Russia on the Path Towards a New Technology Industrial Policy: Exciting Prospects and Fatal Traps

Yuri Simachev, Mikhail Kuzyk, Boris Kuznetsov, Evgeniy Pogrebnyak

Yuri Simachev — Chief Research Associate, Interdepartmental Analytical Center. Address: POB 35, Moscow 121069, Russian Federation. E-mail: simachev@iacenter.ru

Mikhail Kuzyk — Head of Division, Interdepartmental Analytical Center. Address: POB 35, Moscow 121069, Russian Federation. E-mail: kuzyk@iacenter.ru

Boris Kuznetsov — Leading Research Fellow, HSE Institute for Industrial and Market Studies, Laboratory for the Analysis of Companies' Competitive Ability. Address: 20, Myasnitskaya str., Moscow 117574, Russian Federation. E-mail: bkuznetsov@hse.ru

Evgeniy Pogrebnyak — Managing Director, Department for Strategic Analysis, Vnesheconombank. E-mail: 9, Akademika Sakharova prospekt, Moscow 107996, Russian Federation. E-mail: e.pogrebnyak@gmail.com

Keywords

industrial policy; science, technology and innovation policy; priority industries; priority technologies; interest groups; policy evaluation; state institutions

Citation: Simachev Y., Kuzyk M., Kuznetsov B., Pogrebnyak E. (2014) Russia on the Path Towards a New Technology-Industrial Policy: Exciting Prospects and Fatal Traps. *Foresight-Russia*, vol. 8, no 4, pp. 6–23.

Traditionally industrial policy is under scrutiny worldwide. In recent years, issues of its elaboration have gained increased importance in Russia as well. Among the forefront tasks are the harmonization of domestic industrial policy with science, technology and innovation policy, taking into account the specificity of different sectors and technological areas, diversification of the national economy, the formation of new sectors, the development of human capital.

The article aims to discuss the practical problems and inconsistencies of industrial policy in Russia since 2000, to analyze positive and negative experiences, and to draw up some lessons which are essential for a new technology industrial policy.

The conceptual and practical aspects of formulating an industrial policy have attracted the attention of experts and politicians around the world for a long time. In the 2000s, discussions about the opportunities and characteristics of industrial policy and the causes of its success or failure became commonplace both in developed countries and developing economies, especially after the global financial crisis.

Since 2010, questions of establishing and implementing a state industrial policy in Russia took on particular importance. On the one hand, there was a clear need to reflect the specific characteristics of various sectors and technological directions in innovation policy. On the other hand, increasing concerns arose over the diversification of the Russian economy, the development of human capital, the creation of high-productivity workplaces, and the formation of new sectors in the economy. The attention devoted to drawing up a broadly defined Russian industrial policy — taking into account the science and technology challenges — increased significantly in 2014 as a consequence of the worsening external political environment and the restricted opportunities to import certain technologies.

The significant role of politics in decision making in Russia is an obstacle to the development of a balanced and pragmatic industrial policy. Based on an analysis of industrial policy practices, we believe it is possible to discuss certain problems and contradictions in this field and study the positive and negative aspects of the measures implemented. Our aim is not only to outline some policy recommendations but also to suggest possible ways to harmonize domestic industrial policy with science, technology and innovation policy.

Industrial policy: the evolution of models and changing government attitudes

Industrial policy has always been subject to high scrutiny from decision makers, business elites and experts. Various motives could explain this attention: from the urgent need to eliminate certain market failures or initiate specific structural changes to the relatively neutral coordination of various state initiatives.

Questionable steps taken by the state in implementing its industrial policy, combined with objective difficulties in assessing its real impact on social and economic development further complicate any attempts to conceptualize industrial policy. We describe below what we consider some of the most appropriate definitions of industrial policy:

1. The combination of state measures to promote structural shifts or prevent such shifts [*Price*, 1981].
2. Assisting the flow of resources into certain sectors that the state considers important for future economic growth [*Krugman, Obstfeld*, 1991].
3. Supporting certain sectors (associated firms) in achieving results that the state considers effective for the economy as a whole [*Chang*, 1994].

The following definitions are used by international development organizations (OECD, UNIDO):

'*Industrial policy is a state policy aimed at improving the business environment or structure of the economy for sectors and technologies that is expected to give rise to more favourable prospects for economic growth and social welfare compared to the absence of such measures*' [*Pack, Saggi*, 2006; *Warwick*, 2013].

Despite conceptual ambiguity and perceptible changes in approaches to implementing industrial policy, we believe that the following *essential characteristics* need to be identified:

- intensity and predictions;
- the existence of priorities and (or) non-priorities;
- a contrasting redesign of revenues by redistributing resources, rights, and control between sectors (industries);
- a focus on the long-term returns of the entire economy.

As a general rule, industrial policy draws together an extremely varied, but relatively standard, tool box of different areas of state regulation (fiscal, customs, monetary, etc.). However it does not have its own specific instruments which gives rise to difficulties in differentiating industrial policy from notions such as 'structural policy', 'sectoral policy' and 'competitiveness policy'.

There are a multitude of approaches to classifying industrial policy, according to any of the following:

- the nature of its priorities: sectoral, industrial, market or technological;
- its direction (whether targeting an increase of exports or import substitution);
- its focus (affecting traditional or new business, major companies or SMEs);
- the sources of the redistributed resources (budget, development institutes, company funds);
- the actors (domestic or foreign investors);
- the way in which it is formulated or implemented (state or national — state, business, social partnership — etc.)

There is also no consensus on *industrial policy models*. However, as a rule, discussion tends to centre on a comparison of two models: *vertical* and *horizontal*. The vertical model involves the state selecting and supporting certain firms and/or industries (*picking winners*) and implies the selectiveness of the measures implemented. A *vertical industrial policy* is aimed at boosting certain sectors and identifying sectoral priorities. The problem linked to identifying future 'champions', making active use of direct support mechanisms, expressing specific preferences and protectionism are all characteristics of this type of policy. It is important to stress that industrial policy does not have to support industry leaders: it could in fact involve supporting those who are lagging behind. Equally, it is not just about promoting progressive structural changes in the economy, and industrial policy sometimes allows resistance against negative trends.

A horizontal policy is generally linked to structural changes in industry (supporting research and development (R&D), deregulation, promoting competition) and the implementation of relatively neutral measures. A *horizontal industrial policy* to a large degree emphasizes the diversity of channels of influence, innovation,

and the formation of new sectors and companies. It is less geared towards direct redistribution of revenue and more towards reducing barriers to growth.

The consensus from such comparisons is that some experts believe that a third model is possible: *industrial policy in an open economy* [*Kuznetsov, Sabel,* 2011]. This model is characterized by the fostering of conditions for quasi-revenue (which requires special efforts by companies), a focus on supporting relations between agents (*matching winners*) and the widespread use of 'search networks'. At the same time, important aspects of this model remain undisclosed, in particular, the question of how to achieve (accumulate) a critical level of changes.

Throughout the history of its practical implementation in various countries, views on industrial policy have always been far from unanimous: periods of enthusiasm have given way to phases of cooling. From the perspective of evolving views on industrial policy and implementation approaches, four stages can be identified [*Aiginger*, 2007; *Naude*, 2010; *Aghion et al.*, 2011] (Table 1).

While in the 1950s and 1960s state policy priorities of many countries continued to involve industrialization, offsetting market failures, protecting emerging new sectors based on public sector potential, in the 1970s-1990s significant problems in the state's implementation of industrial policy started to come to the fore. These included failings in the implementation of certain initiatives, distortions in the competitive environment, and rent-seeking behaviour by agents. As a result, from roughly the 1980s onwards the ideology of liberalizing trade, privatization, and foreign direct investment started to dominate, and structured programmes took on special importance.

Until the start of the 1990s, states' industrial policies all involved direct support measures, including measures to support 'champions'. Amid the intensification of globalization processes during this decade, the development of transnational corporations and the redistribution of production factors, a change of focus occurred. Industrial policy started to be linked to creating the conditions to allow capital to flow into certain sectors by changing their investment appeal.

