized nature. A significant portion of the economy continues to rely on routine, standardized, and alienated labor, particularly in the trade, manufacturing, transportation, and management sectors.

The main limiting factor is the structural misalignment of the labor market and insufficient, often sporadic, government support for cognitive, creative, and autonomous employment. Despite the quantitative signs of a shift, the qualitative parameters (the meaningfulness of work, the degree of freedom, and integration into socially beneficial activities) remain locally fragmented. This allows us to speak only of the initial phase of nootransition. Its potential for transformation has not yet been translated into a sustainable development model.

Table 3 below summarizes the key findings for each of the indicators considered.

Table 3

Final assessment of indicators in the context of nootransition

INDICATOR	ASSESSMENT
Knowledge intensity of labor	The share of knowledge-intensive industries remains limited. There are areas of growth (IT, education), but there is a lack of systematic approach
Creative component of labor	The share of creative employment is increasing, but remains insufficient. The basic structure is predominantly routine
Routine nature of work	High level of routine tasks in the economy. Automation is not accompanied by cognitive retraining
New forms of employment	They are developing rapidly, but lack sufficient legal and institutional support. Contradictions in modern forms of employment are being identified regarding their actual autonomy
Diffusion of ownership	Collective ownership models (sharing, crowdfunding) are on the rise, but most platform practices remain highly alienating. Signs of institutional shift exist, but they are still fragmented

Source: authors.

The authors believe that moving from fragments to a holistic model of noonomy requires not only expanding employment in the creative industries but also transforming the target function of economic development at the state level. This involves shifting the emphasis from increasing material production and profits to satisfying meaningful, socially beneficial, and intellectual needs, which is the essence of nootransition. In this context, it is important to refer to the conceptual diagram of the stages of nootransition proposed by S.D. Bodrunov, which is given in Figure 3. The figure shows the logic of global noomovement through six key parameters, each allowing for an institutional and structural assessment of the depth of ongoing changes.

Basic characteristics	Vector of global nootransition as an interval of noomovement and its content				
Key stages of nootransition	I	II	III	IV	V
WEO	→	Integral			
TP	→	TP-VI	→	TP-VI 1	
Type of production	→	knowledge-intensive	→	noo-intensive (nooproductio)	→
State of IMFS	EFE	NS	NOO-IMFS		→
Type of social structure	NIS	→	NIS.2	→	Noosociety
Systems transformation	economy		→		noonomy

Note: “→” is a symbol of a transitional state; EFE = “end of financialization era”, NS = “normal state”, “NIS” – new industrial society, “NIS.2” – new industrial society of the second generation; “TP” – technological paradigm, “WEO” – world economic order, “IMFS” – international monetary and financial system.

Fig. 3. Diagram of global nootransition¹

Comparing the presented parameters with the results of the authors’ analysis allows us to formally determine the country’s current position on the nootransition trajectory.

1. World Economic Order (WEO): Russia remains oriented toward an industrial-raw materials structure with a high degree of dependence on resource exports and foreign economic conditions. However, under the influence of sanctions pressure and new technological isolation, elements of transformation are occurring. This corresponds to the transitional state of WEO (→), characteristic of the second stage of nootransition, where a shift away from the neoliberal financial model begins, but an integral order has not yet been established.

2. Technological paradigm (TP): At the global level, modern advanced countries are preparing for the dominance of the sixth technological paradigm where intellect, science, and creative activity become the main productive forces and form a new labor structure and models of organizational development [Bodrunov, 2022, p. 42; Glazyev, 2023, pp. 28–30]. At the same time, according to Academician E.N. Kablov, as of 2023, the structure of Russian economy demonstrates the dominance of technologies of the fourth technological paradigm (about 50%), while the share of the fifth paradigm is about 10% and is concentrated in limited sectors - the defense industry and

¹ Source: Bodrunov S.D. (2025). Theory of Noonomy and a New Stage in the Development of Political Economy. Problems of Political Economy. No. 2(42), pp. 128–138.

the aerospace industry. Approximately one-third of technologies belong to the third technological paradigm¹. This indicates a persistent technological lag preventing the full achievement of potential of labor aromorphosis. Thus, Russia has not yet completed the transition even to the dominance of the fifth technological paradigm, which creates structural limitations for entering the noonomy phase.

3. Production type: The economy primarily retains an industrial-material production type, but in certain sectors, knowledge intensity is increasing (e.g., the growth of creative economy within the social production system). This indicates the beginning of a shift toward knowledge-intensive production characteristic of stage II, with some features of stage III (noo-intensity has not yet been achieved).

4. Type of social structure: Despite the growth of self-employment, freelancing, and digital professions, Russia retains the logic of vertical governance, weak labor agency, and institutional control. Nevertheless, elements of NIS.2 are beginning to emerge, especially in megacities (for example, the localization of creative workers primarily in large urban agglomerations (approximately 80% of those employed)). This corresponds to the end of stage II and the beginning of stage III.

5. Systemic transformation: Economic goal-setting remains focused on GDP growth, resource extraction, and export flows. The categories of “meaning,” “human development,” and “social justice” are not integrated into the system of value-based targets at the level of the state development strategy. Therefore, it can be argued that Russia is still in the “economy” phase as the dominant form of systemic organization, i.e., at the cusp of stages II and III.

Conclusions

Ultimately, an objective scientific analysis and direct generalization of the obtained research results indicate the emergence of certain characteristics in the Russian economy inherent to the third stage of nootransition (i.e., the transition to a “human-centered model” of development, driven by labor according to S.D. Bodrunov). These include: the growing importance of knowledge-intensive production, the increasing share of intellectual labor, and the proliferation of new forms of employment. However, these processes are fragmented and sporadic, and are not accompanied by a large-scale transformation of ownership relations or the universal spread of autonomous forms of labor organization. The authors believe that it is the combination of the established prerequisites for the next stage of development with the continued significant role of traditional socioeconomic relations that allows us to ultimately characterize Russia’s current situation as intermediate (transitional) between the second and third stages of nootransition.

Thus, Russia’s transitional position within the general framework of global nootransition means that the country has transcended the purely industrial stage and entered a zone of semantic and labor transformation, though not yet dominated by new paradigms. The present situation can be characterized as a “potential nootransition zone” where the dialectical contradictions between the old and new logics of development are already clearly evident, but not yet resolved.

The transition to the next stage requires systemic support for creative and cognitive employment, the institutionalization of new forms of labor, and a redefinition of development goals in favor of people, knowledge, and socially beneficial creative endeavors. Only then will the aromorphosis of labor cease to be a fragment and become a structural marker of the future noonomy.

¹ Science and Life. The Sixth Technological Paradigm. URL: <https://www.nkj.ru/archive/articles/17800/> (accessed on: 23.07.2025).

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THE ORIGINS OF NOOTRANSITION: THE EXPERIENCE OF SOCIO-ECONOMIC MODERNIZATION IN CHINA IN THE LATE 20TH – EARLY 21ST CENTURIES

Abstract. The paper examines the socio-economic modernization of China in the late 20th and early 21st centuries, which is inextricably linked to the reforms initiated in 1978. The period under consideration spans three stages and concludes in the late 2000s, when the country largely succeeded in achieving the comprehensive industrialization goals set by the Communist Party, establishing the foundations of a “socialist market economy”, strengthening its position in the global market, and transitioning into the category of middle-income countries. The reforms are characterized by gradualism and consistency, openness to studying international experience, a rejection of theoretical dogmatism, and a practice-oriented research approach, which together fostered record rates of economic growth, albeit accompanied by several social issues (such as rising inequality, increasing environmental pressure, etc.). The principal economic and political mechanisms of the modernization project include the balanced application of state planning instruments, selective regulation, and the construction of an institutional environment where informal institutions play a special role (notably reliance on the moral and ethical principles of Confucianism). It is demonstrated that, despite its historical specificity, this experience remains highly relevant today for addressing the challenges of catch-up development. The ideological and theoretical foundation of the reforms intersects with contemporary concepts developed in Russia, in particular with the tenets of noonomy theory. This convergence relates primarily to the principles of socializing public relations, the diffusion of property ownership, and a shift away from the Western-centric model of individualism.

Keywords: socialism with Chinese characteristics, socialist market economy, state planning, selective regulation, industrialization, moderately prosperous society, Confucianism, noonomy.

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智慧型转型的源头:20世纪末至21世纪初中国社会经济现代化的经验

摘要: 本文的研究课题是20世纪末至21世纪初中国的社会经济现代化进程。这一进程开始于1978年启动的改革。所考察的时间段涵盖三个阶段,截止到21世纪初。此时,中国总体上已成功完成了中国共产党提出的全面工业化、建立社会主义市场经济基础、巩固国际市场地位,以及跻身中等收入国家行列等任务。值得注意的是,改革进程具有渐进性和连贯性,中国对借鉴国际经验持开放态度,摒弃了理论上的教条主义,采取了以实践为导向的研究方法,这促成了创纪录的经济增长速度,尽管随之而来的是若干社会问题(如不平等加剧、环境压力等)。作为现代化项目的主要经济政治机制,值得重点指出的是:均衡运用国家计划和选择性监管等工具,以及构建以非正式制度发挥特殊作用的制度环境(特别是依托儒家道德伦理原则)。研究表明,尽管这一经验具有其历史特殊性,但在当今时代仍可用于解决赶超式发展的课题。改革的意识形态和理论基础与俄罗斯当前发展的现代理念相契合,特别是与智慧型经济理论的原则相呼应。这首先体现在社会关系的社会化、所有制扩散以及摆脱以西方为中心的个人主义模式等原则上。

关键词: 具有中国特色的社会主义、社会主义市场经济、国家计划、选择性监管、工业化、中等富裕社会、儒家思想、智慧型经济。

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Introduction

Present-day world is experiencing an intensification of transformation processes at various levels. This includes changes in the balance of power, international specialization, and the movement of commodity chains in the global market, resulting in an escalation of conflicts, rising protectionism, and geopolitical tensions. Technological transition, which is largely related to this process, is the desire of leading countries to master and implement new technologies related to the fourth industrial revolution and the sixth technological paradigm faster than their competitors. However, less developed countries are also caught in the vortex of these transformational processes, further highlighting the need to formulate new development programs aimed at achieving a comprehensive modernization of the economic system.

This paper examines China's modernization experience in the late 20th and early 21st centuries. During this period, China made a powerful modernization leapfrog ahead, achieving record rates of economic growth (from 1980 to 1989, the average GDP growth rate was 9.69%, from 1990 to 1999 – 10.01%, from 2000 to 2009 – 10.36%¹), becoming a leading industrial power and deeply integrating into the global market. The background for China's modernization project was quite unique. Nevertheless, studying this experience remains highly relevant today for developing and moderately developed countries, from both theoretical and practical perspectives, as it touches

¹ According to the World Bank: <https://www.worldbank.org/>. At the same time, it should be noted that as the economy becomes more marketized, previously existing production becomes more visible in GDP calculations, which may in fact somewhat overstate real growth figures.

on many aspects of the transformation of an economic system. In particular, it illustrates the evolution of principles of state intervention in the economy, the development of intersectoral links, the varying balance between planning and market forces, and the specific role of ideological and institutional factors. The list goes on. Furthermore, when studying the development of modern China, which is undoubtedly relevant today, it is important to draw on the experience of China in the late 20th and early 21st centuries, as it was during this period that the fundamental principles of state economic management were laid down.

Ideological and Theoretical Foundations of Chinese Reforms

The onset of reforms in the late 1970s was driven by a multitude of both objective and subjective factors. Following World War II and the end of the civil war that culminated in the proclamation of the People's Republic of China in 1949, the country's financial situation was at an extremely low level; China was one of the poorest countries in the world. In setting the goal of transitioning to a qualitatively new stage of development, the Chinese leadership under Mao Zedong drew significant inspiration from the Soviet experience of self-reliant industrialization characterized by a significant degree of isolation from the outside world. New sectors of heavy industry began to emerge. Despite a number of achievements during the industrialization drive, such as the successful testing of a hydrogen bomb in 1967, the launch of Sputnik in 1970, and the introduction of the first social benefits from public consumption funds (albeit very limited in scope and affecting a narrow segment of the population), the modernization project failed to be implemented in a balanced manner. Subsequently characterized within China as "leftist excesses," the policies of the Great Leap Forward and the Cultural Revolution led to mass famine, high rates of extreme poverty, and the undermining of the country's economic strength and scientific capability. The villages, with the rural population accounting for approximately 85% of the country's population, found themselves in the direst situation [Hu Angang, 2005, p. 52]. The need for a change in economic and political course was clearly urgent.