The 2000s saw the rethinking of the role of the state, a more balanced assessment of market failures, greater attention to stimulating innovation and the development of national innovation systems. In the first half of this decade, a profound disillusionment with the results of the previous industrial policy gave way to demand for an industrial policy from states, including EU countries. This was explained by a number of reasons [*Aiginger*, 2007], in particular the increased risks of de-industrialization due to relocation of plants to countries to take advantage of factors of underdevelopment (low wages, lack of strict environmental regulations, etc.) and unfair competition. Another reason was poor economic growth in Europe and moreover, the ineffectiveness of traditional market instruments (privatization, deregulation, etc.) under the new conditions. Evolutionary growth theory played its own special role, attributing special importance to training, col-

Table 1. **Main stages in the evolution of views on industrial policy around the world**

Stage	State policy priorities	Characteristic features of industrial policy	Attitude towards industrial policy
1950s–1960s	Industrialization, import substitution, protection of emerging industries, public sector administration	Strict vertical policy, offsetting market failures, high level of selectiveness	Rapid growth in popularity in various countries
1970s–1990s	Trade liberalization, privatization, attracting foreign direct investment, *laissez-faire*	Limited use, renunciation of strict tools (protecting markets, supporting national champions) in favour of 'softer' tools (conditions for inflow of capital)	Doubts as to its justification in the face of state failures, distortion of the business environment, rent-seeking behaviour under conditions of globalization
2000–2009	Re-industrialization, stable innovative development, improvements of national innovation systems	Soft horizontal policy, offsetting systemic failures and supporting receptiveness to knowledge, guaranteeing beneficial dynamics, achieving demonstrable effects, self-exposure	Re-thinking the role of the state and the implementation format, market and state failures, the growth of influence of China and India, the backwardness factor, the marked impact of evolutionary theories of growth
2010 — present	Protecting national sectors, guaranteeing employment, searching for new sources of sustainable growth	Technological industrial policy, cluster industrial policy, stimulating links between agents, supporting partnerships, accumulation of critical changes, constructing a sectoral policy that is conducive to competition and to raising the quality of growth	Ideological crisis of the Washington Consensus, new post-crisis realism with a growing and more defined role of the state, a search for new models and experiments in devising a new industrial policy

Source: compiled by the authors using material from [*Aiginger*, 2007; *Naude,* 2010; *Aghion et al.,* 2011].

laboration, and receptivity to knowledge: the impact of this theory was buoyed by the emerging technological dynamism and intensive formation of new technological industries.

Globalization reduced the potential of a vertical industrial policy and its traditional policy instruments such as tariff regulation, subsidies, local market regulations, etc. As a result, there has been regular growth in demand for a new industrial policy geared not so much towards offsetting statistical market failures but more towards guaranteeing successful trends, supporting innovation and improving education, with a clear focus on training and achieving demonstrable effects. Subsequently, in the most acute period of the global financial crisis in 2008–2009, there was an expansion in the scope of the industrial policy tool kit and an increase of protectionist and preferential measures. The changed role of the state in many economically developed nations, the search by governments for new sources of sustainable growth and increased employment were just some of the after-effects of the crisis.

On account of these political and economic reasons, industrial policy came to be one of the areas witnessing a radical change in guidelines and more complex ideas on the role of the state in economic development. We will now enumerate the key changes in approaches to industrial policy in the last decade.

1. *Rapid rapprochement with innovation policy.* Industrial policy is becoming more horizontal, while in contrast innovation policy, by transforming into a component of industrial policy, is becoming more vertical and specialist. The contradictory lessons learnt from the crisis have led to industrial policy being proclaimed the most important structural element of state policy that has a systemic, coordinating role in the post-crisis period of unstable global economic development.
2. *Industrial policy is complemented by industrial organization policy*, including aspects such as the position of companies in a market, optimal firm sizes, and value-added chains. This was brought about by the problems inherent in restructuring natural monopolies, introducing balanced approach rules, and developing technology regulation rules [*Avdasheva, Shastitko*, 2003]. Modern competition and industrial policies can be active and co-exist harmoniously [*Aghion et al.*, 2012].
3. *Ideas about the risks of state (non-) intervention* have significantly shifted *in favour of the application of more active, 'smart' instruments.* Specialists have identified 'innovation path dependence' and state investment to shift to clean technologies as key factors in industrial policy [*Acemoglu et al.*, 2010]. Even a contentious tool such as domestic market tariff protection has been recognized as having positive features. For example, its effectiveness in 'skill-intensive' sectors has been observed where the tariff structure is tied to the required level of work qualifications [*Nunn, Trefler*, 2010].

Many studies have been devoted to extremely productive comparisons of the advantages and risks inherent in an industrial policy [*Kuznetsov*, 2001; *Rodrik*, 2004; *Pack, Saggi*, 2006; *Aiginger*, 2007; *Warwick*, 2013]. However, positive examples and arguments in favour of an active policy in this field are, as a rule, counterbalanced with numerous opposing examples. Often, countries such as Brazil, Finland, Japan and South Korea are cited as having implemented a successful national industrial policy. Unsuccessful examples include initiatives in this field by countries in Sub-Saharan Africa and, with some provisos, Latin America. On the whole, expert assessments of different industrial policy variants tend to show considerable discrepancies as it is relatively difficult to establish with any certainty the economic impact of specific state efforts in this field. As a result, an analysis of specific cases does not allow any meaningful conclusions to be drawn on the 'productivity' or 'ineffectiveness' of industrial policy.

At the same time, certain general patterns are evident. A smart industrial policy provides medium-term gains, but often causes harm to long-term sustainable development. A long-term industrial policy cannot fail to take into account the global context: the structures of global production chains, technology trends, the forms and channels by which skills are distributed, and the specific nature of international competition and inter-country alliances. Overall, *an industrial policy is a complex tool that opens up tempting prospects but comes lumbered with incredibly high risks.* Effective implementation of an industrial policy requires a state to be able to conduct a 'smart' policy, listen to impartial assessments, and, above all, publicly recognize mistakes and learn lessons for the future.

Russian industrial policy in the 2000s: vehicles of change and interest groups

Industrial policy in Russia is traditionally associated with excessive state intervention in the economy and protecting the interests of certain major players, i.e. it is perceived as a somewhat dangerous regression from market principles. Its harshest criticism came in the late 1990s and early 2000s in relation to the initial lack of faith in the possibility of its effective implementation when the quality of the state's administration was low; in addition, there were risks of secretive lobbying by various interest groups, as well as risks of distortion of competition.

The specific nature of Russian industrial policy and the transformation of approaches to industrial policy were largely shaped by factors such as changes in budget restrictions, the dominant model of state-business relations, challenges for further development, and first and foremost — the exhaustion of the former growth model. Taking this into account, we have identified four stages in the development of Russian industrial policy in the 2000s (Table 2):

- A policy of structural reformation (restoration growth, soft regulatory policy, priority of institutional reforms) — 2000–2003;
- A vertical sectoral policy (sectoral priorities, increasing the role of the state in the economy, scheduling changes) — 2004–2007;
- A compensatory industrial policy (direct support and preferences for companies in certain crisis-affected sectors) — from late 2008 up to and including 2009;
- A technology industrial policy (expanding the mechanisms to stimulate innovation, improving the business environment, priority for creating new high-tech work places) — since 2010.

Policy of structural reformation (2000–2003)

It is no exaggeration to say that the early 2000s opened up one of the most significant opportunities in Russian history, including in relation to domestic industrial policy. In May 2000, work was completed on the most important conceptual document, the Social and Economic Development Strategy of the Russian Federation up to 2010 [CSR, 2000]. Its main focus lay in support for market principles and institutions: various conditions for competition, deregulation, and reforms of natural monopolies, the tax system, the authorities, the administrative apparatus, etc.

Critical discussions between those supporting liberalization and the mobilized economic development scenario led to even the softest of initiatives in industrial policy being rejected. Such a course was also dictated by the limited resources to implement direct state support measures, the underdeveloped nature of market institutions, and the low potential of indirect regulatory instruments in industrial policy.

The general lack of acceptance of industrial policy ideas did not stop the state from at least trying to formulate and implement a new model in this area, in-

Table 2. **Stages in the formation of Russia's industrial policy in the 2000s**

Period	Priorities	Characteristic features	Resources	Relations model
2000–2003	Development of market institutions and structural reforms	Soft regulation of taxes and tariffs on natural monopolies and exchange rates	Restoration growth, limited budget funds	Intensive collaboration between large-scale business and the state, personalized nature of relations
2004–2008	Diversification of the economy, stimulating innovation	Vertical sectoral policy, long-term planning, creation of development institutions	Significant budget resources	Consolidation of 'power vertical', increase in state control, institutionalization of access, expanding the number of actors involved in creating industrial policy (development institutions)
2008–2009	Social stability	Vertical compensatory policy, support for large-scale companies, micro-management style of governance, preferences	Drastically stricter budget restrictions	State support in exchange for social commitments by large-scale companies
2010 — present	Search for new sources of growth (innovation, modernization, structural privatization), reindustrialization, improved investment climate, assisting in the development of new high-tech sectors	Technology industrial policy	Moderate budget capabilities, high uncertainty	Increased access to decision-making centres and competition for access, emergence of new players, consolidation of science and technology interest group, new forms of communication (Agency for Strategic Initiatives, Open Government)

Source: compiled by the authors.

spired ad hoc by the success of India in stimulating its information and communication technology (ICT) sector. In February 2001, a special federal programme 'Electronic Russia (2002–2010)' was initiated, and later approved in early 2002.[1] The initial aim of the programme was to create the necessary conditions to raise the efficiency of the economy, state authorities and local government by introducing and rolling out ICT on a large scale, guaranteeing rights to search, obtain, transmit, produce and distribute information freely, and expanding specialist training in this field.

'Electronic Russia' became a rare example of a horizontal industrial policy geared towards development of the ICT sector, primarily by removing unjustified administrative barriers and stimulating additional demand. However, by 2004, the special federal programme was adjusted in favour of accomplishing the state's objectives and raising efficiency in the public sector. Such a noticeable change was caused by the fact that the idea of non-funded industrial policy in 2004–2005 was not justified enough: removing administrative barriers proved a far harder task than expected, which required considerable efforts and provided negligible benefits in terms of administrative growth. The Ministry of Economic Development of the Russian Federation, the initial instigator of the 'horizontal ideology' behind the programme, turned its attention to other, larger-scale projects. Since in the initial stages of implementing the special federal programme a strong consolidated interest group of ICT market players was not formed (largely because this market was characterized by small companies on the whole), its subsequent evolution as an ordinary departmental programme by the then Ministry of Information Technology and Communications of the Russian Federation was natural and expected.

Vertical sectoral policy (2004–2007)

The second stage was linked to the vastly increased role of the state in the economy and the turn towards a vertical industrial policy. The factors and prerequisites behind this shift were:

- the alignment of the 'power vertical', the reduced influence of large-scale business on the authorities, and purposeful planning of structural changes in the economy;
- the relaxation of budget restrictions, the increased financial capabilities of the state;
- the stabilization of conditions for business activity, the improvement in the performance of obligations making it possible to implement long-term projects.

Since 2005, there has been a sharp increase in the state's interest in long-term planning instruments. Work started on various development strategies, primarily sectoral, and the creation of a set of special federal programmes relating to science and technology. The reformers were particularly interested in opportunities to expand private co-financing and quantitative performance targets, i.e. indicators of the effectiveness and performance of budget spending. There was then a shift in favour of *sectoral designed industrial policy*, including in sectors where private companies tend to dominate.

In 2006–2007, the inadequacy of the state's existing tool kit for the updated structure of priority social and economic development objectives (diversification of the economy, innovation, etc.) became clear. As a consequence, several decisions were adopted that went beyond the standard regulatory framework and expanded both the opportunities and risks of implementing an industrial policy.

From 2006, intensive work began to *create vertically integrated holding companies in the public sector*, in particular in the military-industrial complex (MIC), the aeronautical industry, and ship building. All of this was dictated by the desire not only to reduce the administrative burden of managing a multitude of different enterprises, but also to improve the ability of the state and sectoral ministries to directly influence the development of certain sectors.

2007 was noted for its turn towards forming *financial development institutions* and expanding their resource base. This happened via the political decision to use a portion of the resources from the National Welfare Fund (approximately 300 billion roubles) to plough funding into certain development institutions (Vnesheconombank, Investment Fund, Russian Venture Company, etc.)[2] There

[1] Approved by the Resolution of the Government of the Russian Federation no 65, dated 28.01.2002.

[2] Message from the President of the Russian Federation to the Federal Council of the Russian Federation, dated 26.04.2007.

were a number of reasons underlying this decision, one of which was the attempt to reach a compromise between those supporting greater state investment in the economy and the proponents of macroeconomic stability who opposed higher levels of state spending [*Ivanov et al.*, 2012].

One noticeable administrative innovation at this stage was *the creation of large-scale state corporations* in response to past inability or unwillingness to find effective public-private partnership methods. Two state corporations — Vnesheconombank and Rusnano — were set up as financial development institutions to make up for 'market failures'; two others — Rosatom and Rostec — were viewed as instruments and agents to restructure state property, consolidate state assets and raise the competitiveness of certain sectors (the nuclear industry, military-industrial complex, automotive industry, air travel) [*Simachev, Kuzyk,* 2009].

Vneseconombank and Rusnano were the most important driving forces behind the industrial policy. While Rusnano reproduced a horizontal model (forming the nanoindustry, identifying technological priorities, investing in new high-tech companies), Vnesheconombank gravitated towards a vertical model, supporting large-scale projects within the framework of 'standard' sectoral priorities set for it (space, aviation, ship, machine building, timber, nuclear, electronics industry, military-industrial complex). The list of Vnesheconombank's priorities was later expanded considerably and now includes a number of technology directions alongside sector-specific priorities.[3]

Compensatory industrial policy (end of 2008–2009)

The most severe economic crisis at the end of the first decade of the 21st century forced the state to move away from strategic objectives in industrial policy to tactical objectives (including using 'micro-management' mechanisms) and to review once again the development priorities and funding opportunities for large-scale reformation of the structure of the economy. Industrial policy measures during this period started to become extremely selective [*Gorst et al.*, 2009]. The automotive industry, agricultural equipment manufacturing, military-industrial complex, agriculture, transport complex, and residential construction were identified as sectoral priorities. A substantial proportion of the measures adopted were aimed at offsetting the recession in the most vulnerable sectors and supporting large, strategically important companies [*Simachev et al.*, 2012]. In a number of cases, the anti-crisis initiatives went counter to the principles of a market economy: private demand gave way to public, in some sectors protectionist barriers were formed, administrative control over pricing intensified, and the mutual obligations of the state and large company owners were untransparent [*Simachev, Kuzyk*, 2012].

Although lessons from the crisis were learnt at the very highest political level, the practical consequences of these lessons turned out to be extremely divergent. At the start of 2009, a set of measures to stimulate innovative development and deregulate the economy were identified. In June 2009, the Presidential Committee on Modernization of the Economy included energy, energy efficiency, nuclear, information and space technologies and telecommunications, medicine, pharmaceuticals and nanotechnology in its list of strategic technology priorities.

Technology industrial policy (from 2010)

The ambiguity over the conclusions drawn by the authorities from the crisis predetermined the specific nature and inconsistency of industrial policy in the post-crisis period. Its reorientation away from a vertical, sectoral model towards a technological model during recent years is linked to the search for new sources of growth and the growing influence of interest groups from scientific, technological and educational spheres.

The fourth stage of industrial policy is characterized by state efforts to introduce new horizontal policy instruments [*Simachev, Kuzyk*, 2013]. Specifically, this means technology platforms, matching grants to stimulate partnerships between companies and universities, a more innovation-oriented stance in the system of public procurement and in state corporations' development programmes, and finally, support for the creation of regional innovation clusters, among other things. However, the principal obstacles to making many of these new instruments work

[3] In November 2008, amid the rapidly intensifying economic crisis, one additional priority was added to this list: the agro-industrial complex (Resolution of the Government of the Russian Federation no 1697, dated 19.11.2008), and within just one year additional technology priorities were identified for Vnesheconombank: strategic computer technologies and software, information and communication systems, medical equipment and pharmaceuticals. Available at: http://www.veb.ru/press/news/?id=5937 (Resolution of the Government of the Russian Federation no 1783-r, dated 26.11.2009. Available at: http://government.consultant.ru/page.aspx?1036042).

better include their appropriation by traditional interest groups, the difficulties in sharing positive experiences, and restrictions on accumulating a critical mass of stable, self-sustaining changes.

At the end of 2011, after protracted adjustments and revisions, the Innovative Development Strategy for the Russian Federation up to 2020 was approved [Ministry of Economic Development, 2012]. This declaratory reinforcement of the technological and innovative turn in industrial policy was filled out with substance, which was predetermined by serious changes in the global competitive environment, a critical assessment of traditional sectoral approaches and reduced opportunities for implementing such approaches.

The stricter budget restrictions combined with expanded social obligations in 2012 brought the task of *searching for new sources of growth* to the fore. The ideas of *re-industrializing* the Russian economy (in many respects inspired by the European example), creating new employment in high-tech, and fundamentally improving the business environment received widespread support. In January 2012, the need for an industrial policy was first discussed at a high political level. Among the possible priorities were pharmaceuticals, high-tech chemistry, composite and non-metallic materials, the nuclear and aviation industries, ICT, nanotechnology, and the space industry (the list was said to be open to further additions and adjustments) [*Putin*, 2012].

In May 2012, two fundamental landmarks were named as part of the long-term economic objectives for the country: i) increasing by 1.3 times the proportion of output from high-tech and science-intensive economic industries of total GDP by 2018 relative to 2011 levels; and ii) creating and modernizing 25 million highly productive jobs by 2020.[4] These were followed by administrative measures to distribute responsibility in terms of achieving these goals among core ministries and departments, alongside the regular monitoring of current figures. Discussions of state programmes, strategies and budget allocations went ever more closely in hand with assessments of their contribution to achieving priority target figures.

In 2012–2013, work continued to expand the number of industrial policy priorities (Figure 1), which led to a watering down of the very notion of 'priorities' and the loss of their original effectiveness as an instrument to concentrate efforts in certain areas. By this time, the poor performance of many sectoral development strategies had become clear. In our opinion, state programmes did not yield their expected results, and turned out to be yet another bureaucratic structure on top of other federal budget spending mechanisms.

In July 2013, action plans on the development of five technological sectors were approved in the new form of *road maps*, focusing on the implementation of practical measures up to 2018. These five sectors were: biotechnology and genetic engineering, ICT, engineering and industrial design, composite materials production, and optoelectronic technologies and photonics. It should be noted that the adoption of these road maps served as the first clear sign of the state's increasing attention to the development of new, promising and high-tech sectors, not just in industry but also in the services sector.