The population's low initial standard of living, on the one hand, provided abundant scope for vigorous reform implementation (figuratively speaking, there was nothing to lose). On the other hand, the country's leadership was wary of the rapid introduction of market relations due to the risk of political turbulence. This predetermined the gradual, drawn-out nature of the reforms. It's also essential to note Deng Xiaoping's affiliation with the revolutionary generation, which, as world history shows, is a factor restraining radical political change. Even during the difficult 1930s, isolated from major cities (with minimal potential for influencing the extremely small working class), the Communist Party of China found its social support primarily not on a class basis, but in the country's broad "national liberation" consolidation and nationwide mobilization [Vinogradov, 2010]. The ideological and economic measures that were initiated did not conflict with the idea of strong state paternalism. Moreover, the imperialist nature of China's modernization has been observed, with a number of institutional forms borrowed from previous centuries of its history [Jiang, 2023]. The party's Four Principles took on a politically charged resonance: adherence to the socialist path, the leading role of the CPC, Marxism-Leninism (with its declaration of the dictatorship of the proletariat), and the ideas of Mao Zedong (alongside with criticism of his individual approaches and political practices) [Vinogradov, 2010].

Marxism emphasized historical materialism, the relationship between productive forces and production relations, which determines the degree of socialization of production, and the prin-

ciple of “practice is the sole criterion for testing truth.” This became the foundation of a new approach to economic pragmatism, developed by Deng Xiaoping, a rejection of any rigid theoretical frameworks in favor of a practice-oriented approach to economic thought [Vinogradov, 2008]. While maintaining the principle of “self-reliance” and respectfully addressing various milestones in China’s history, the study of foreign experience rapidly developed: from the practices of the USSR which traditionally served as a benchmark for China to the experience of Eastern Europe and the capitalist countries of East Asia. The need for a distinct development path was justified by the impossibility of replicating the Western-style modernization project, including the limitations of both neoliberalism and the late Soviet model [Borokh, Lomanov, 2024].

The major turning point in the ideological and theoretical basis of the reforms was a different interpretation of the socialist development path. The essential criterion of socialism became the development of productive forces and the rise in the population’s standard of living. The state’s primary goal during the reform period becomes the transition to a moderately prosperous society (*xiaokang*). As a result, the state-planned economy and the market economy are understood not as essential characteristics of the economic system, but rather as instruments of economic policy that can operate in different systems. As Deng Xiaoping wrote, “The predominance of a plan or a market are not essential criteria for distinguishing between capitalism and socialism. A planned economy is not identical to socialism; capitalism also has planning; a market economy is not identical to capitalism; socialism also has a market. Plan and market are all economic measures (Quoted from [Kafyrin, 2012, p. 69]).” This approach laid the foundation for the subsequent assessment of the Chinese model as socialist, and, accordingly, modernization is also characterized as socialist [Losurdo, 2017; Jian, 2025]. The criterion of socialism in this case is the political power of the Communist Party, which directs the functioning of various forms of economic relations for the benefit of the entire population. In 1979, Deng Xiaoping articulated the concept of Chinese-Style Modernization, and in 1982, “building socialism with Chinese characteristics.” It was emphasized that this building project would require a long journey (up to 100 years), as it would take considerable time to achieve a sufficiently high level of development of productive forces [Feoktistov, Tsyplakov, 2008; Borokh, Lomanov, 2024].

One of the pillars of “Chinese characteristics” in this model was the gradual revival of ancient Chinese cultural traditions, which subsequently became an important institutional component of the ongoing reforms¹. Beyond the philosophical and religious roots of Taoism and Buddhism, Confucianism which was labeled “feudal rubbish” during the Cultural Revolution occupied a special position. In contrast to Western individualism, China embodied a society based on collectivist thinking, emphasizing a sense of duty, mutual responsibility, and harmonious and trusting relationships between people. As in other East Asian countries that had achieved a modernization push, the population demonstrated high levels of workaholicism, diligence, and thrift. Within the framework of Confucian philosophy, the cult of family ties and respect for elders was represented in a strong state paternalism that prioritized the interests of the state. At the same time, officials are obligated to adhere to high moral standards and care for the population as if it were their own children. Confucianism also historically sets the framework for meritocracy, respect for education, and high qualifications of civil servants, with a rigorous preliminary selection process for leadership positions [Orekhov, Reshetneva, 2004; Burov, 2011]. It should be noted that appeals to

¹ It’s worth noting that national consolidation, as a component of the modernization project, also manifested itself in the significant active participation of the Chinese diaspora abroad in state-led projects.

virtues and moral norms are inherently linked to networking within society. Despite the shortcomings of a lack of formal rules, these informal relationships made it possible to plug “management gaps,” especially at the local level, which arose as a result of gradual but significant political changes in the context of a vast country. Thus, the revival of cultural traditions contributed to the development of formal and informal institutions, combined with the proclaimed principles of Marxism, national revival, and the practice of economic reform. In China, perhaps more than in any other major country, these factors, lying outside the immediate economic framework, had a significant impact on the implementation of the modernization project.

Currently, when implementing modernization projects in other lagging countries, the most important steps are also the establishment of a solid ideological and theoretical foundation for reforms, along with the construction of an institutional “backbone.” Otherwise, even a well-designed program of socioeconomic transformations risks failure. Political economy has great application potential in this context. It offers a comprehensive approach that allows for the uncovering of the complex nature of relationships at various levels of the economic system and, particularly important during periods of global transformation, traces the historical logic in the development of socioeconomic processes (this latter aspect primarily relates to Marxist historical materialism, the dialectic of productive forces, and the relations of production).

It is worth highlighting the approach of contemporary researcher S.D. Bodrunov, author of the theory of noonomy, which, in developing this Marxist approach, expresses the leading transformative role of the material factor in scientific and technological progress [Bodrunov, 2024]. In this case, there is a close intersection with the ideological and theoretical basis of the Chinese reforms, where the starting point was also the identification of the Marxist connection between productive forces and production relations, which largely determines the specific set of economic and political measures in specific historical environment. Furthermore, under the theory of noonomy, the logic of socialization of social relations and the diffusion of ownership are demonstrated as an objective consequence of the development of the production system. Although China’s reforms were implemented against a backdrop of an initially rather backward technological capabilities, their development revealed to the world a vision of the future as an integrated model that balances planned and market principles, various forms of ownership, and which holds the potential for a fast-paced nootransition. Finally, it’s worth mentioning the noocriteria of reasonableness and harmonious development, where people are not “selfish” individuals fixated on maximizing personal material consumption, but rather part of a community that shapes a broader set of goals. These criteria are close to the aforementioned Confucian principles, and, as the Chinese experience examined here demonstrates, they are not abstract “superstructural” elements detached from practice, but rather can be strong institutional factors that directly influence the efficiency of economic reproduction.

Key Milestones of the Modernization Project

The first stage of reforms is generally attributed to the years 1978–1984 [Gelbras, 2009; Kafyrin, 2012]. During this period, the state set the goal of finally eliminating the echoes of cultural revolution and, as is natural in the context of the sectoral dominance of agriculture, to begin reforms with the agricultural sector. The communes were disbanded, and while state ownership preserved, peasants were given the opportunity to manage their land plots, and a commodity market for agricultural products began to emerge. Family farming and village-based enterprises

with collective ownership relations, including contributions from the population to a “common fund” and village administrative committees, became the institutional basis for production. The state encouraged rural development by raising procurement prices, supporting rural specialization and mechanization, and developing industries related to agriculture. As a result, township and village enterprises quickly became a key component of the national economy (by the early 1990s, they accounted for 40% of China’s total industrial output and exports, not to mention their leading role as the country’s breadwinner in food production) [Kruglova, 2020]. In the city, only the first experiments in expanding the autonomy and self-governance of state-owned enterprises, as well as the creation of special economic zones, were being implemented.

A key component of the initial stage of reform was the decentralization of public sector and the expansion of regional authorities’ powers while adhering to national development frameworks as part of five-year plans (after a pause in the first years of reform, these were restored in 1981). Subsidies from the center were allocated to key infrastructure projects and to cover regional budget deficits (subject to verification of their justification). However, clear regulations for tax collection and budget execution had not yet been established. A major beneficial effect of budget policy decentralization has been enhanced governance efficiency and incentives for local development, taking into account regional specifics. However, new problems have also arisen, related to declining federal budget revenues and interregional competition to extract additional resources from the center, given the lack of a legislative framework and strict principles for resource allocation [Kadochnikov, 2016]. It’s worth noting that even under the Maoist model of hyper-centralism, due to the country’s large size and the specific nature of national governance, significant de facto power remained in the hands of local authorities for a long time. Furthermore, the process of nationalization of production was also drawn out. Thus, regional governance institutions retained their traditions and did not have to be created from scratch. As mentioned above, the reform program was implemented gradually, with many measures being spread out over time and scaled up after being tested in specific areas of the economic system. The State Commission for Restructuring the Economy was established in 1982, only eventually acquiring powers equivalent to a ministry [Chubarov, 2024].

The second stage (1984–1991) was marked by accelerated reform implementation, primarily in the city. At the same time, reforms remained gradual. The slogan of this period was “the plan is primary, the market is secondary” [Gelbras, 2009]. The State Planning Commission which was merged with the State Economics Commission increasingly focused on indicative planning with macroeconomic regulation and, accordingly, less on directive planning. Thus, in 1984, 80% of industrial output was created under directive planning, but by 1992 this figure had fallen to 16% [Reforms, 2000, pp. 13–14]. Compared to the previous period, the state shifted its focus to industrial development and urbanization. In addition to changes in the allocation of financial resources, this was reflected in the easing of restrictions on rural-to-urban migration.

Price liberalization gradually occurred, along with a reduction in public consumption funds, leading to greater autonomy for enterprises and their transfer to private ownership. The reforms began with the ability to sell excess production on the market, increasingly moving toward self-financing principles (though such measures were introduced later in large-scale industry than in small and medium-sized industries), and to independently manage bonus funds. At the same time, various spaces were formed in terms of pricing rules. In some segments, prices continued to be set in a prescriptive manner; in others, while a “baseline” price was fixed, it was allowed to fluctuate.

tuates within a certain range (approximately 20%) due to fluctuations in supply and demand; and in others, free market pricing was established. Greater state supervision over prices was maintained in socially significant areas, including in resources industries, to curb cost increases and supply-side inflation.

Thus, the market began to penetrate China's economic life in a very measured manner, with changes being mutually coordinated at various levels of the economic system. The same caution was also exercised during the initial denationalization of property with the aim of increasing the efficiency of enterprise management. Fearing the ineffectiveness of private ownership of production in a developing market, the state "prepared" the enterprise in advance. Specifically, shares were placed to attract additional financial resources while the state maintained a controlling stake for a long time, technical modernization of production was carried out, institutional instruments for integrating the enterprise into the market were developed, etc. Thus, the process of denationalization of the economy proceeded smoothly through the gradual transfer of actual powers to the managers of enterprises while simultaneously modernizing them and cultivating new niches of operation [Fedorovsky, 2003; Pivovarova, 2011].

Projects to create special economic zones in coastal regions, attracting foreign capital, were implemented more rapidly. This paved the way for the country's significant export potential through maritime trade, and also implemented a policy of identifying regions that would be the driving forces of the national economy, as it was impossible to achieve high growth rates everywhere. Overall, ties with foreign partners were strengthened, while international business practices were studied.