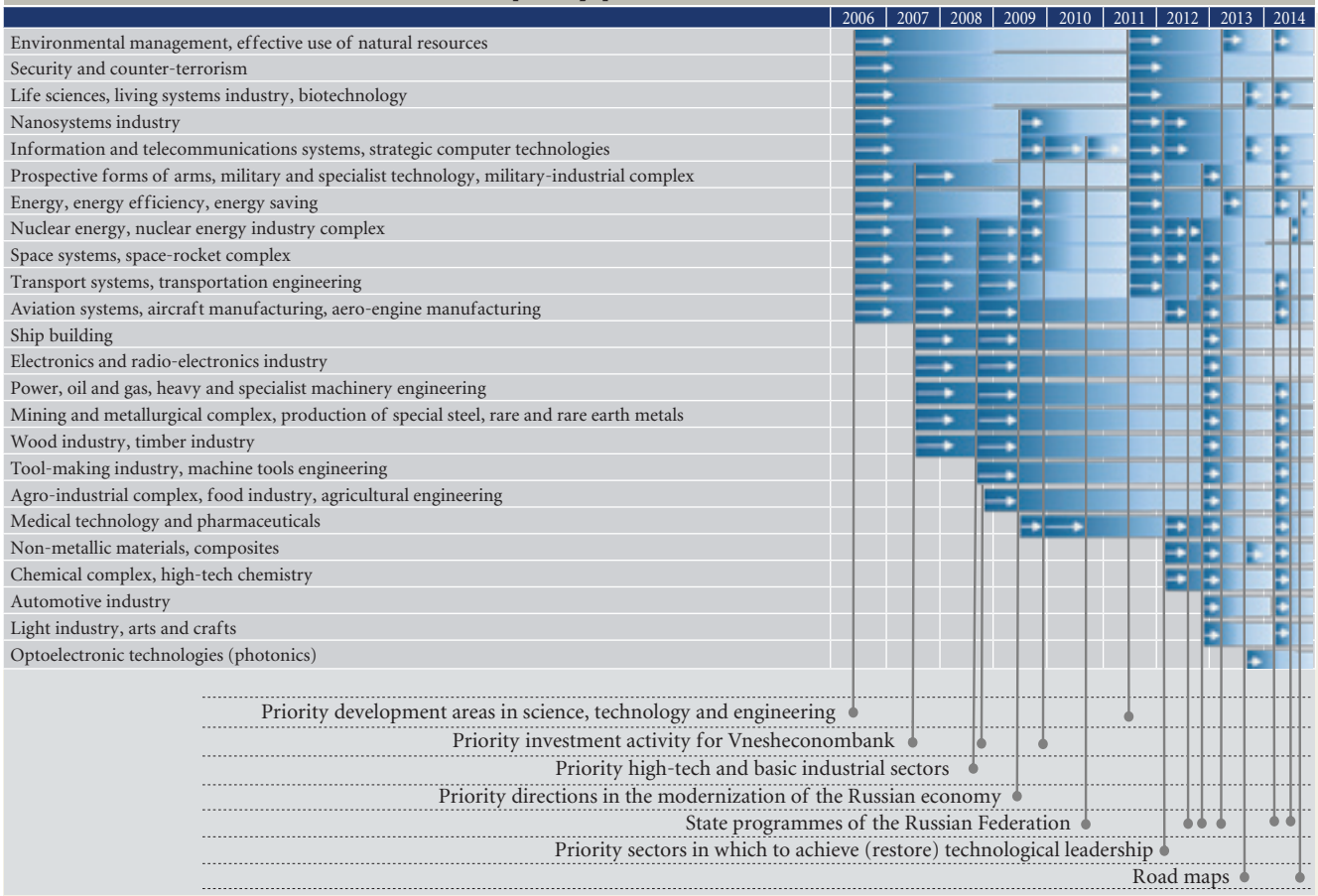
Demand for industrial policy in Russia and key interest groups

Society and the state in Russia have traditionally shown high demand for an industrial policy. Despite the widespread view among Russian experts on the negative consequences of the state intervening in regulation in this field, a large number of practical questions call for coordinated and centralized measures, the adoption of which lies solely within the remit of state authorities. Such measures include: defining priorities when making decisions to reduce (raise) the tax burden or change customs duties; agreeing on conditions for joining a foreign economic system (WTO, Customs Union) and terms for transitional periods and compensation for national producers; offering selective support to certain sectors in times of crisis; selecting preferential investment areas when the state has enough resources and expands its role as an investor (directly or through a development institution).

Domestic industrial policy is expected to overcome various economic problems and guarantee long-term growth through diversification of the economy, import substitution, increasing the volume of exports with a high level of processing, developing research and the use of Russian developments, and creating new economic sectors based on cutting-edge technologies. Besides these economic ob-

[4] Decree of the President of the Russian Federation 'On long-term state economic policy' no 596, dated 07.05.2012.

Figure 1. **Industrial policy priorities in Russia, 2006-2014**



Source: compiled by the authors based on materials from fundamental strategic and programme documents, statements by the President and Chairman of the Government of the Russian Federation.

jectives, the fundamental aim of Russia's industrial policy was and continues to be providing social stability, and supporting employment in certain regions, single-industry cities and big businesses.

Political stability remains an important factor and can be guaranteed by redistributing revenue among the powerful elites. The possibility of changing the status quo by invoking long-term and politically advantageous objectives and seeking support and preferences for certain sectors make industrial policy attractive to members of various interest groups.

In the period 2000–2003, the discussion of industrial policy was outwardly inspired by the problem of changing the structure of the Russian economy. However discussions in this regard were generally initiated by large businesses made up of the most powerful, consolidated industries (metallurgy, energy, railways, and extractive industry) and took place between the stakeholders themselves. Contradictions surrounding questions such as tariffs for services provided by natural monopolies, the conditions and expediency of joining the WTO, and the exchange rate policy of the Central Bank were all, among others, extremely delicate matters.

While in the early 2000s business was the main counterpart of the state, later in that decade state interest groups and competition between these groups shaped the developmental trajectory and configuration of industrial policy (Table 3). We have identified four of these interest groups: budgetary, structural, sectoral and science and technology. The specific nature — and advantage — of the proposed classification is linked to the stability of these groups and the fact that they all have a positive agenda. The position and influence of each of these groups is highly dependent on current budget restrictions, the level of social support from the population and the lessons learnt by the authorities from crises.

It seems unlikely that the various interest groups can be unified on rational terms when it comes to elaborating an industrial policy. Three of the four groups — structural, sectoral and science and technology — have a positive attitude to industrial policy, but differ significantly in their views on the principles guiding its implementation.

Table 3. **State interest groups in Russia's industrial policy: positions and stakes**

Interest group			
Budgetary	**Structural**	**Sectoral**	**Science and technology**
Key positions			
Guaranteeing macroeconomic stability	Diversification, development of new sectors	Guaranteeing social stability and control over the current situation and prices on the market	Guaranteeing the transition to an innovative development model
Neutral regulation, improvement of investment climate	Expanding mechanisms to stimulate exports and production of high tech products	Retaining (intensifying) direct influence over the development of certain sectors that are important to the population and to the development of the economy as a whole	'Supply of innovations' logic, expanding the range of breakthrough fields
Limiting opportunities to use additional income to intensify current budget spending	Increasing spending on economic development, new programmes	Implementing large-scale investment programmes, providing for innovative break-throughs	Increasing spending on science and education, forcing the public sector to collaborate
Limiting new initiatives	Expanding cooperation, signing new agreements between business and the state	Reforming major companies, integration, forming groups of 'national champions'	Creating national laboratories, research universities, developing scientific production partnerships
Attitude towards industrial policy			
On the whole — cautious, in the event of additional budget liabilities — hostile	Towards horizontal — positive, towards vertical — cautious	Towards horizontal — neutral, towards vertical — positive	On the whole — favourable, in the event of a technology industrial policy — very positive
Conditions to consolidate positions			
Stricter budget restrictions	Curtailment of traditional sources of economic growth	Social tension	Lower competitiveness of traditional products

Source: compiled by the authors.

There is still competition in Russia between the vertical and horizontal (technology industrial) models for the implementation of industrial policy (Table 4). The state (mostly represented by sectoral interest group members) gravitates towards a traditional (vertical) industrial policy. This orientation is determined by the following factors:

- the existence of instruments to exert a direct influence on public sector companies and the opportunity to make resolute decisions (especially with poorly developed education mechanisms);
- direct mutual obligations between the state and big business with the possibility of enforcement amid insufficient trust between the parties;
- the simplicity with which the consequences of decisions are modelled and assessed, the high speed with which the effects take hold.

Opportunities to elaborate a long-term industrial policy are the most radically restricted in times of crisis, while demand for an industrial policy only grows in a complex economic situation. However, as such demand is determined by the protection of existing production and employment levels it acquires a predominantly sectoral and situational nature. In periods of economic turbulence, demand for budget balancing and stability grows, the positions of the 'budgetary' interest

Table 4. **Characteristics of traditional (vertical) and new (horizontal) industrial policy**

Traditional (vertical) policy	New (horizontal) science and technology policy
Sectoral priorities	Technology priorities
Existing sectors and industries	New industries, creative sector of the economy
Production	Services and production
Import substitution	Exports and new demand
Big and mega business	Newly created small and medium-sized business
Public sector, state development institutions	Private sector, foreign investors
Integrated structures, holding companies	Science and technology networks, clusters, sub-contractor chains
Current interest groups	Search for new stakeholders
Redistribution of revenue	Future changes in the distribution of revenue
Investment, public initiative	Innovations, private initiative
Sectoral development strategies, special-purpose budget programmes, regulation on sectoral levels	Plurality of instruments, quasi-budgetary nature, regulation on company levels
Resolute decisions	Decision-making rules

Source: compiled by the authors.

group grow stronger, while the financial opportunities to implement an industrial policy shrink drastically. The convergence of sectoral and stabilization agendas in industrial policy make it necessary to resort to using a riskier set of tools (riskier in terms of the long-term consequences), tools that involve protective, quota-based and preferential measures. As a result, there is a general shift towards a vertical, sectoral policy with a focus on non-financial, restrictive mechanisms, and formal and non-formal state regulation of the conduct of the biggest companies.

The specific nature of relations between the state and business and mechanisms to assert and coordinate various interests have a considerable impact on the interaction between interest groups when formulating and implementing industrial policy. In the last five years, we have seen increased access to decision-making centres, the institutionalization of new channels for collaboration, and the increasing influence of science and technology interest group. At the same time, the newly emerging technology industrial policy still has some 'vertical' traits, including:

- an orientation towards the interests of large stakeholders, albeit with an increase in their numbers because of the scientific, educational and technological spheres;
- the low level of competition among public institutions with a tendency towards monopolizing views on possible approaches and assessments;
- under valuation of demonstrable effects and transmission mechanisms of best practices, reliance on (quasi-) public resources;
- lack of transparency surrounding decision-making processes and results appraisal processes despite relative openness towards proposals.

The lack of development of 'horizontal' expert instruments, the shortage of objective comparisons of proposals put forward by various interest groups, and the lack of fair distribution of responsibilities between stakeholders is giving rise to an *inconsistent and one-sided industrial policy.*

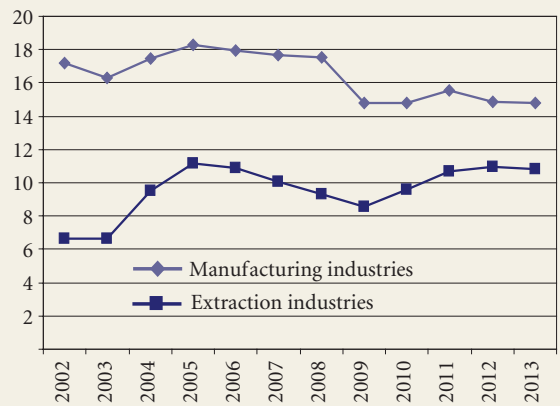
Results of industrial policy: are there any appreciable successes?

The results of Russia's industrial policy of the 2000s primarily show a lack of correspondence between economic realities and the objective declared by the state for over ten years to reduce the role of the raw materials extraction sector and support processing industries. The proportion of extraction industries as a percentage of gross value added shows strong upward trends, while the share of processing industries has been falling since 2002 (Figure 2). Of course, it is important to remember that the accelerated development of raw materials industries was caused above all by the situation on the external market, while processing industries are geared almost exclusively towards domestic demand.

The increased share of innovation output in aggregate output witnessed in recent years has not been accompanied by any perceptible growth in the proportion of research-intensive or high-tech sectors in the economy (Figure 3).

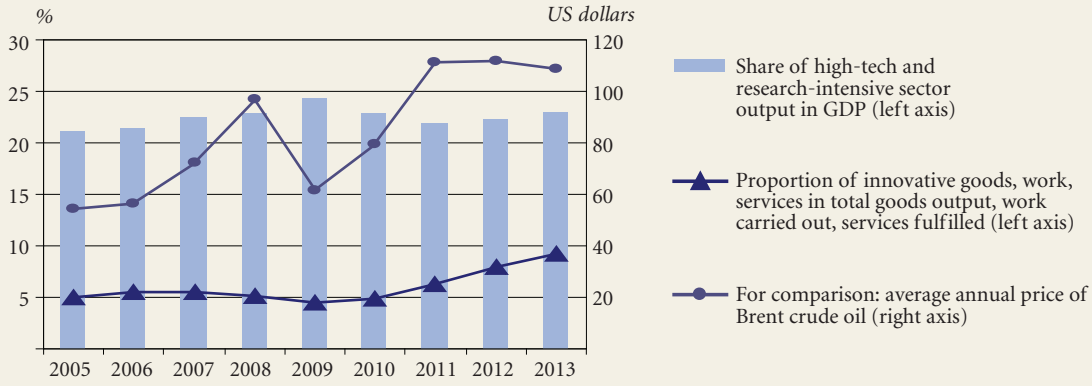
The lack of any clear successes in Russian industrial policy compared to the country's economy as a whole make the task of searching for and studying local achievements in certain sectors and industries all the more pressing. We have selected the automotive industry and nano industry as examples of industrial policy

Figure 2. **Percentage of extraction and processing sectors in gross value added in Russia (%)**



Source: Rosstat databases.

Figure 3. **Percentage of innovation output and output from high-tech and research-intensive sectors in the Russian economy**



Sources: [HSE, 2014a; *Polivanov*, 2014], Rosstat databases.

implementation in Russia. The two industries differ in terms of their initial conditions and development strategies; both are capable of achieving positive results.

The automotive industry is classified as a medium high-tech sector. Larger scales, the existence of large and extra large companies and consistently high interest from the state — these are the sector's characteristics which are in no small part due to the high social importance of a number of businesses for the labour market. The nano industry lags some way behind the automotive industry and is looked at, not from the perspective of supporting employment, but as a bridge to the economy of the future which opens up prospects to capitalize on cutting-edge R&D.

These examples illustrate two fundamentally different approaches to the implementation of a technology industrial policy (Table 5). The automotive industry is a traditional, large-scale industry which attracts investment from leading foreign companies (with a growing degree of new facilities built locally), and enjoys the support for domestic manufacturers (predominantly, to protect jobs). Industrial policy, in nano industry, involves a set of measures to form a new high-tech sector of significant size for the national economy and competitive on a global scale. The key to this is to create the necessary infrastructure (including financial), guaranteeing advanced R&D and striving to increase output of nano-technology.

South Korea can be thought of as a model country in terms of the implementation of industrial policy in the automotive industry, at least regarding the special-purpose aspect of the sector. The government in South Korea actively supported this industry in the 1970s–1980s. Repeating this experience under current conditions is extremely complicated on account of the high level of competition on the

Table 5. **Specifics of Russian industrial policy in the automotive and nano industries**

	Automotive industry	Nano industry
Scope of implementation	Traditional, large-scale, medium high-tech industry	Fundamentally new high-tech sector with the potential to transform into a key sector for the economy as a whole
Start of implementation	2005	2007
Country example	South Korea (1970s-1980s), China and India (1980s)	USA (from 2000)
Interest group / initiator	Structural	Science and technology
Focus	• Attracting foreign investment • Supporting collaboration • Creating new facilities, localization • Import substitution • Supporting employment	• Creating infrastructure • Advanced R&D progress • Commercialization, production of new high-tech output
Innovation model	'Evolutionary' — doing, using, interacting (DUI)	'Neoclassical' — science, technology, innovation (STI)
Policy type	Vertical with horizontal elements	Horizontal with vertical elements
Main instruments and measures	• Customs regulation • Stimulating demand • Financial support for existing manufacturers	• Kurchatov Institute national research centre • Rusnano • Special federal programme 'Development of nano industry infrastructure in the Russian Federation between 2008 and 2011' • Budget funding for R&D

Source: compiled by the authors.

Table 6. **Main outcomes of the implementation of industrial policy in Russia's automotive industry and nano industry**

	Automotive industry	Nano industry
Strengths / achievements	• Attracting foreign investment • Creating new facilities • Cooperation between Russian and foreign manufacturers • Improving production culture	• Creation of new tools and mechanisms to stimulate innovation • Growth in R&D spending and numbers of researchers • Launch of new plants, growth in output and services • Increasing Russian society's attention to advanced nano-technologies
Weaknesses / failings	• Weak impact on import substitution, deterioration of the trade balance • Diverse structure of the sector, retention of ineffective businesses • Lack of significant progress in raising research and design skills • Compromise, and increasing gap between the old and new segments in the sector	• Narrow circle of beneficiaries • Weak demonstration effect • Deficit of new potential projects • Orientation towards state support, limited inflow of private resources

Source: compiled by the authors.

global automotive market and various institutional restrictions, including international trade agreements within the WTO. In addition, some elements of the policy supporting the Russian automotive industry have clearly been borrowed from countries with more recent experiences in fostering automotive industry, primarily China and India. Distinctive features of the automotive industries in these countries include the existence of one or more large national automobile manufacturers, extensive development of joint enterprises, and the creation of assembly lines with a growing trend of extreme localization, for example.[5]

Considerable impetus for the development of a policy to advance nano industry in Russia and a model for its implementation came in the form of the US National Nanotechnology Initiative, announced in 2000.[6] It should be noted that despite the frenzied discussions about support for nanotechnologies in 2004–2006 (including at a governmental level), the state policy supporting the industry was only launched between the end of 2006 and early 2007.