During this period of reform, the state heavily increased budget expenditures, stimulating industrial development and rapidly increasing the money supply despite the initially very low level of monetization of the economy. Since price liberalization had already begun, the increase in the money supply did not lead to commodity shortages, as had happened in the USSR. The opposite problem characteristic of market economies arose: rising inflation. This sometimes led to deviations from sustainable growth¹ and challenges to the political system, but overall, the state managed to prevent major macroeconomic imbalances by temporarily implementing measures to slow down the economy. Moreover, public confidence in monetary policy and the ability to save for durable goods (thereby curbing overheating from current demand) had an additional beneficial effect. One could argue that both demand and supply were stimulated simultaneously, but the primary focus was undoubtedly on the latter. Specific mechanisms included the devaluation of the yuan to support exports, and the stimulation of investment through both budgetary and monetary instruments (primarily cheap targeted loans), which led to a consistently high and growing rate of accumulation (from 1986 to 2000, the share of investment in GDP was over 30%, in 2003 – 48%, in 2007 – 55% [Gelbras, 2009, p. 77]).

The 1990s were marked by a significant acceleration of economic liberalization with continued intensification of industrial development. The turning point was 1992, with Jiang Zemin's proclamation of establishing a "socialist market economy." Export orientation enhanced, foreign investment and internal migration intensified, and the labor market became more flexible. The official theoretical framework combined the experiences of capitalism and socialism (primarily the Soviet type) with the promotion of the "three utilities" as the primary criterion for the success

¹ Thus, in 1989, GDP growth was a modest 4.2% by Chinese standards, while in 1990 it was 3.94%. According to the World Bank: <https://www.worldbank.org/>.

of state policy: developing productive forces, strengthening the state's power, and improving the population's standard of living. The priority of developing flexible and practice-oriented economic thought was emphasized. As can be seen, the class aspects of Marxist doctrine were not emphasized within the official discourse. At the same time, new theses began to be voiced about the importance of building a harmonious society, supporting employment, the countryside, and developing social safety net [Pivovarova, 2011].

One of the key areas of liberalization was the transformation of ownership, planning, and taxation institutions. The activities of the former State Planning Commission departments, previously merged with the State Economics Commission, were limited to developing medium- and long-term plans for socio-economic development and coordinating the construction of major infrastructure projects. Meanwhile, the State Economics Commission departments were responsible for meeting and adjusting annual targets and overseeing the implementation of approved projects. The former "reform headquarters" – the State Commission for Restructuring the Economy – continued to decline in importance. Along with significant staff reductions, it was transformed into an advisory body performing research functions [Chubarov, 2024]. Overall, directive planning began to become irrelevant, while indicative planning and macroregulation mechanisms expanded. In particular, in 1994, directive planning practices for foreign trade were drastically curtailed.

As mentioned above, the process of transferring enterprises to private ownership occurred gradually, with preliminary "preparatory measures" implemented, following the widespread practice of corporatization. From 1978 to 1998, the private sector's share of GDP increased from 0.9% to 25%. Throughout the reform period (including the 2000s), the state retained almost complete control over strategically important sectors: transportation, energy, chemicals, and metallurgy. Land always remained in state hands. More than half of facilities in construction and mechanical engineering were state-owned. Various forms of state control have been largely preserved in the banking sector. It should be noted that it was only in 1999 that the Constitution was amended to stipulate that the private sector is also an "essential part of the socialist market economy" [Reforms, 2000, p. 13]. In 1994, the privatization of township and village enterprises intensified. The securities market was fully authorized, and a private sector in the service sector (hotels, restaurants, etc.) was extensively developing. As the denationalization of production developed, the problem of tax collection became more pressing, which became a prerequisite for the unification of tax regimes and the implementation of tax reform in 1994. It is also worth noting that, under this reform, in order to smooth out regional inequality as the market developed, the ratio of federal and regional budgets increased by approximately one and a half times in favor of the former [Kadochnikov, 2016, p. 116].

The policy of gradual, yet radical, price liberalization continued. While in 1992, approximately half of prices were controlled to some degree by the state (while maintaining the rationing system), by the end of the century, the prices of more than 90% of goods were determined by the market (while maintaining indirect regulation through differentiated tax rates, subsidies, duties, etc.) [Reforms, p. 13]. Since 1995, the banking sector has enjoyed significantly greater freedom, although the state continued to restrict its functions by stimulating the influx of cheap money into material production and preventing speculative operations. Provisions for no-profit lending for lagging regions and industries were partially retained. On the one hand, this addressed the key objective of rapidly expanding large-scale investment projects in the real sector. On the other

hand, it deprived banks of flexibility and led to debt problems in the late 1990s (although China suffered relatively little from the Asian economic crisis during this period) [Fedorovsky, 2003].

In the early 2000s, as commercialization and liberalization intensified, Chinese society faced a kind of ideological impasse, necessitating the formulation of a new paradigm for the country's development. The response was Jiang Zemin's proclamation of the Communist Party's role as both the vanguard of the working class and the consolidating force of Chinese society. The latter aspect was represented, in particular, by the emergence of opportunities for businessmen to join the Communist Party. In 2002, as a step toward strengthening the Communist Party's consolidating institutional role, new measures were formalized to implement mechanisms for political continuity, and term limits were established [Vinogradov, 2010]. The emphasis on building a moderately prosperous society was once again highlighted as a key development objective. At the same time, a significantly greater focus was placed on the development of the social services, science, culture, and the need to transition to a more high-tech model of reproduction [Feoktistov, Tsyplakov, 2008]. In 2004, Hu Jintao reinforced this approach by proposing a concept of harmonious planning focused on comprehensive human development, transcending purely economic goals.

Within this new paradigm, programs were implemented, albeit in a rather limited form, to support employment, develop social services (especially healthcare), the pension system, improve rural infrastructure which was increasingly lagging behind the cities, and provide financial assistance to the poorest segments of the population. In 2006, school education became free in rural areas (in cities, it had been generally available since the early 1990s). Meanwhile, liberalization and privatization continued. By 2008, two-thirds of GDP was already being generated outside state ownership [Feoktistov, Tsyplakov, 2008]. In 2003, the State Economics Commission and the State Commission for Restructuring the Economy were abolished, and they were replaced by the still-existing single body, the National Development and Reform Commission. It began coordinating key investment projects and selecting priority development sectors. As part of the economic liberalization process, the state placed particular emphasis on developing market institutions that ensure transparency and predictability of the "rules of the game" for businesses. Regarding fiscal policy, it is worth noting the reduction of taxes, which hinder the expansion of demand for finished goods. The authorities sought to maintain a generally balanced consolidated budget, incurring significant deficits only during the implementation of certain key investment projects. The dual budgeting approach (for current and capital expenditures) served as the basis. Despite a somewhat increased share of regional budgets, many poorer regions remained highly dependent on federal transfers [Kadochnikov, 2016].

In the early 2000s, China's industrialization led to lower employment in agriculture than in industry and services combined [Hu Angang, 2005, p. 40]. The country increasingly cemented its status as a "world's factory floor" with a high rate of accumulation. Cheap labor, accessible loans, heavy government investment in infrastructure (especially transportation), and the support of a cheap yuan made Chinese goods highly competitive on the global stage. China was becoming the leader in accumulated foreign exchange reserves, which, firstly, served as a tool for devaluing the national currency and, secondly, as a resource for subsequent foreign investment, primarily in poor countries. However, the general course toward economic openness, despite its rapid pace (for example, in 1978, China's foreign trade turnover constituted only 13% of GDP, in 2003 it was already 60%, and in 2007 – 67%) [Hu Angang, 2005, p. 40; Gelbras, 2009, p. 77] was not total and

“dogmatic,” but rather implied the possibility of countermeasures. For example, in 2001, upon joining the WTO, China secured a five-year deferment of foreign investment in a number of sectors, such as finance, telecommunications, wholesale trade, freight transportation, and tourism [Fedorovsky, 2003].

At the same time, China began gradually implementing a policy to increase the knowledge-intensiveness of its own products, primarily in the information technology (IT) sector, electronics (especially in the mobile phone market), and transportation. Back in the 1990s, China, while creating favorable conditions for foreign multinationals (free market access, low taxes), in exchange demanded partial transfer of technology and production expertise, and the participation of local manufacturers as subcontractors. As in other East Asian countries that had undertaken major modernization projects, technology was concentrated in large companies which in China’s case were even more closely tied to the state. The transition from a policy of borrowing technologies to indigenous developments took place through a variety of state planning mechanisms, which included special budgetary and monetary support for key industries and the creation of an innovative environment through the fusion of education, research, and production¹. There was a gradual increase in spending on science, primarily applied science (however, subsequently, independent schools of fundamental science, particularly in the natural sciences, also began to emerge), and on the development of human potential in general [Porunov, 2006; Kolganov, 2023]. At the same time, the state’s significant role in this area did not contradict the general course toward economic liberalization mentioned above.

As a result, by the late 2000s, China still remained a country with low labor productivity relative to advanced countries and an extensive economic growth model. It was heavily dependent on foreign technology, while lacking domestic development and overall research potential, and suffered from high inequality in technological resources (including as a result of the high degree of economic monopolization). However, during this period, the foundations were laid for the subsequent acceleration of advancements in science and technology that is still observed today.

Summary

The period under review encompassed the initial stages of China’s modernization, which, according to the plan adopted in 1996, were to become the first stage of the country’s long-term socioeconomic development program (until 2050). It was initially scheduled to run until 2010, by which time it was expected to achieve deep industrialization, establish the foundation of a “socialist market economy,” integrate closely into the global market, and transition to the category of a medium-development country. Modernization thus addressed the threefold task of transformation: from an agrarian economy to an industrial one, from a planned economy to a market economy, and from external isolation to openness. China succeeded in achieving these ambitious goals, demonstrating record growth rates over a long period and setting an example of a path to a market economy based on principles distinct from neoliberalism and the Washington Consensus. Russia, taking into account its national characteristics, could have followed this path and avoid significant transformational losses [Ostrovsky, 2007]. This paper examines this period because it encompasses the “full cycle” of a qualitative modernization leap. Although the initial conditions

¹ A striking example is the coastal free economic zone in Shenzhen, which was established back in 1980. Subsequently, a university, an industrial-and-scientific park, and a stock exchange emerged within it, transforming this former fishing village into a major technological and financial center with global status.

and goals have their own specifics, it is important to consider this experience in relation to the search for responses to contemporary challenges.

The following universal factors of this type of modernization, identified by A. Gershenkron, can be considered as the initial prerequisites for the rapid dynamics of development in relation to China: the low-base effect, the possibility of a rapid transfer of resources to industry, the advantages of inclusion in world trade based on an export-oriented model, and the rapid spread of new technology due to the possibility of borrowing technological solutions from more developed countries [Gershenkron, 1962]. In the context of an open economy, the latter aspect is particularly closely linked to the flying geese model, which also qualitatively describes the mechanisms of China's rise [Ozawa, 1993]. The demographic factor also became very important: at the beginning of the reforms, a large proportion of the population consisted of a young workforce, which was further complicated by the one-child policy. According to calculations by Chinese researchers, between 1978 and 1995, half of the growth in per capita GDP was due to the growth of capital-labor ratio, a third to institutional variables, and 20% to knowledge development. From 1995 to 2001, the growth rate of capital-labor ratio increased by another 4%, indicating the acceleration of industrialization and the substitution of capital for labor in terms of factor returns [Hu Angang, 2005, p. 38]. In the 21st century, as mentioned, the role of new technologies has enhanced; however, China remains a country modernizing primarily through extensive factors.

Despite its undeniable successes, the Chinese model also led to systemic contradictions. These include, first and foremost, high inequality (primarily between regions, including between urban and rural areas), underdeveloped social services, low consumption, insufficient domestic demand coupled with heavy dependence on foreign markets and technology, employment problems, arduous working conditions and environmental concerns, capital overaccumulation, and corruption and bureaucracy due to the large role of the state. Subsequently, in the 2010s, Chinese leadership began to focus increasing efforts on addressing these issues, although many remain pressing.