The initiator of industrial policy in the domestic automotive industry was a structural interest group, while in the nano industry it was the science and technology group that was the source of the policy. The absence of significant practical steps to develop the nano industry in the first half of the past decade is in no small measure linked to the lack of a core department with a direct interest in the project's success.

In keeping with the differences in the focus of industrial policy, its target directives, and aspects, the tool kit used by the state also differed. The automotive industry was incentivized through customs tariff regulation, supporting demand for domestic output (including foreign producers), and various forms of budget funding for specific enterprises (primarily, AVTOVAZ). In contrast, the nano industry saw the formation of a large-scale development institution (Rusnano), the launch of a special federal programme to establish the necessary research and information infrastructure[7], the set-up of a national research centre with the corresponding profile, and budget funding for R&D.

If we look at the innovative development models chosen by the state in these two sectors, the nano industry applied a classic STI model with support for all stages of the innovation cycle: fundamental (through the efforts of the Kurchatov Institute national research centre and certain academic institutes), applied research (through direct budget funding, and to a lesser degree through funds from state development institutions and funds), and commercialization (primarily, through Rusnano). However, the automotive industry used a DUI model, based on close cooperation with leading foreign producers.

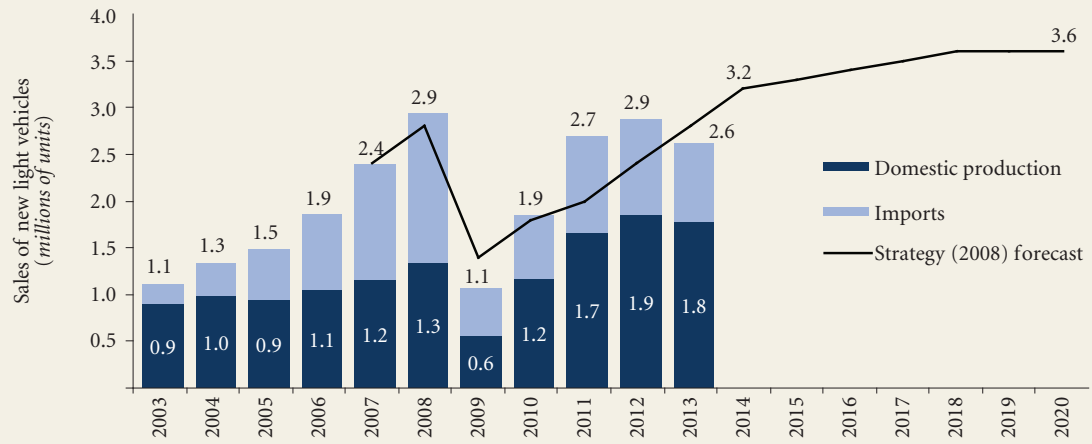
Neither of the examples analysed is a clear-cut vertical or horizontal form of industrial policy. However, the development of the automotive industry, oriented towards large-scale and mega stakeholders and clearly geared towards import sub-

[5] For more on country-specific industrial policy models in the automotive industry, see: [*Simachev et al.*, 2014].

[6] It is no coincidence that the document launching the active implementation of the nano industry support policy in Russia was named a presidential initiative, entitled the 'Nano industry development strategy' [Ministry of Education and Science, 2011].

[7] Special federal programme 'Development of nano industry infrastructure in the Russian Federation between 2008–2011' (approved by Resolution of the Government of the Russian Federation no 498, dated 02.08.2007). Available at: http://www.fcpnano.ru/, accessed 12.10.2014.

Figure 4. **Dynamics of the Russian light vehicle market**



Source: calculations by the authors based on materials from [Ministry of Industry and Trade (or Minpromtorg), 2010] and Rosstat databases.

stitution, definitely gravitates towards a vertical model in conjunction with the large-scale involvement of foreign investors which is characteristic of a horizontal policy. On the contrary, support for the nano industry as a fundamentally new high-tech sector, the creation of new businesses and stimulating exports are all predominantly horizontal measures, notwithstanding such vertical policy attributes as the overarching role of the state and state institutions.

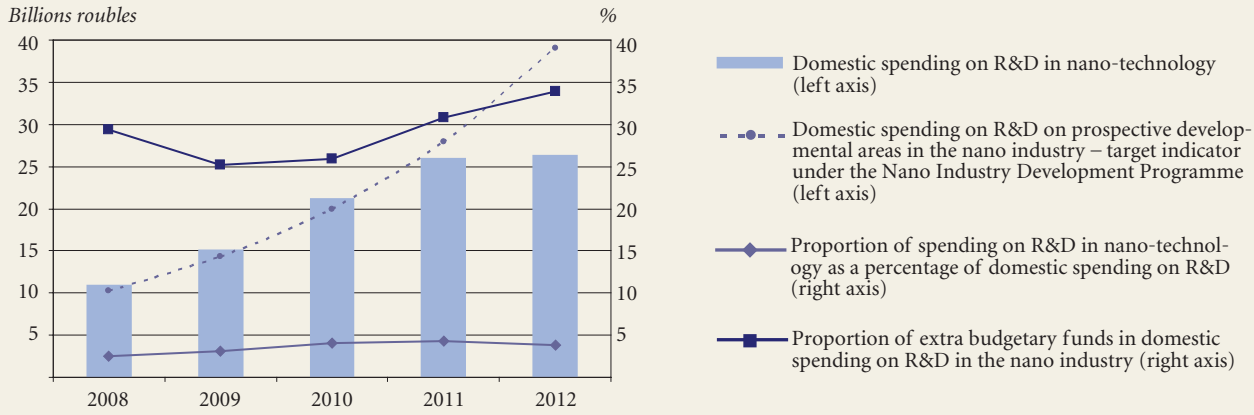
The result of support for the automotive industry was the immediate arrival in Russia of several leading global manufacturers, the formation of stable alliances between domestic and foreign companies, the launch of a number of new enterprises and, as a result, a rise in the overall culture of production and progress in industrial development in certain regions. State policy in the nano industry has made it possible to develop and introduce new instruments to stimulate the sector (including the specialist development institute, Rusnano), achieve growth in research activity in this field, set up new plants and increase the volume of output and services carried out, and has attracted the attention of the state and society to the issue of developing nano-technology in Russia.

Nonetheless, achievements in both sectors are limited. In the automotive industry, the measures undertaken by the state did not improve the trade balance: from 2000 to 2011 imports of vehicles in value terms increased by almost 40 times, while exports increased only four-fold. In essence, Russia is now occupying an intermediate position between countries where supply comes from foreign branded manufacturers and national players are virtually lacking (for example, Brazil) and countries where the automotive industry is developing in collaboration with international companies (India, China, etc.) However, according to foreign trade balance figures, automotive industry output in Russia is lagging far behind these countries. Although Russia is one of the largest importers of vehicles, for exports (in 2011) the country was far from the top of the list, surpassed by South Africa and the United Arab Emirates among others. The policy has not resulted in the development of research and design skills among Russian vehicle manufacturers. Previous players, whose competitiveness is largely because of state support, still continue to exist in the market.

In the nano industry, despite vast sums of state funding (over 200 billion roubles over the period from 2007 to 2012), the actual growth in R&D spending (Figure 5) and nano-technology output and services (Figure 6) are visibly behind the targets set out in the corresponding basic programme document, the Programme for the Development of the Nano Industry in the Russian Federation up to 2015 [Ministry of Education and Science, 2010]. While the gap between planned and actual nano industry output in recent years is showing signs of shrinking (despite the still relatively modest involvement of portfolio companies in Rusnano), the gap between actual and planned R&D spending (as set out in the development programme) is actually increasing.

The discrepancy between actual nano industry dynamics and the planned guidelines set by the state could suggest both that the policy is insufficiently effective and that the goals set in early 2008 (which have not been adjusted since) were excessively ambitious. We should be more wary that the group of beneficiaries of

Figure 5. **Dynamics of domestic R&D spending in nano-technology**



Source: compiled by the authors based on the materials [Ministry of Education and Science, 2010; HSE, 2010; NRU HSE, 2011, 2012, 2013, 2014b; Centre for Scientific Research and Statistics, 2009, 2013] and based on data from Rosstat.

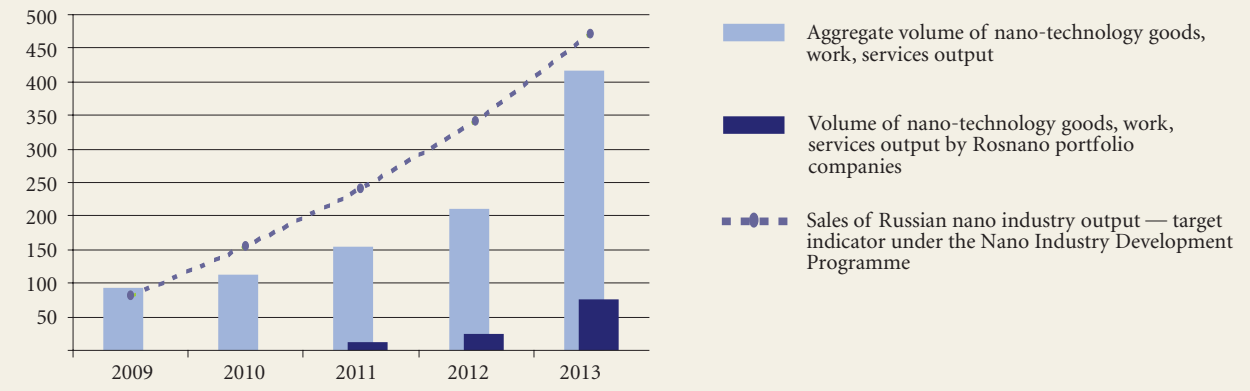
this support is too small, examples of success in this field are isolated and do not have any significant demonstration effect, and the main stakeholders and interest groups are focused on obtaining and exploiting state funds with relatively modest private investment.