As Chinese academic Cheng Enfu demonstrates, the solution to the contemporary contradictions facing not only China but the world as a whole lies in further harmonization of planned and market principles and the development of a multi-structured economy [Cheng, 2023]. The challenges of curbing rising inequality are becoming particularly pressing, largely due to the consolidation of digital giants, the risks of uncontrolled development of artificial intelligence, and the channeling of resources toward the needs of the "real sector" rather than speculative markets. Under capitalism today, the prerequisites for the slowdown of scientific and technological progress are emerging due to intellectual private property. Another particularly dangerous threat is the potential for total manipulation of consumer behavior through digitalization. These aspects are also quite prevalent in Russian academic research, including within the framework of the aforementioned components of the theory of noonomy, which has particularly close intersections with Chinese economic thought and also highlights the forks in the main directions of both national and civilizational development, the prerequisites for the nootransition [Bodrunov, 2023; Bodrunov, 2026]. Thus, the relevance and continuity of the theoretical foundations of Chinese reforms of the late 20th and early 21st centuries with the present day are preserved.

Taking into account all the differences in historical conditions, in conclusion, it is worth highlighting what appear to be the most important components of the Chinese modernization pro-

ject, which, in adjusted form, could be successfully adopted today. The Chinese leadership has established major theoretical, or more accurately, metatheoretical, philosophical, and ideological paradigms (be it Marxism or Confucianism). At the same time, this has not resulted in a narrow theoretical framework for the modernization project or dogmatism that would hinder the development of economic and political measures appropriate to the given situation. On the contrary, through a comprehensive study of international experience, both theoretical and practical, economists have been able to develop flexible, practice-oriented approaches. These approaches have also become part of long-term strategic development programs.

It should be emphasized that, despite all the problems and contradictions of the Chinese political system, the success of the reforms was secured by the institutions of meritocracy and official accountability, coupled with the population's willingness to engage in new state projects and their workaholicism. Despite the widespread use of informal institutions, which at first glance might seem to undermine the stability of the reproductive system, China has developed an institutional environment that, despite all the problems and negative "side effects," serves as a powerful pillar of national development.

Regarding more practical economic and political aspects, it should be noted that the foundation of the Chinese development model is state planning, direct state participation in the establishment of value chains, and selective regulation. Throughout the period under study, a consistent and balanced industrial policy was evident (first, agricultural reforms, then the accelerated development of assembly production at the core of industry, and finally, the development of indigenous technologies based on previous borrowings, and the integration of manufacturing, science, and education). This ensured the sustainability of economic dynamics during large-scale structural transformations. The state supported the industries driving development with direct injections and cheap loans. Even with accelerated economic liberalization and the emergence of multiple forms of ownership, the state retained primary control over key industries, vigorously implemented infrastructure and construction megaprojects, and curbed the "unproductive" flow of resources (financial speculation, rent income, etc.). In foreign trade relations, it's important to highlight state policy (from managing the exchange rate to the conditions for admitting foreign multinational corporations to free economic zones). When certain structural and macroeconomic imbalances arose, this policy, firstly, provided local producers with broad access to foreign markets and, secondly, created a mechanism for adopting foreign technologies to facilitate the subsequent development of domestic scientific and industrial capabilities. In today's increasingly competitive global marketplace and rising protectionism, such fine-tuning of foreign economic policy is of critical importance.

Thus, despite its unique characteristics, China's modernization of the late 20th and early 21st centuries provides extensive data for study and practical application today. The implementation of major scientific and technological development projects and the strengthening integration of production, science, and education are particularly relevant for countries currently focusing on catch-up and advanced development. After some time, following disillusionment with the neoliberal dogmas imposed on the world, projects to develop strategic planning, encompassing all levels of the economic system with the state having a directing role, are once again being championed. Nowadays, this goes beyond the narrow goals of maximizing material production and prioritizes harmonious development in various areas of social reproduction, thus creating the foundation for the nootransition.

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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 nooproduct, 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.

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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。

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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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KNOWLEDGE-INTENSIVE TECHNOLOGIES AS A KEY FACTOR IN THE NEW DEVELOPMENT PARADIGM

Abstract. Modern high technologies are transforming the model of civilizational development toward increasing the value of knowledge as a necessary component of the transition from an industrial society to a post-industrial and knowledge society. Society is witnessing the realization of what in the mid-20th century seemed a distant prospect or a product of the emotion and experience industry: science fiction books and films. This paper examines the potential of modern technologies, knowledge, and information as necessary components of the high-tech development of a knowledge civilization. The theoretical and methodological foundation of the study is based on the provisions of structural-functional, systemic, and activity-based approaches. A combination of methods was employed: content analysis of openly accessible specialized scientific literature on the knowledge economy and high-tech development, as well as methods of abstraction and modeling. In the course of the research, the author drew upon the works of D. Bell and A. Toffler devoted to post-industrial society, high-tech development, the knowledge economy, and digitalization. The study also separately uses the provisions of S.D. Bodrunov on NIS.2, knowledge-intensive production, and noonomy, which make it possible to consider knowledge-intensive technologies not only as a sign of a post-industrial shift, but also as a prerequisite for deeper changes in production, labor, and social development.

Keywords: knowledge, information, knowledge-intensive technologies, high technologies, post-industrialism, post-industrial society, NIS.2, knowledge society, socio-humanitarian technologies, digitalization.

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知识密集型技术成为新发展范式的关键因素

摘要:当代高科技正在改变文明发展模式,使知识价值在从工业社会向后工业社会和知识型社会转型中的作用不断增强。社会正在见证这样一种现实:那些在20世纪中叶还被视为遥远前景,或被看作情感和体验工业产品的内容,如科幻小说和电影,如今正在逐步实现。本文探讨现代技术、知识和信息作为知识型文明高科技发展必要组成部分的潜力。本研究的理论与方法论基础源于结构功能论、系统论和活动论的相关原理。研究采用综合方法,包括对公开获取的关于知识型经济和高科技发展

的专业学术文献进行内容分析,以及抽象和建模方法。在研究过程中,作者参考了D. 贝尔和E. 托夫勒关于后工业社会、高科技发展、知识型经济和数字化的研究成果。同时,本文还单独运用了S.D. 博德鲁诺夫关于第二代新工业社会、知识密集型生产和智慧经济的相关观点,从而将知识密集型技术不仅视为后工业转向的表现,也视为生产、劳动和社会发展发生更深层变化的前提。

关键词: 知识、信息、知识密集型技术、高科技、后工业主义、后工业社会、第二代新工业社会、知识型社会、社会人文技术、数字化。

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Contemporary processes of civilizational evolution are marked by transformative changes of post-industrial development in virtually all areas of public life [Malakhova, 2016], which inevitably impacts the very fabric of society. As S.D. Bodrunov notes, the terms «knowledge economy» and «information society» have entered common usage in political, economic, and academic discourse [Bodrunov, 2019].

The authors' approaches relating to the so-called «post-industrial wave» present the qualitative characteristics of the new information society and knowledge economy from various aspects and perspectives. One of the fundamental and defining factors is the radical shift toward a high-tech economic structure. Society is witnessing processes described in the works of D. Bell and A. Toffler within the theory of information (post-industrial) society and the third stage of the wave concept of society, where the interpenetration (convergence) of technologies is rapidly increasing. The works of American sociologist M. Castells and Japanese economist T. Sakai have gained widespread popularity. S.D. Bodrunov cites these works in his examination of the network structure of society and the paramount importance of knowledge in social development [Bodrunov, 2016].

N.N. Trofimova offers the following interpretations of the knowledge economy [Trofimova, 2022]:

1. A segment of the economy associated with the production and transfer of knowledge.
2. Knowledge-intensive sectors of the economy.
3. Economy as a whole, where intellectual potential and the production, distribution, and use of knowledge are of strategic importance.

Economic development, particularly production (both tangible and intangible), implies the growing value of knowledge as a strategically essential asset across all economic categories, i.e., it contains permanent trends toward a transition to a knowledge economy. It is important to note, however, that a knowledge economy is not identical to S.D. Bodrunov's noonomy, but rather serves as one of the prerequisites for a more profound transformation of production, labor, and needs. Criterion indicators that represent the share of knowledge economy in the institutional development of the state should include the number of professionals engaged in research and practical implementation of scientific research results, the level of R&D funding in the overall structure of public expenditures and R&D commercialization (Rodina, 2019), the share of high-tech industries and their distribution across economic sectors, the impact of high technology on the quality of life of the population, the interpenetration of technologies (convergence), etc.

The transition to a post-industrial economy based on the NBICS convergence platform, which presupposes a new quality of knowledge and a new level of knowledge-intensive technological development, is the subject of close attention from economists, political scientists, philosophers, and futurologists. So-called «new» technologies – digital, cognitive, bio-, nano-, additive, and social, etc. – are intensively evolving, forming a knowledge «superstructure» over the traditional world of machine technology. «Hybrid» technologies are becoming commonplace as a combined toolkit of machine and non-machine technologies for guiding and regulating natural processes to achieve social goal-settings [Bodrunov, 2018]. In this case, it is crucial that we are not talking about displacing material production, but rather about saturating it with knowledge, scientific components, and new forms of labor organization.

It should be noted that development based on knowledge and «new» (knowledge-intensive) technologies implies not only the transformation of existing ones but also the creation of new high-tech industries with technological and intellectual potential being the key elements of knowledge and production synergy, the creation of new value, the expansion of competitive advantages, technological self-sufficiency, etc.

The definition of «technology» is of Greek origin, including «τέχνη» (skill, craftsmanship, art) and «λόγος» (thought, science, word). Introduced into semantic circulation in 1772 by Johann Beckmann, it was associated with craft skills, and more broadly, industrial mastery. The modern interpretation is adjusted to changes associated with the development of civilization and encompasses scientific and methodological approaches, tools, and processes for achieving goal-setting.

In the context of growing creative and innovative trends in economic transformation, the value of technological potential distinguished by breakthrough knowledge intensity and a range of competitive advantages over existing technological products is also growing. In this regard, we classify technologies based on their life cycle and value for the economy as a whole [Bagirova, 2018; Melnichuk, 2003]:

- unique, used on the basis of exclusive (monopoly) ownership granted by intellectual property rights;
- advanced, differing from traditional similar technologies by technical and economic advantages – novelty and economic effect, enhanced efficiency, an expanded range of competitive advantages, and environmental friendliness;
- traditional, used everywhere and supporting the usual standard of living, production and economic performance;
- obsolete, not meeting modern standards, characterized by low efficiency, high maintenance costs and wear level, technological backwardness and extremely low competitiveness.

The differentiation between unique and breakthrough technologies which contain a significant share of knowledge and require significant investment, including highly skilled human resources, lies in their nature of origin, goal-setting, and impact on the market component of civilizational development.

Thus, according to A. Gerasimov, digitalization is a source of higher importance for the production potential in the economy, which evolves based on the convergence of material resource components and cyber-physical systems [Gerasimov, 2019], which imply a significant share of knowledge component. In this case, the platform foundation for the evolution of production is the production potential generated during the industrialization period of the Soviet Union.

Knowledge transforms the potential of scientific research into a fundamental asset of critical technologies that shape national security and the technological sovereignty of the state. In the military-industrial complex, this involves research and development of the latest types of weapons. Knowledge-intensive technologies enable the high-tech development of promising areas of industrial potential and economic sectors, including the civilian sector (smart manufacturing, nanosystems industry, biomedical and cognitive technologies, unmanned and autonomous systems, etc).

The importance of technological potential as a guarantee of a high quality of life for citizens, well-being, and the preservation of the state's global strategic security is supported by the shift toward the demand for intellectual and creative activity, rather than the mere creation of material goods. In a post-industrial economy, the value of socially created goods is increasingly shifting toward a range of intangible qualities. In S.D. Bodrunov's approach, this shift should be viewed not as the disappearance of material production, but as a change in its quality due to knowledge, science, technology, and creative labor [Bodrunov, 2018; Bodrunov, 2019].

According to S.D. Bodrunov, the resource component of a high-tech economy is changing in a post-industrial society. Information is becoming the most important resource and product [Bodrunov, 2018]. The very existence of information presupposes its processing and analysis, which implies a high level of societal development and employee qualifications. Knowledge is becoming the primary, inexhaustible asset of the post-industrial economy and information society, the foundation of intellectual interaction between the state, society, business, and the academic community based on the «quadruple helix» principle of human-centered civilizational development. In order to implement the nootransition, it is essential to distinguish between information as a transmitted and processed resource and knowledge as the result of human cognitive and creative activity [Bodrunov, 2018; Dmitriev, 2025].