On the one hand, the evidence presented above do not allow us to consider Russia's experience of industrial policy in the automotive and nano industries an unequivocal success. On the other hand, they do show signs of significant progress in both fields; the positive results, in our opinion, clearly outstrip the negative.

To conclude this section, we now make several recommendations, each of which has proven its effectiveness in at least one of the two sectors.

1. Implementation of measures in the initial stages that meet the interests of both old and new groups. This makes it possible to avoid any strong initial opposition, gain time to form new interest groups, clarify the real aims of the stakeholders, and lay down possible consolidation methods.
2. The application of new support instruments with limited use of traditional mechanisms such as special federal programmes. The use of the usual tool kit makes the traditional beneficiaries of state support active and provokes strong competition between them, which makes its use undesirable.
3. The lack of or a reasonable number of quantitative targets, which reduces the risk of distortions or manipulations in pursuit of the planned figures and makes it possible to focus on qualitative changes and to re-assess and hone constructive objectives.
4. The existence of a charismatic leader (political ministry) who combines personified responsibilities with far-reaching rights and powers. In an ideal world, this should be a figure with excellent professional competencies and who en-

Figure 6. **Dynamics of nano industry output** (billions of roubles)



Source: compiled by the authors based on the materials [Ministry of Education and Science, 2010; HSE, 2011, 2012, 2013; RUSNANO, 2012, 2013].

joys the trust of both the authorities and the population, which significantly restricts the number of potential candidates.

5. An orientation towards consumer demand, guaranteeing attention from all levels of the population, fair assessment, independent controls, and significant social support as a minimum from the very beginning.
6. Openness, globality, an orientation towards the global market (including technology and capital) and strategic foreign investors. All these should help to develop new skills, acquire new knowledge and capabilities, to carry out objective assessments, and benchmark the current state of the sector and existing work done.
7. Refusal to be geared towards rapid science and technology breakthroughs, which simplifies international collaboration, including in terms of technology and training transfers. This should also spare the country ineffective efforts in searching for and making practical use of its own strengths and conserving — often imaginary — local advantages.

Lessons for the future

At various times, Russia has made many attempts to implement an industrial policy. Due to the attractiveness of this tool in the eyes of politicians as a simple and effective mechanism for collaboration with society, redistribution of revenues and for satisfying the interests of economic actors, such attempts will be repeated. An industrial policy makes it possible to reformat the traditional set of measures to improve the investment climate and optimize state regulation, and combine divergent policies to focus on clear and measurable goals. Taking into account the various forms of domestic industrial policy, it is useful to highlight certain patterns and features.

The industrial policy of Russia in the 2000s was aimed primarily at avoiding negative structural changes and offsetting the losses of domestic producers. The direction of this policy was largely shaped by attempts to use Soviet science and technology capacity. It was only recently that the signs of a proactive agenda started to emerge: industrial policy was re-oriented towards supporting progressive changes in the structure of the economy, the development of new sectors, and the dissemination of advanced skills and knowledge. Innovation policy was also shifted in favour of more active development of new skills and fields of knowledge.

The predominantly latent nature of the industrial policy conducted by the state often led to a discrepancy between the declared and real objectives, a reinforcement of the revenue-oriented behaviour of stakeholders and secret lobbying for the interests of certain businesses and owners. The superior lobbying abilities of traditional groups make it possible to implement a vertical industrial policy model, which is hard to predict and fragmented. The system of industrial policy priorities is being continuously transformed: the range of priorities expanded to such an extent that they have been stripped of their main role of consolidating the efforts of the state and business to work on certain breakthrough developmental areas. As a general rule, priorities are chosen and changed without a broad dialogue between society, the state and business.

The implementation of an effective industrial policy in Russia, both vertical and horizontal, is also hampered by the poor quality of state institutions, the lack of or ineffective feedback channels, and the shift in the competencies of state officials from a technocratic profile (sectoral, science and technology) towards a predominantly economic (financial, managerial, or institutional) background. In addition, restrictions in priority setting due to the dominance of existing interest groups and ineffective agreements are further obstacles.

Russian industrial policy traditionally opted for the distribution of financial resources, while regulatory instruments were seen as ineffective. The key directions of industrial policy were stimulating domestic demand (including through public procurement) and establishing quotas and preferences for certain groups of producers. No system to assess the outcomes of domestic industrial policy was actually developed. An evaluation procedure only came about using non-transparent rules based on aggregate assessments by potential beneficiaries. Under these conditions, the identification and dissemination of best practices was kept to a minimum.

We now set out several lessons that could optimize the new industrial policy in Russia.

First. Global experience shows that the requirements for industrial policy, its instruments, and other opportunities change significantly with time. Adapting to

changing conditions requires a continuous review of previous approaches to industrial policy and the implementation of new ideas and solutions. It is extremely difficult to transfer successful experience and replicate the successes of other countries.

Retrospective (*ex post*) assessments of industrial policy are valuable not just for their ability to identify the necessary (correct) content and direction of the policy, but also to formulate principles to develop, implement, monitor and review it. Methods to formulate and implement politics alongside quality state management play a decisive role in this area.

Second. It is widely recognized that a central element of industrial policy is the system of sectoral and technology priorities, which has not yet been formed in Russia in any clear and valid way. At the same time, every new round of interest in industrial policy in Russia started with a discussion of priorities. Unfortunately, these broad-based discussions were typically limited by this topic.

Setting limits on the number of priorities is a complex political task, requiring the state to refuse to support a given sector despite lobbying efforts by that sector's representatives. Evidence shows that the transition from sectoral priorities to technology priorities does not radically change the situation: traditional priorities still exist in the science and technology sphere.

Third. Countries that have achieved relative success in the implementation of industrial policy gambled on an orientation towards the global market, guaranteeing global competitiveness and attracting foreign investors. Today, an effective industrial policy is impossible without transparent and sufficiently free entry and exit conditions for major players, without the involvement of foreign partners (financial or technological). Otherwise, such a policy devolves into imitation (or worse still, simulation) of successes, giving rise to strong information asymmetry and contradictory images of what is actually happening in the economy in the eyes of society and the public authorities. Globalization requires consistent formation of global value chains, the transfer and broadening of current skills, the selection of strategic partners and the creation of international technology alliances.

Fourth. The problem of correctly assessing scientific and technological potential and areas where this potential can be used is of great importance for implementing technology industrial policy. Numerous assessments appear to be overestimates as they are based on 20–30 year old ideas, in particular with regard to the structure of demand for technology in business and the economy as a whole. The dependence on the legacy of past decades is sometimes politically motivated and often blocks new approaches and the development of international technology cooperation.

Fifth. The analysis of certain examples of industrial policy implemented in Russia showed that the stability of the changes is critically dependent on the rapid formation of new interest groups (re-orientation of a portion of existing groups towards modernization goals). Consolidation of new interest groups is more probable in emerging sectors where traditional networks are not yet strong, in order to fully monopolize industrial policy instruments. At the same time, the emergence and consolidation of such groups is often unwittingly hindered by the state, pushing its best individuals into public service.

Sixth. A negative attitude towards particular policies and the activity of the state in certain areas should not impose a taboo against studying the related issues. The long-term lack of an official industrial policy in Russia has led to the low quality of its formation and implementation as well as of the culture surrounding its research.

The categorical nature and ideological bias of discussions surrounding industrial policy and the lack of pragmatism and substantiation are all hindering a rationalization of industrial policy. The range of opportunities and risks in terms of developing and implementing industrial policy in the modern world are only multiplying. Therefore, of crucial importance is the exchange of reasoned and verified opinions on the forms of industrial policy, the forecast results, and, above all, on the undesirable or directly destructive measures. F

Acemoglu D., Aghion Ph., Bursztyn L., Hemous D. (2010) *The Environment and Directed Technical Change* (FEEM Working Paper no 93.2010), Milan: Fondazione Eni Enrico Mattei.
Aghion Ph., Boulanger J., Cohen E. (2011) Rethinking Industrial Policy (Bruegel Policy Brief no 04/2011), Brussels: Bruegel.
Aghion Ph., Dewatripont M., Du L., Harrison A., Legros P. (2012) *Industrial Policy and Competition* (NBER Working Paper no 18048), Cambridge, MA: National Bureau of Economic Research.
Aiginger K. (2007) Industrial Policy: A Dying Breed or a Re-emerging Phoenix. *Journal of Industry, Competition and Trade*, vol. 7, no 3, pp. 297–323.