In this context, we consider it appropriate to make a note regarding the demarcation of the concepts of «knowledge» and «information,» as there are instances of their being equated. Information can be defined as data whose nature does not change with variations in its representation and is an object of storage, transmission, and processing. From a philosophical perspective, information is a fundamental concept, representing a reflection of existing reality – the real world, through which an individual understands changes occurring in space. From a technical perspective, the following definition is noteworthy: information is a sequence of signals transmitted from a transmitter to a receiver, accumulated in a storage device, processed, and output as deliverables [Wiener, 1958]. While knowledge is the product of cognition, the result of human activity – the so-called cognitive process. The manifestation of knowledge is based on the systematic organization of information, which reflects reality in synergy with existing experience, logical justification, and necessary conclusions. Considering the second signaling system, only humans possess knowledge, which is one of the fundamental differences between humans and the animal world.

Let us note the specific dual manifestations of knowledge and information in the context of their properties necessary for the development of high technologies and the characteristic features inherent in both knowledge and post-industrial evolution [Chirkov, 2020]:

- knowledge and information are global in their manifestation of limitless properties;
- in the information society in a spatial-territorial context, they have no limitations on the level of distribution, limited only by artificial institutional barriers;
- a growing trend towards a permanent increase in the extent of knowledge and information exchange;

- scenario-based unpredictability of the consequences of the application and generation of new knowledge as a component of high technologies. This feature depends on the goal-setting of the actors involved in the creative process of post-industrial development factors;
- development of a special ecosystem where knowledge and information acquire the status of a commodity (service) with a fairly rapid rate of distribution and consumption;
- the same knowledge and information can be used repeatedly, while simultaneously in different places without restrictions on application agency;
- knowledge and information are a consequence of human cognitive activity, which can be repeatedly transmitted without losing their properties. On the contrary, in the process of transfer and use, knowledge can potentially acquire new derivatives, facilitating the generation of new emergent properties.

These properties contribute to the blurring of boundaries between the production of goods and the provision of services, transforming the economy into a service-based plane of functioning under the influence of high technology. Major corporations are now offering not just a brand, but a comprehensive solution with the product serving as a platform for delivering high-quality services. The traditional consumption model is shifting to a «product as a service» model [Mironova, 2025], where the synergy of knowledge and technology is fundamental. However, this servitization does not negate the productive nature of high-tech development: it changes not only the form of product delivery but also the knowledge-intensive nature of its creation, maintenance, and use.

The importance of the creative component in the intellectual process of creating value-based goods is growing. The demand for a special environment for the creative and intellectual technologies (an ecosystem) is growing, with human activity having a special role as a source of new ideas and approaches to technological development. This thesis suggests the interaction of human potential and high-tech development, including the influence of high technologies on the development of new capabilities for humans and society.

Given the stated trend of interdependence between high technology and human potential, we present the main qualitative characteristics of the content of labor that arise under the influence of the creative-intellectual ecosystem of replacing capital-intensive technologies with knowledge-intensive ones:

1. Emergence of new professions and fading of existing ones [Gubernatorov, 2024], which expands the range of opportunities for the actualization of intellectual capital, but gives rise to a complex set of issues associated with the previous format of labor and the individual's place within it.

2. The nature and intensity of the production process are changing, which is caused by an effect formed by a complex set of constituent factors: the growing role of knowledge and technology in the creation of goods; the expansion of the variety of operations, which gradually become more complex as the knowledge-intensiveness of the created product increases; the need for a creative approach to addressing non-routine tasks.

3. Permanent reduction in employee dependence on a fixed workplace and the employer's means of production. This transformation is driven by the growing importance of information and communication technologies and the capabilities of digitalization.

4. Performance evaluation criteria are changing based on the transformation of the nature of working activity. The effect of synergy and emergence of knowledge-intensive technologies and

teamwork is increasingly taking up a larger share in the production process, which is significantly more effective than previous approaches of the industrial economy.

5. Variability of product lines and services provided is subject to further addition and expansion, including due to a reduction in life cycles and changes in the product range and production characteristics, which affects the need for continuous improvement of employee qualifications and verification of knowledge and competencies.

6. Increase in the number and variety of non-routine tasks arising in the process of changes in working conditions, market demands, needs and wishes of the target audience, which presupposes a different architecture for the management of human resources and intellectual potential in the context of ever-increasing competition in a high-tech economy;

7. The significance of labor and the status of professional activity are changing. Employees' attitudes toward careers are also undergoing transformation, given that many physically demanding and exhausting types of professions are either undergoing significant changes or disappearing in general, freeing up the service sector and manufacturing niche for knowledge-intensive professions and high-tech activities.

Closely related to the changing content of labor is the definition of the American economist R. Florida, who proposed calling the social group closely associated with the post-industrial economy the «creative class» [R. Florida, 2005]. Yu. V. Latov notes the transition from capitalism, the secondary phase of social formation, to a new, tertiary formation, accompanied by numerous contradictions [Latov, 2024], which are discussed in numerous discourses and examined and analyzed in scholarly works devoted to the transition to a post-industrial society.

The topic of post-industrial society and the creative class as actors in the post-industrial economy deserves special attention. American sociologist D. Bell, in his works (*The Coming of Post-Industrial Society* and *The Age of Disunity*), identifies the key factors and causes of the transition to a new type of society. He also notes that the definition of «post-industrial society» is most appropriate for reference in studies of subsequent development (the development of civilization), since other terms characterize only one aspect or focus on a specific feature (for example, «information» society, «new type» society, etc.). The definition of «post-industrial society» emphasizes the overcoming of the industrial nature of the previous mode of production in the emerging new society.

D. Bell lists the following characteristic features of the «post-industrial society»: the paramount importance of theoretical knowledge as a source of new economic and political decisions; the transition from material production to a predominantly service sector; the creation of technological potential of an intellectual type; knowledge becomes the main value contributing to economic development and growth; decisions are made on the basis of intellectual technology, excluding the intuitive component; education and competencies become the basis of the elite (meritocracy) of the post-industrial society; the growing role of women in society (in the economy, in public administration); education becomes a key sector, one of the prerequisites for development. He argues that these constants will persist at each specific stage of the post-industrialism development. However, according to the scholar, this does not mean post-industrialism will completely replace industrial society. He draws an analogy with ancient frescoes, where new images are added layer by layer over time. Similarly, in the development of civilization, newer phenomena superimpose on previous ones, leveling out some of the characteristic features of society and shaping its unified texture [Bell, 1999].

In this context, it is necessary to voice the position of S.D. Bodrunov, which contains a critique of the views of «post-industrialists». The scholar believes that the importance of the service sector has been unjustifiably exaggerated. According to him, a significant portion of industrial production potential has been transferred to the periphery, to the so-called states of the economic South [Maslov, 2020]. He also notes the duality of post-industrialism: despite the external growth of the service sector, the knowledge-intensive nature of industrial processes that meet society's needs is maintained. Knowledge, a specific resource, increasingly predominates over material resources and is implemented not only in technology and production but also infiltrated into all areas of society as part of global digitalization processes, fundamentally altering its narratives and structure [Bodrunov, 2024].

According to a number of scholars, given the centrality of knowledge and information in post-industrialism, one of the crucial elements of political, economic, and social life is the establishment of a social structure in convergence with information and communication technologies and the intellectualization of labor. The ever-increasing volumes of data arrays require a significant enhancement in technological digital potential, with the parallel development of the corresponding supporting infrastructure to meet the ever-increasing needs of the information society.

One of the stages of high-tech development is the emergence of a digital society («Society 5.0») marked by a comprehensive digital transformation where technologies create a unique ecosystem. This ecosystem, in synergy with knowledge, generates significant emergent potential for post-industrial evolution. Digital society is often characterized by describing the corresponding supporting infrastructure that directly impacts digital technologies. Furthermore, researchers of post-industrial evolution describe the transformation of social connections, social practices, and public relations in a digital society.

In a post-industrial society, the socio-cultural aspect of consumption is changing as the development of the service and digital economy transforms the value system, especially among the younger generation. Consumption ceases to be merely a process of satisfying basic needs and becomes a creative approach to identity construction.

Post-industrial society implies a descriptive approach to examining technology infrastructure. At the same time, it is appropriate to correlate the impact of technology on changing social relationships, ties, and practices. Information has a dual function, serving both as an infrastructural and an intermediary function, collectively ensuring constructive interconnection and interaction between participants in the process, and being an essential element of a specific ecosystem. For example, N.D. Uzlov mentions that humanitarian technologies possess significant resource-intensive potential, given the multiplicity of agencies aimed at managing complex structural systems, from the individual to society as a whole. They are specific, given the nonlinear nature of the connections and interactions of the elements that shape social impact [Uzlov, 2011].

Therefore, the definition of «technology» is applicable not only to areas directly related to engineering or technical skills, but, in the context of post-industrial society and the growing value of knowledge, to any field of society. Technologies are classified into political, educational, financial, economic, managerial, social, and humanitarian categories. This classification represents the range of applications and variations of methods for systematizing activity in modern civilizational development.

The convergence of digital and humanitarian technologies is leading to the emergence of a high-tech arts and humanities, which, in addition to their positive potential, pose hidden threats to individuals and society. Thus, high-tech humanitarian technologies are potential tools for manipulating consciousness at various levels – mental and psychological. M.G. Delyagin believes that these technologies have a dual nature [Delyagin, 2000]. In addition to their primary purpose of improving communications, generating analytical, informational, and organizational capabilities, fostering a positive corporate culture and image, and so on, they have the potential for negative, destructive impacts on individuals and society as a whole.

In this regard, special attention should be paid to the consideration of socio-humanitarian technologies of influence [Podberezkin, 2019] on the individual's value-motivational component, and technologies for manipulating social groups through «soft» methods of persuasion, cultural influence, and social engineering for the covert management of behavior in the face of ever-increasing threats.

The strategic significance of socio-humanitarian technologies lies in their potential as an instrumental component, which can potentially be used not only for human resource management and monitoring and studying economic processes, as discussed above, but also for manipulation and influencing individuals and the social space as a whole, which, accordingly, implies a variety of effects in the context of influencing the dynamics of social development. In this regard, the necessity of engaging so-called high-hume technologies (high-level humanitarian technologies) in the process of influencing individual and public consciousness in today's reality lies in the fundamental transformational changes in the economy and society.

These processes are accompanied by technological changes in production chains, which, in turn, are changing the structure of the global economy, increase the share of the service sector and intensify competition in the struggle for consumers. In this context, one of the competitive advantages will potentially be the minimization of the time it takes to satisfy consumer demand, which, according to N.V. Vasilenko, will require the implementation of the following areas [Vasilenko, 2019]:

- assessment of the transformation of information into products and services from the perspective of a humanitarian approach to create an ethical and value-ideological filter necessary to prevent the potential threat of destructive changes to the existing format of society;
- gradual adaptation of the population to high-tech changes in the digital space.

Given the close relationship between the knowledge economy and technology development, we believe it is necessary to articulate the semantic content of the high-tech industry – advancements in technology – in the context of the transition from industry affiliation to the focus of infrastructural support for economic development.

Thus, McQuaid substantively delineated the concept of «high-tech advances» in his methodology for identifying the initial producers of high-tech products in the subsequent chain of utilization and capitalization of their advances. He distinguishes between innovation and technological advancement, thereby confirming the distinction between the closely related definitions of «knowledge-intensive technologies» and «high technologies» as identifications from the perspective of outcome and process.

Butchart, Breheny, and McQuaid formulated a methodological framework for conceptually differentiating high-tech industries, which represents a variation on the grouping of industry indicators (measures) based on research and development intensity, including the share (as a

percentage) of personnel engaged in research and experimentation out of the total number of personnel of an economic entity.

According to M. Cedrini and M. Fontana, the near future will see an expansion of institutional approaches in economic science [Cedrini, 2018]. This reality necessitates the adjustment of economic models to the knowledge-intensive and high-tech development of post-industrialism, amid rapidly changing, turbulent processes.

The economic impact lies in the use of accumulated knowledge through high technology. However, alongside this positive impact, it is necessary to consider the potential negative impact of knowledge and high technology on society [Lachinina, 2020]. This threat is growing in the context of geopolitical uncertainty and turbulent global processes.

Finally, keep in mind that in the current reality, the industrial and post-industrial segments of the economy continue to function in parallel, with new knowledge-intensive forms not immediately displacing industrial ones, but rather overlapping them and changing their quality. At the same time, digital transformations and high technologies are accelerating the pace of knowledge accumulation and improving personnel competencies in the face of increasingly complex goods creation processes. The most important prerequisite for the development of a knowledge economy and advanced technologies is the stability of the institutional environment, supporting its development and improvement in line with processes occurring in a turbulent environment, while maintaining the significant role of fundamental science.

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DIGITAL TRANSFORMATION OF INVESTMENT OPPORTUNITIES IN THE ERA OF NOOTRANSITION

Abstract. This paper examines the digital transformation of investment opportunities in the context of the transition to noonomy, taking into account the growing priority of exploiting the results of intellectual activity. Due to the extremely high uncertainty of investment returns on digital intellectual assets, their circulation on photostock platforms is examined within the framework of the concept of real options. The specifics of photostock platforms functioning as digital option generators are analyzed, facilitating the creation and realization of investment opportunities for authors, investors, and end users. The study found that the investment potential of a digital platform is determined by the current balance of digital options (assets) and digital debt (liabilities), which are formed through the management of the results of intellectual activity (RIA) of platform ecosystem participants. RIA should be understood as not only digital intellectual assets in the form of creative content, but also elements of the digital platform's software and information architecture.

Keywords: debt, digital intellectual asset, digital platform, ecosystem, investment, noonomy, option, photostock.

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向智慧经济过度时期投资机会的数字化转型

摘要: 本文致力于研究向智慧经济过度条件下投资机会的数字化转型过程, 并考虑到日益增长の利用智力活动成果的重要性。数字知识资产投资回报的不确定性极高, 因此本文从实物期权理论的角度

度,探讨了其在微图库平台上的流通机制。文章分析了微图库作为数字期权生成器的运作特点,这些期权为作者、投资者和终端用户创造了投资机会。研究发现,数字平台的投资机会由数字期权(资产)与数字债务(负债)的当前平衡决定,而这两者是在平台生态系统参与者管理其智力活动成果(RID)的过程中形成的。在这里,智力活动成果不仅指以创意内容形式存在的数字知识产权资产,还包括数字平台软件与信息架构的组成部分。

关键词: 债务、投资、智慧经济、期权、数字平台、数字知识产权、图片库、生态系统。

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Introduction

The digital transformation of investment processes observed today includes, among other things, opportunities to invest in intellectual assets, which are, by definition, the most promising resources of the noonomy. Specifically, such opportunities are provided to users by modern digital stock photography platforms (photostocks), which develop flexible business models for the commercial turnover of ready-made digital images, videos, audio files, and 3D models [Voronov, Viktorov, 2025, p. 89]. Photostocks are an example of successful representatives of the creative sector of the digital economy, whose accelerated development is characteristic of the current state of transition to the noonomy – the noo-transition [Bodrunov, 2025, p. 26]. Nevertheless, the theoretical foundations for investing in digital intellectual assets remain nascent, and the business practices of these digital platforms rely primarily on trial-and-error approach.

According to the authors, among numerous studies dedicated to the analysis of modern digital platforms, the most interesting approaches are those utilizing elements of the real options concept. In one such approach, in accordance with the double entry system, it is proposed to balance digital (real) options created within a platform ecosystem (as assets) by digital debt (as liabilities). In doing so, the authors define the essence of digital debt starting from the concept of technical debt, which emerged in the fields of software engineering and information systems [Rolland et al., 2018]. However, it should be noted that in the aforementioned approach, issues of digital platform management are considered without regard to the economic turnover of intellectual assets in any form.

In this study, given the substantial uncertainty surrounding the return on digital intellectual assets, it is proposed to analyze them within the framework of the concept of real (digital) options, whose economic turnover is contingent upon the development of liabilities typical for the investment environment of modern digital platforms.

Research Results and Discussion

As it is well known in financial theory, an option represents the right to exercise or decline an investment opportunity in the future. The holder of a financial option gains a preferential right to choose when making investments [Black, Scholes, 1973]. Furthermore, the concept of options has also been adapted for the processes of implementing strategic opportunities of an organization or a creator to participate (or not to participate) in future actions through sequential investments in any resources [Bowman, Hurry, 1993].

Option thinking, in a broader sense, helps managers develop strategies by generating investment variants that arise from (1) current opportunities, (2) future opportunities within the investment environment, and (3) associated uncertainties. For example, applying this concept to the management of information system capabilities, Sambamurthy and colleagues suggested that an organization's investment in information technology, combined with changes in its technological environment, can be viewed as digital options for competitive actions [Sambamurthy et al., 2003].

Thus, digital option thinking helps managers consider IT investment without firm commitments to its yields, develop and combine variants in order to evaluate alternative investments, and ultimately make selective investments in specific information technology capabilities [Sandberg, Mathiassen, Napier, 2014]. In the context of digital platforms, *digital options* represent opportunities to invest in new technical and information functions that increase the platform's value proposition for both business partners and end users.

A modern digital platform offers users access to a continuous stream of products, services, and applications produced by creators within the platform's ecosystem. Each such offering helps managers understand whether accepting the proposal will generate benefits for the business of organization. Consequently, digital platforms can be interpreted as *generators of digital platform options* within an organizational context. Identifying probable digital options basically implies nothing other than recognizing new investment, information, technical, and other platform functions. Developing new options includes, among other things, evaluating and combining new functions into desirable and feasible competitive actions, while exercising selected options involves integrating new functions into the organization's infrastructure and business processes.

Digital Intellectual Asset as a Real Option

Photostock companies provide users with platform technologies and facilitate various services – to authors/investors on one hand, and to licensees on the other. License sales are influenced by numerous factors, including the artistic merit of the image, thematic focus, prevailing seasonal and fashion trends, color schemes, execution quality, physical dimensions, and even the author's reputation. These and other factors introduce extremely high uncertainty into the process of generating investment yields from these assets. This uncertainty is reflected not only in the number of licenses sold but also in the potential for certain assets to fail to secure any market demand, thereby yielding no investment return. Furthermore, this situation can persist for quite a long time – sometimes for many years.

As a result, almost any average portfolio contains images for which use licenses have never been sold. Even successful images can be categorized into groups based on sales volume: those with only a few licenses sold (up to ten), those with dozens (up to a hundred), or finally, those with hundreds or thousands of sales. The latter are the so-called “record-breaker” assets that have captured the attention of the global graphic design market [Voronov, Viktorov, 2024]. The evident probabilistic nature of this process allows this *class of digital intellectual assets* to be considered as *real options*. These options provide (1) authors/investors, (2) platform managers, and (3) end-licensees with the opportunity to undertake specific actions to improve or modify the terms for exercising such options in the future.

For example, a stock photography platform provides buyers with the right to choose the specific license type they need: standard, extended, editorial, etc. In turn, by purchasing a license, the

buyer acquires the right, but not the obligation, to utilize all the limits in the license. Specifically, the limits regarding the maximum print run of a publication in which the image will be used are typically set at 250,000 units for a standard license. On the other hand, if a buyer requires a larger print run, they purchase two or more licenses for the use of the same image. Thus, option logic allows buyers to manage their production needs.

On the photostock side, option thinking is also embedded in offering buyers a wide range of so-called “subscriptions.” These allow buyers, by paying in advance (a direct analog of an option premium), to obtain the right – but not the obligation – to purchase on favorable terms a fixed large volume of licenses for any images in the following period, such as 500 or 1,000 units daily. Such options are extremely beneficial for professional actors in the graphic design, advertising, and marketing markets, i.e. all those who purchase ready-made digital images in large quantities on a daily basis as part of their professional activities.

When these buyers, intentionally or otherwise, single out a particular image (video or audio file), an avalanche in growth of license sales begins. Specifically, there are cases known of record-breaking sales involving tens of thousands of licenses for individual photographs or video clips. As a result, the investment return on such assets increases exponentially, providing the opportunity to partially or fully compensate for the lack of returns from other assets in the portfolio of both the author/investor and the photostock platform as a whole.

Finally, from the author/investor perspective, the preparation and uploading of each asset to a photostock platform – considering the preliminary costs – basically represents the acquisition of a real (digital) option to receive investment income from the platform’s sale of licenses. Given the probabilistic nature of this process discussed above, it is easy to understand the reasons behind the accumulation of extra-large asset portfolios by photostock platforms, particularly by industry leaders (Table 1).

Table 1
Leading stock photography platforms as of Q2 2026

No.	Company	Image and Video Collection, million units	Stock Ticker
1	Shutterstock	< 600	NYSE: SSTK
2	Adobe.Stock	< 900	NASDAQ: ADBE

Source: Compiled by the authors based on company data

Thus, in the context of photostocks, digital platform options can represent investments in platform expansion through:

- populating the platform with visual, video, audio, and other digital content;
- integrating applications related, for example, to the generation of digital images, video and audio content, 3D models using the integrated AI version;
- offering other technological or information resources by members of the platform ecosystem.

Investments in platform functions can be directed toward all levels of the modular architecture. As Yoo et al. define it, “the layered modular architecture is a hybrid between a modular architecture and a layered architecture, where the degree by which the layered architecture adds the generativity to the modular architecture forms a continuum” [Yoo et al., 2010].

In fact, it is the generativity inherent in the platform's layered modular architecture that potentially provides a plenty of digital options. Furthermore, an important characteristic feature of digital technology is its self-referential nature, which implies that the introduction of innovations opens up additional opportunities for subsequent innovations [Kallinikos et al., 2013]. Thus, the development and exercise of each digital platform option can facilitate the emergence of *additional new digital options*.

On the other hand, numerous options increase the managerial complexity of the platform. This is particularly relevant when a company's infrastructure includes multiple platforms. For instance, in the case of photostocks, investment opportunities are represented by separate platforms for digital images, video, and audio. Nonetheless, the management of digital platforms and infrastructure cannot be separated from the broader platform ecosystems. Consequently, an author/investor using, for example, Shutterstock's services will be dependent on how its platform ecosystems evolve.

Digital Liabilities (Debt)

The concept of technical debt has long been utilized in software engineering practice. It was first introduced as a symbolic (even "metaphorical") notation to describe writing "fast but not necessarily high-quality" code as a commitment (debt) to be fulfilled later [Tom, Aurum, Vidgen, 2013]. Interest in technical debt has intensified recently, as the failure to manage it properly can negatively impact the long-term development and quality of any software system. Although technical debt was originally associated with code and software architecture, its modern concept has expanded to include lack of testing, poor documentation, and other software development artifacts [Li, Avgeriou, Liang, 2015]. However, it should be noted that *technical debt is not inherently negative*; accepting a manageable amount of debt can accelerate development and allow a company to bring new services and products to market faster.

Many researchers have expanded the definition of technical debt to include both evolvability issues related to technological gaps in software architecture and features, and maintainability issues related to code quality. Thus, technical debt is not merely the result of initial flaws, but rather the outcome of an evolving context over time – a result of choices that appear suboptimal in retrospect. In this sense, technical debt is driven by external events:

- technological obsolescence and the emergence of superior technologies;
- environmental changes;
- rapid commercial success.

Particularly in the context of digital platforms, understanding the evolutionary nature of debt is crucial. Successful platform ecosystems constantly introduce innovative solutions and opportunities (options) for resource investment, provided they are not hindered by existing (accumulated) debt.

Based on these ideas, a broader concept of *digital liabilities (debt)* has been proposed. This encompasses the accumulation of financial, legal, technical, and informational obligations that impact the development of the platform as a component of the user's digital infrastructure. Collectively, these liabilities increase risks for the relationship between the platform and other ecosystem players, as well as between the infrastructure elements and processes that the platform facilitates. Thus, digital debt essentially embodies the obligations that arise from the platform's continuous implementation of new capabilities and innovations into its digital infrastructure and processes.