Avdasheva S., Shastitko A. (2003) Promyshlennaya i konkurentnaya politika: problemy vzaimodeistviya i uroki dlya Rossii [Industrial and Competition Policy: The Issue of Interrelation and Lessons for Russia]. *Voprosy Economiki*, no 9, pp. 18–32.
Chang H.J. (1994) *The Political Economy of Industrial Policy*, New York: St Martins's Press.
CSR (2000) *Osnovnye napravleniya sotsial'no-ekonomicheskoi politiki Pravitel'stva Rossiiskoi Federatsii na dolgosrochnuyu perspektivu* [Main directions of long-term social and economic policy of the Government of the Russian Federation], Moscow: Center for Strategic Research. Available at: http://old.nasledie.ru/fin/6_13/6_13_1/kniga1/article.php?art=0, accessed 15.09.2014.
CSRS (2009) *Nauka Rossii v tsifrakh: 2009. Statisticheskii sbornik* [Russian Science and Technology at a Glance: 2009. Data Book], Moscow: CSRS.
CSRS (2013) *Nauka Rossii v tsifrakh: 2013. Statisticheskii sbornik* [Russian Science and Technology at a Glance: 2013. Data Book], Moscow: CSRS.
Gorst M., Danil'tsev A., Kuznetsov B., Kuzyk M., Simachev Yu., Yakovlev A. (2009) Otsenka antikrizisnykh mer po podderzhke real'nogo sektora rossiiskoi ekonomiki [Evaluation of Anti-crisis Measures Supporting the Real Sector of the Russian Economy]. *Voprosy Economiki*, no 5, pp. 21–46.
HSE (2010) *Indikatory nauki: 2010. Statisticheskii sbornik* [Science and Technology Indicators in the Russian Federation: 2010. Data Book], Moscow: HSE.
HSE (2011) *Indikatory nauki: 2011. Statisticheskii sbornik* [Science and Technology Indicators in the Russian Federation: 2011. Data Book], Moscow: HSE.
HSE (2012) *Indikatory nauki: 2012. Statisticheskii sbornik* [Science and Technology Indicators in the Russian Federation: 2012. Data Book], Moscow: HSE.
HSE (2013) *Indikatory nauki: 2013. Statisticheskii sbornik* [Science and Technology Indicators in the Russian Federation: 2013. Data Book], Moscow: HSE.
HSE (2014a) *Indikatory innovatsionnoi deyatel'nosti: 2014. Statisticheskii sbornik* [Indicators of Innovation in the Russian Federation: 2014. Data Book], Moscow: HSE.
HSE (2014b) *Indikatory nauki: 2014. Statisticheskii sbornik* [Science and Technology Indicators in the Russian Federation: 2014. Data Book], Moscow: HSE.
Ivanov D., Simachev Yu., Kuzyk M. (2012) Rossiiskie finansovye instituty razvitiya: vernoi dorogoi? [Russian Financial Development Institutions: Are We on the Right Way?]. *Voprosy Economiki,* no 7, pp. 4–29.
Krugman P., Obstfeld M. (1991) *International Economics: Theory and Policy*, New York: HarperCollins Publishers.
Kuznetsov B. (2001) *Nuzhna li Rossii promyshlennaya politika?* [Does Russia need industrial policy?]. Paper presented at the MSU and ICSS Workshop «Strategiya razvitiya», December 17, Moscow. Available at: http://vmw.prime-tass.ru/documents/documents/20011218/%2020011218.asp, accessed 17.02.2014.
Kuznetsov Y., Sabel C. (2011) *New Open Economy Industrial Policy: Making Choices without Picking Winners*, Washington, DC: World Bank. Available at: https://openknowledge.worldbank.org/handle/10986/11057, accessed 19.10.2014.
Ministry of Economic Development (2012) *Strategiya innovatsionnogo razvitiya Rossiiskoi Federatsii na period do 2020 goda* [Strategy of the Innovative Development of the Russian Federation until 2020], Moscow: Ministry of Economic Development of the Russian Federation. Available at: http://www.economy.gov.ru/minec/activity/sections/innovations/doc20120210_04, accessed 28.06.2014.
Ministry of Education and Science (2010) *Programma razvitiya nanoindustrii v Rossiiskoi Federatsii do 2015 g.* [Programme of Development of Nanotechnology Industry in the Russian Federation up to 2015], Moscow: Ministry of Education and Science of the Russian Federation. Available at: http://www.portalnano.ru/files/563, accessed 14.10.2014.
Ministry of Education and Science (2011) *Razvitie nanoindustrii v Rossiiskoi Federatsii* [Development of Nanotechnology Industry in the Russian Federation], Moscow: Ministry of Education and Science of the Russian Federation.
Minpromtorg (2010) Strategiya razvitiya avtomobil'noi promyshlennosti na period do 2020 goda (utverzhdena prikazom Minpromtorga Rossii no 319 ot 23.04. 2010) [Strategy of Development of Automotive industry up to 2020 (approved by the Order of the Ministry of Industry and Trade of the Russian Federation no 319 dated 23.04.2010)], Moscow: Ministry of Industry and Trade of the Russian Federation.
Naude W. (2010) *Industrial Policy: Old and New Issues* (UNU-WIDER Working Paper no 106), Helsinki: United Nations University — World Institute for Development Economics Research. Available at: http://www.wider.unu.edu/publications/working-papers/2010/en_GB/wp2010-106/, accessed 19.10.2014.
Nunn N., Trefler D. (2010) The Structure of Tariffs and Long-Term Growth. *American Economic Journal: Macroeconomics*, vol. 2, no 4, pp. 158–194.
Pack H., Saggi K. (2006) Is there a case for industrial policy? A critical survey. *World Bank Research Observer*, vol. 21, no 2, pp. 267–297.
Polivanov A. (2014) Tseny na neft' i VVP: velika li zavisimost'? [Oil prices and GDP: Is there a great dependence?]. *Vedomosti*, 07.10.2014. Available at: http://www.vedomosti.ru/companies/news/34371881/ceny-na-neft-i-vvp-velika-li-zavisimost, accessed 22.09.2014.
Price C.V. (1981) *Industrial Policies in the European Community*, Houndmills, Basingstoke, Hampshire: MacMillan Trade Policy Research Centre.
Putin V. (2012) Nam nuzhna novaya ekonomika [We need a new economy], *Vedomosti,* 30.01.2012.
Rodrik D. (2004) Industrial Policy for the Twenty-First Century (CEPR Discussion Paper no 4767), London: Centre for Economic Policy Research.
RUSNANO (2012) Godovoi otchet OAO «ROSNANO» za 2012 god [RUSNANO Annual Report for 2012], Moscow: RUSNANO. Available at: http://www.rusnano.com/upload/images/normativedocs/ROSNANO_AR-2012_Rus.pdf, accessed 22.09.2014.
RUSNANO (2013) Godovoi otchet otkrytogo aktsionernogo obshchestva «ROSNANO» za 2013 god [RUSNANO Annual Report for 2013], Moscow: RUSNANO. Available at: http://www.rusnano.com/upload/images/normativedocs/ROSNANO-OAO_Annual_Report_2013_Rus.pdf, accessed 22.09.2014.
Simachev Yu., Ivanov D., Kuznetsov B., Korotkov M., Kuzyk M. (2012) *Gosudarstvennaya antikrizisnaya podderzhka krupnykh i sistemoobrazuyushchikh kompanii: napravleniya, osobennosti i uroki rossiiskoi praktiki* [Public anti-crisis support of large and strategic companies: Trends, features and lessons of the Russian practice] (ed. A. Radygin), Moscow: Delo.
Simachev Yu., Kuzyk M. (2009) Gosudarstvennye korporatsii: osnovnye napravleniya i tendentsii razvitiya v 2007–2008 gg. [Public corporations: Main directions and trends of development in 2007–2008]. *Rossiiskaya ekonomika v 2008 godu. Tendentsii i perspektivy* [Russian economy in 2008: Trends and outlooks], issue 30, Moscow: Institute for the Economy in Transition, pp. 468–489.
Simachev Yu., Kuzyk M. (2012) Gosudarstvennaya antikrizisnaya podderzhka rossiiskikh kompanii: pomoshch' i ogranitcheniya [The State Anti-Crisis Support of Russian Companies: Assistance and Restrictions]. *Zhurnal Novoi ekonomitcheskoi assotsiatsii* [The Journal of the New Economic Association], no 1, pp. 100–125.
Simachev Yu., Kuzyk M. (2013) Rossiiskaya politika po stimulirovaniyu innovatsii: evolyutsiya, dostizheniya, problemy i uroki [Russia's Innovation Promotion Policies: Their Evolution, Achievements, Challenges and Lessons]. *Rossiiskaya ekonomika v 2012 g. Tendentsii i perspektivy* [Russian Economy in 2012. Trends and Outlooks], issue 34, Moscow: Gaidar Institute Publishers, pp. 521–571.
Simachev Yu., Kuzyk M., Kuznetsov B., Pogrebniak E. (2014) *Industrial Policy in Russia in 2000–2013: Institutional Features and Key Lessons*, Moscow: Gaidar Institute for Economic Policy.
Warwick K. (2013) *Beyond Industrial Policy: Emerging Issues and New Trends* (OECD STI Policy Paper no 2), Paris: OECD.