Photostock platforms not only maintain and develop the software associated with their digital platforms but also, as noted above, accumulate massive volumes of creative content. Therefore, a multitude of obligations is linked to the management, structuring, and storage of this content.

Specifically, financial liabilities arise because the license fee for an individual asset (e.g., a digital image) is a very small amount. It is extremely inefficient to pay royalties to the author/investor immediately after a license sale; consequently, all photostocks accumulate royalties until a certain threshold is reached – usually \$100 – before transferring the funds to the recipient. As a result, the total current liabilities for unpaid royalties can amount to hundreds of millions of dollars.

The legal obligations of photostock platforms are related, first, to the necessity of complying with the copyrights of the digital asset owners who upload to the platform. Second, photostocks assume the obligation to monitor buyers' compliance with the licensing terms for these assets. In this regard, the high market reputation of leading photostock companies plays a significant role.

Finally, debt associated with information functions can result from decisions on structuring of content within databases and on how users interact with that content. From the perspective of layered platform architecture, purely technical debt pertains to the service, network, and device layers, whereas *informational debt* (in practice – a distinct concept) relates to the content layer.

In accordance with the concept of digital options, one can identify a lifecycle of practices through which digital debt manifests and evolves during digital platform management – progressing from creation to the evaluation and resolution of said debt (see Table 2). The creation of digital debt involves the formation of all types of obligations that must be fulfilled during the future operation, maintenance, and development of the platform. Evaluation includes examining and prioritizing these obligations. Finally, resolution (settlement) involves fulfilling the platform's commitments to partially or fully repay the digital debt.

The concept of digital debt is also linked to the concept of the installed base – the aggregate of deployed systems and associated business processes within a digital infrastructure. While the installed base refers to the entire set of disparate systems and associated processes, the notion of digital debt provides a refined conceptualization of those specific elements that require significant maintenance and reduce the capacity for evolution in particular contexts. Moreover, in accordance with the concept of digital options, the development and utilization of a platform can also introduce digital debt into the digital infrastructure as a result of intimate interdependencies. Table 2 summarizes the core concepts explaining the idea of the digital transformation of the balance between options and debt.

The influence of digital options and digital debt on platform management is not an expression of dualism where options are inherently “good” and debt is “bad.” Some options may be so complex and uncertain that their exercise becomes unlikely, while digital debt can be introduced strategically to improve platform management. Thus, digital options and digital debt are interdependent; while they may limit one another during the platform management process, they are not necessarily in opposition.

It is important to emphasize that the interaction between options and debt can occur during various phases of (1) the identification, development, and exercise of digital options, as well as (2) the implementation, evaluation, and resolution of digital debt. When a company develops and exercises new options—for instance, to update a platform—the generation of digital debt may be incurred to strategically accelerate the process. Conversely, digital debt can hinder the develop-

Table 2
Options and Liabilities Associated with Digital Platforms

No.	Concept	Definition	Examples	Processes
1	Digital Option (Asset)	The opportunity to invest in new assets, technical, and information functions that enhance the platform's value proposition	New digital (intellectual) assets. Improvements through platform updates. Development of new platform functions.	Identification and Development of new options. Exercise: Integrating new content, technical and information functions into platform's infrastructure and processes.
2	Digital Debt (Liability)	The accumulation of various obligations related to management, maintenance, and development of the platform. All that increases operational risks.	Financial liabilities (royalty payments to authors/investors). Legal obligations (copyright compliance). Lack of updates of platform configurations.	Planning future obligations. Evaluation: Examining and prioritizing debt by type. Resolution: Fulfilling commitments to settle digital debt partially or fully.
3	Platform management based on a balance of options and debt	The interaction between digital options and digital debt during platform utilization, accounting for reactions to both internal and external events.	Digital options can increase or decrease the ability to resolve debt. Debt can facilitate or hinder the exercise of digital options.	Platforms may incur digital debt to exercise attractive options. Platforms may use digital options to reduce existing digital debt.

Source: compiled by authors

ment and exercise of digital platform options. For example, it may make the transition to a new software version more costly. On the other hand, digital debt can facilitate the identification, development, and exercise of new digital options.

Conclusion

The conducted research has allowed for the development of approaches to comprehensive understanding of the digital transformation of investment opportunities within the sphere of the noonomy. Noonomy is viewed as a fundamentally new social order that transcends the boundaries of the traditional knowledge economy and is based on the priority of reason, the free dissemination of knowledge, and collective creative activity.

In the theory of the noonomy, the noo-transition is interpreted as a management paradigm where priority is given to human decision-making, ethical norms, and the public benefit. In the context of this noo-transition, digital assets and platforms take on special significance; they become tools for collective creation rather than just profit-making. This requires a rethinking of evaluation criteria, shifting the focus from short-term financial returns toward contributions to the development of collective intelligence and sustainable public benefit. Digital platforms are integrating in ecosystems where knowledge and assets circulate freely, and risks are distributed in light of ethical and social imperatives.

The interconnection between the noonomy and digital investment processes is manifested in the necessity of accounting for a global ethical context (e.g., the principle of "a person does

not harm a person or the environment”) and adapting asset management models to the logic of cognitive cooperation rather than competition. It is essential to integrate technology – including artificial intelligence – into systems oriented toward the fair distribution of benefits and the minimization of destructive consequences.

This study has shown that the successful development of investment opportunities in the era of noo-transition requires a systemic approach to managing digital assets and liabilities. It demands taking into account the specifics of the noonomy (the free distribution of knowledge, the priority of creative activity, and ethical imperatives) and the integration of technological, social, and cultural aspects into a unified management paradigm.

The theoretical significance of this work lies in advancing the methodology for evaluating the investment opportunities of digital platforms through the lens of the option-based approach, as well as in the conceptualization of “digital debt” as a complex of financial, legal, technical, and informational liabilities. The findings may be utilized both in the academic community – to deepen the theories of noonomy and the digital economy – and in practical applications – to optimize investment processes on digital platforms while accounting for global challenges and ethical norms.

Promising directions for further research include the development of risk assessment methods for investing in digital intellectual assets based on noonomy principles, the study of how technological innovations influence digital debt dynamics in the context of cognitive cooperation, and the adaptation of the proposed concept to other sectors of the digital economy within the ethical framework of the noo-transition.

* * *

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*Book Review of “Nuovo Ordine Sociale. Conoscere e Agire la Noonomia”¹***REGARDING REGULARITIES OF NOONOMY
IN VIEW OF THE LEGACY OF PROFESSOR V. ORATI**

“The New Social Order” is an ambitious and insightful book offering a clear, well-reasoned rethinking of contemporary geopolitical and economic transformations. Sergey Bodrunov and Sergey Glazyev seamlessly combine analytical rigor with strategic vision: their work goes beyond describing the symptoms of the global crisis, seeking to identify its structural causes and outline specific paths to building a more just and sustainable international order.

The book’s key strengths include:

- **Systems analysis.** The authors offer a holistic view of the interrelations between international politics, the real economy, and national sovereignty; they convincingly demonstrate how macroeconomic decisions influence geopolitical equilibrium (it’s no coincidence that the term “political economy” is used in academia).

- **Practical focus of the proposals.** In addition to an in-depth analysis of existing problems, the authors propose detailed solutions — institutional reforms, monetary strategies, and industrial policies — designed to strengthen the resilience and economic independence of states.

- **Clarity and credibility of presentation.** Despite the complexity of the topics covered, the book is written in plain language without sacrificing scholarly rigor. The presentation is supported by numerous facts and references of interest to both the academic community and policymakers.

- **Alternative vision.** The book serves as a necessary counterweight to prevailing concepts, offering original, less orthodox, but potentially more effective approaches to addressing inequality, technological dependence, and financial instability — the obvious ills that plague modern capitalism.

Reflections on Noonomy and the Significance of the 20th Century Heritage

The book takes on particular relevance when considered in light of the concept of noonomy — a knowledge-based economy, networked interactions, and high-tech production. Bodrunov and Glazyev emphasize the need for policies that recognize and regulate the key role of intangible assets, digital infrastructure, and critical technological value chains. It is here that the concept of noonomy becomes a crucial theoretical foundation for understanding how economic power, technological sovereignty, and competitiveness are intertwined today.

Personally, I (as the son of Professor Vittorangelo Orati²) am convinced that my father would have enthusiastically supported many of the ideas presented in the book — much more so than the theories awarded with Nobel Prizes in economics, which were essentially created ad hoc to

¹ Bodrunov S., Glazyev S. *Nuovo ordine sociale. Conoscere e agire la noonomia* [New Social Order. Understanding and Implementing Noonomy] / Bodrunov S., Glazyev S. – Italy: Sandro Teti Editore, 2026. – 400 p. (editor’s note: in Russia, the book was published under the title “Regularities of the Noonomy Foundations Formation as Future Social Order: To Know and Operate. – St. Petersburg: S. Yu. Witte INID; Moscow: Centercatalog Publ., 2023. – 340 p.)

² Editor’s note: Professor Vittorangelo Orati is a renowned Italian scholar. He is the author of the well-known work titled “The Stagflation Anomaly and the Crisis of Economic Paradigms” (1984). V. Orati has lectured at the universities of Nice, Lisbon, Copenhagen, Johannesburg, Bologna, Boston, and San Francisco. Together with Nobel laureates in economics Lawrence Klein and Robert Solow, Orati contributed to the first issue of the International Institute for Advanced Economic and Social Studies (IIAESS) journal, dedicated to Paul Samuelson. Orati was one of the first to deeply analyze and explain the contradictory nature of stagflation.

maintain the status quo (or, more accurately, the comatose state) of the economic and geopolitical structure in a monocentric world.

Professor Orati's scholarly legacy based on a radical reexamination of the fundamental tenets of modern economic theory — primarily a critique of simplified models that reduce economic analysis to a “composite good world” — also provides important theoretical tools for understanding noonomy. His multi-commodity model of value and price formation helps explain how technological innovation and knowledge alter processes of capital accumulation, resource redistribution, and systemic risk.

Reflecting on the past century, the book and the framework it presents also encourage a critical rethinking of economic history. Hasty dismissal of the former USSR and its socialist models as “losers” leads to the neglect of their significant contribution to global progress. The authors are talking about advances in fundamental science, the large-scale electrification of a vast country, the creation of major industrial complexes, and space programs — all of which, in the context of noonomy, are once again gaining particular relevance, as they demonstrate the ability of a state or an entire economic system to purposefully develop innovation and technological education.

If you're looking for a book that encourages critical reflection on contemporary processes while offering practical tools for reassessing economic, industrial, and technological sovereignty policies, then “The New Social Order” will be a truly valuable read.

Combined with the ideas of noonomy and the theoretical legacy of Vittorangelo Orati (as interpreted in this review), this book prompts a rethinking not only of national and international development strategies but also of the very hierarchy of historical narratives that have accompanied mankind's technological and economic development.

This book is recommended for politicians and government officials, economists, foreign affairs analysts, and anyone seeking a conscientious and truly scholarly approach to explore an alternative, well-reasoned perspective on the key challenges of our time.

Dr. Pierluigi Orati
Economist, Risk and ESG Manager

*Recensione di Nuovo ordine sociale. Conoscere e agire la noonomia*¹

SULLE REGOLARITÀ DI NOONOMIA IN RELAZIONE ALL'EREDITÀ DEL PROFESSORE V. ORATI

Nuovo ordine sociale. Conoscere e agire la noonomia è un libro ambizioso e stimolante che propone una rilettura lucida e documentata delle trasformazioni geopolitiche ed economiche contemporanee. Bodrunov e Glazev uniscono rigore analitico e visione strategica: il testo non si limita a descrivere i sintomi della crisi globale, ma cerca di individuarne le radici strutturali e di tracciare percorsi concreti per un ordine internazionale più equilibrato e sostenibile.

I punti di forza del volume sono molteplici:

- **Analisi sistemica:** il libro offre una mappa coerente delle relazioni fra politica internazionale, economia reale e sovranità nazionale, mostrando come le scelte macroeconomiche influenzino gli equilibri geopolitici (non a caso nel mondo accademico si parla di “Economia Politica”).

- **Concretezza delle proposte:** oltre alla diagnosi, gli autori avanzano soluzioni operative — riforme istituzionali, strategie monetarie e politiche industriali — pensate per rafforzare resilienza e autonomia economica.

- **Linguaggio chiaro e autorevole:** pur trattando temi complessi, la prosa resta accessibile anche ad un pubblico non addetto ai lavori pur non perdendo rigore, prosa supportata da evidenze e riferimenti utili al lettore attento sia del mondo accademico sia della politica.

- **Visione alternativa:** il libro si pone come controcanto necessario e immancabile alle narrazioni dominanti, invitando a considerare percorsi originali, meno ortodossi ma potenzialmente più efficaci per affrontare disuguaglianze, dipendenze tecnologiche e instabilità finanziaria, ovvero i mali innegabili del capitalismo corrente.

Considerazioni sulla *noonomia* e sul ruolo delle eredità del XX secolo

Il volume risuona particolarmente interessante se letto, anche, alla luce della *noonomia* — l'economia della conoscenza, delle reti e delle produzioni altamente tecnologiche. Bodrunov e Glazev mettono in rilievo la necessità di politiche che riconoscano e regolino la centralità degli asset intangibili, delle infrastrutture digitali e delle filiere tecnologiche critiche; proprio qui la *noonomia* fornisce una cornice utile per comprendere come potere economico, sovranità tecnologica e competitività si intreccino oggi.

A titolo personale (quale figlio del professor Vittorangelo Orati), ritengo che mio padre avrebbe in gran parte sposato con entusiasmo queste tesi, certamente molto più di quelle servite ad assegnare premi Nobel per l'economia a teorie partorite ad hoc per mantenere invariato lo status quo (ovvero comatoso) dei destini economici e geopolitici del mondo unipolare. Anche l'opera del professor Orati, che parte da una radicale reversione dei fondamenti della teoria economica corrente — cioè dalla critica alle semplificazioni che confinano l'analisi in un «mondo a bene unico» — offre gli strumenti teorici per comprendere la *noonomia*: una rappresentazione multi-bene della formazione dei valori e dei prezzi, capace di spiegare come innovazioni tecnologiche e conoscenza ridefiniscano accumulazione, redistribuzione e rischio sistemico.

¹ Bodrunov S., Glazev S. *Nuovo ordine sociale. Conoscere e agire la noonomia* / Bodrunov S., Glazev S. – Italy: Sandro Teti Editore, 2026. – 400 p.

Riflettendo sul secolo scorso, il libro e questa prospettiva invitano inoltre a una rivalutazione critica della storia economica: etichettare frettolosamente l'ex URSS e i modelli ex socialisti come «perdenti» elide contributi tecnici e infrastrutturali che hanno alimentato il progresso globale — dalla scienza di base, l'elettrificazione di un continente ad esempio, alle grandi infrastrutture industriali e spaziali — e che oggi, nel contesto della noonomia, tornano rilevanti per la capacità di uno Stato o di un sistema di orientare innovazione e formazione tecnologica.

Se cercate un testo che stimoli la riflessione critica e fornisca strumenti concreti per ripensare politiche economiche, industriali e di sovranità tecnologica, *Nuovo ordine sociale* è una lettura preziosa. Integrandolo con le riflessioni sulla noonomia e con la prospettiva teorica di Vittorangelo Orati (come qui interpretata), il libro diventa occasione per ripensare non solo le strategie nazionali e internazionali, ma anche la gerarchia delle narrative storiche che hanno accompagnato il nostro sviluppo tecnologico ed economico. Consigliato a policy-maker, economisti, studiosi di relazioni internazionali e a chiunque voglia, in buona fede e con spirito realmente scientifico, approcciarsi ad una visione alternativa e informata delle sfide contemporanee.

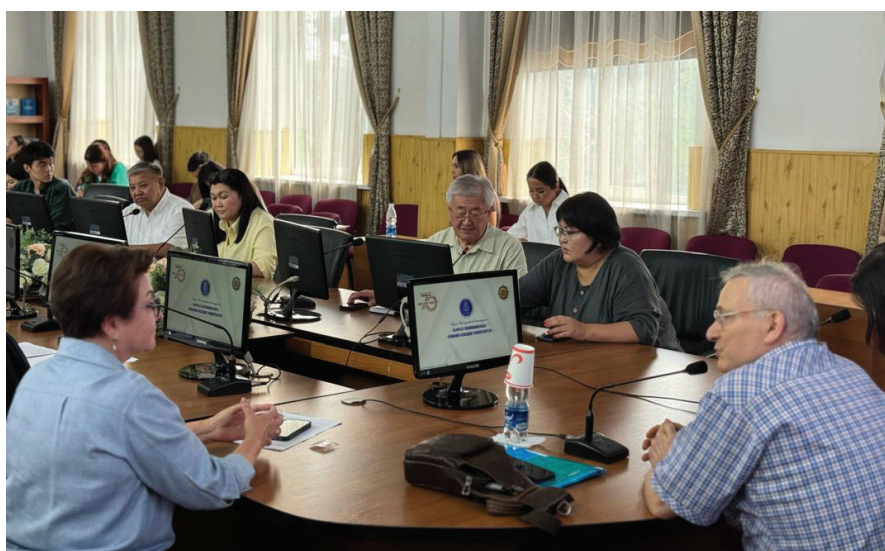
Dott. Pierluigi Orati,
economista, Risk & ESG Manager

A SCIENTIFIC SEMINAR OF THE S.Y. WITTE INID AT THE KYRGYZ ECONOMIC UNIVERSITY

On June 30, 2026, at the Kyrgyz Economic University named after Musa Ryskulbekov (KEU), a traveling scientific seminar organized by the S. Y. Witte Institute of Noonomy and New Industrial Development (INID), under issues of the theory of noonomy on the topic "Monopolarity as a New Paradigm of International Relations" was held.



A keynote address was made by the President of VEO of Russia, Director of the S.Y. Witte Institute of Noonomy and New Industrial Development, President of the World Association of Noonomy (WAN), Corresponding Member of the Russian Academy of Sciences **S.D. Bodrunov**.



The Rector of KEU, Professor G.T. Supaeva, Vice Rector for International Relations of KEU, Professor T.Yu. Dzholdosheva, and the representatives of the KEU academic teaching staff took part in the work of the scientific seminar. The graduate students of KEU took part in the discussion.

Within the framework of the seminar, the presentation of new editions made by the S.Y. Witte INID took place. The following was presented: the course of lectures under the general theory of noonomy "The Global Transformation: Technologies, Economy, Human", published in the jubilee series "Foundation for the Future: Moscow State University Classic Textbook", in Honor of the 270th Anniversary of M.V. Lomonosov Moscow State University; textbook "Transformation of Society: Strategy and Noonomy" (authors: Vladimir Kvint, Sergey Bodrunov); book "From an Economic System to a Non-Economic Society. The Theory of Noonomy and the Practice of Nootransition: Global Experience and Chinese Modernization" (author: Sergey Bodrunov); the Collection of Scientific Works by Sergey Bodrunov "Political Economy Notebooks". The publications were donated to the KEU library.



Following the seminar, it was decided to create, under the methodological guidance of the S.Y. Witte INID at the KEU, the Noonomy Center of the World Association of Noonomy, which will become the basic center for the Central Asian region. The tasks of the Center include: the preparation of the course of lectures under the theory of noonomy, and the learning modules under the theory of noonomy for students and master's students of KEU.

The World Association of Noonomy plans to hold an annual scientific Central Asia congress under the theory of noonomy based on the KEU Noonomy Center.



ANNUAL CONGRESS OF THE WORLD ASSOCIATION OF NOONOMY (WAN)

On September 16-19, 2026 in Rome (Italy), an Annual Congress of the World Association of Noonomy will be held.

The World Association of Noonomy (WAN) was founded in 2026 and is a non-profit organization that unites scholars and representatives of scientific and educational organizations from **52 countries**.

The program of the Congress includes the following: an international scientific conference on the topic «Theory of Noonomy: A New Paradigm of Civilizational Development»; Annual Assembly of the World Association of Noonomy.

Among key areas of the discussion in the Congress, there are the following: noonomy as a new paradigm of civilizational development; fundamental theoretical bases of noonomy; drivers for forming a noo-value core and mechanisms of noo-transition; trends of global transformations and structural shifts in the world economy; and the role of noonomy in resolving socio-economic issues of developing countries.

Leading scholars, experts, representatives of social institutions and educational communities, and public officials from 35 countries, including Italy, China, Russia, Mexico, Chile, Great Britain, the USA, Brazil, India, Greece, Laos, Uganda, Austria, Cuba, Georgia, Colombia, and Bolivia, take part in the Congress.

Special guests of the Congress include: **Sergey Bodrunov**, President of the World Association of Noonomy (WAN), Director of the S. Yu. Witte Institute of Noonomy and New Industrial Development (INID), President of the Free Economic Society of Russia (VEO of Russia); **Cheng Enfu**, Chairman of the World Association for Political Economy (WAPE); **Francisco Rojas Aravena**, Rector of the UN University for Peace; **Roberto Savio**, Director of the Rome branch of the UN University for Peace; Vladimir **Kuznetsov**, Head of the UN group of agencies in Russia; **Sergio Bellucci**, Academic Director of the Rome branch of the UN University for Peace; **Alan Freeman**, Co-Director of the Geopolitical Economy Research Group, University of Manitoba; **Radhika Desai**, Director of the Geopolitical Economy Research Group, Professor of the University of Manitoba; **Vladimir Kvint**, Head of Economical and Financing Strategy Department of the Moscow School of Economics of M. V. Lomonosov Moscow State University; **James K. Galbraith**, Professor at the University of Texas at Austin; **Aleksander Nekipelov**, Director of the Moscow School of Economics, M. V. Lomonosov Moscow State University; **Alexey Gromyko**, Director of the Institute of Europe of the Russian Academy of Sciences; **Alexander Shirov**, Director of the Institute of Economic Forecasting of the Russian Academy of Sciences, etc.

The Congress is aimed to consolidate the intellectual potential of scholars from different countries to deepen knowledge in the field of the theory of noonomy and look for solutions to actual socio-economic issues based on the noonomy.

TONGZHOU GLOBAL DEVELOPMENT FORUM

From October 10 to October 11, 2026, in Beijing, the Tongzhou Global Development Forum will be held.

The Forum is organized by the Renmin University of China with the participation of the Government of the Tongzhou District in Beijing.

Last year, in 2025, the Forum united over 400 participants from over 30 countries appealing for joint work for global development and a common future.



Russian delegation headed by the President of the World Association of Noonomy (WAN), Director of the S. Yu. Witte Institute of Noonomy and New Industrial Development (INID), President of the Free Economic Society of Russia (VEO of Russia), Corresponding Member of the Russian Academy of Sciences, Professor S.D. Bodrunov will take part in the Forum of 2006.

BOOKS OF PROFESSOR S.D. BODRUNOV AT THE LARGEST BOOK FAIR IN ITALY



Sandro Teti, Founder of the Sandro Teti Editore Publishing House (Rome)

At the Turin International Book Fair (Salone Internazionale del Libro Torino), which was held from May 14 to May 19, 2026, books of the Director of S.Y. Witte INID, Professor S.D. Bodrunov, were presented. This is the largest literary event in Italy. More than 240 thousand people visited it in five days.

According to the owner of the Sandro Teti Editore publishing house (Rome), S. Teti, despite the current specific political atmosphere in Italy and pressure from European structures after the Venice Biennale, the exhibition caused a huge interest in the European scientific community.

At the fair, the monographs published in Italian were presented: S.D. Bodrunov "Noonomy", S.D. Bodrunov and V.L. Kvint "Strategizing Societal Transformation: Knowledge, Technologies, Noonomy", S.D. Bodrunov, R. Desai, A. Freeman "Beyond the Global Crisis: Noonomy, Creativity, Geopolitical Economy", S.D. Bodrunov and S.Yu. Glazyev "Regularities of the Noonomy Foundations Formation as Future Social Order: To Know and Operate", and others.

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