

Modernization of the russian economy as the imperative of the country's prospective innovative development*

This paper summarizes the approaches to the definition of the category “economic modernization” and identifies its common and specific characteristics. The basic strategies of modernization and development of innovative processes are considered, the classification of economic modernization depending on a way of its realization and character of plant renewal is presented in this paper. The necessity of the Russian economy modernization is also proved, the purpose, problems and priority ways of its carrying out are formulated. It is argued that Russia needs new industrialization (with the active and coordinated participation of government, business, science and society) with creating competitive industry producing the required products for the country.

Russian economy, modernization, innovative development, strategic priority and guidelines, innovative-technological breakthrough.



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“Speed of movement is not an end in itself. Especially, if we do not control its trajectory”¹.

After the long period of stable growth the economy of the Russian Federation and its regions have faced serious challenges of the global financial and economic crisis which has begun in the autumn, 2008. Conjuncture deterioration on the world and home markets caused a number of negative consequences which have negatively affected an economic

situation in the country: growth rates of most socio-economic indicators have decreased in 2008 – 2009.

Volumes of output and the foreign trade turnover, productivity and investment activity of the enterprises decreased, unemployment grew, incomes of the population decreased and receipts to the budget reduced (*tab. 1*).

Once again financial and economic crisis has shown the hopelessness of Russian export of raw materials model of development², it also

* This work was supported by the Russian Humanitarian Research Foundation (grant № 11-32-03001 “Socio-humanitarian potential of Russia’s modernization”).

¹ Modernization of Russia as the construction of a new state: An independent expert report / I. Ponomarev, M. Remizov, R. Karev, K. Bakulev. - M., 2009.

² Export of raw materials sector includes oil and gas industry, metallurgy, fertilizers and large-capacity chemistry, timber and paper industry. In Russia during the last years this sector had about a quarter of value added and more than two thirds of goods traded in the world market (source: Federal State Statistics Service [Electronic resource]. – Access mode: <http://www.gks.ru>).

Table 1. Indexes of the basic social and economic indicators in the Russian Federation, % to the previous year (cost indicators in comparable prices)

Indicator	2005	2006	2007	2008	2009
Gross domestic product (GDP)	106.4	108.2	108.5	105.2	92.1
Industrial output volume	105.1	106.3	106.8	100.6	90.7
Agricultural output volume	101.6	103.0	103.3	110.8	101.4
Fixed investment	110.9	116.7	122.7	109.9	83.8
Foreign-trade turnover	131.6	126.7	123.5	132.1	64.9
Federal budget incomes	149.5	122.5	123.9	119.2	79.1
Balanced financial result of enterprises	151.3	175.7	111.8	69.1	124.1
Average population income	111.7	114.1	113.1	103.8	101.2
People living on substandard income	87.7	85.3	87.0	101.1	97.9
General unemployed population	90.2	96.0	84.9	124.6	116.5

definitely helped to eliminate the illusion of the ruling elite that market relations themselves will handle the economy and make it effective and competitive³. In these circumstances the economy needs the active state participation which manifests itself in the application of various instruments of direct and indirect influence on the socio-economic processes (first of all in the case of business activity and investment attractiveness of the area, the development of a fair competition and etc.).

The importance of changes in the economy and social sphere is realized by the government (as President of Russia in the message to Federal Assembly in November 2009 proclaimed, the strategic target of Russian society development should be to create “smart” (i.e. innovative) economy, satisfying the needs and interests of the general population) and is reflected in government policy defined by the Concept of long-term social and economic development of the Russian Federation for the period till 2020 (approved by the Government of the Russian Federation from 17.11.2008 №1662-r). The concept points as expected to be realized by means of all-round modernization of economy.

³ The freedom of entrepreneurship is necessary, but it is not a sufficient condition of country's economic development. In the state arsenal there should be a complex system of economic and administrative tools to ensure a reasonable economic policy. And these tools should be reasonably used in coordination on federal and regional level. Only this approach ensures the success (source: Gavrishenko M. About regional industrial policy // Smart production: journal for industrial leaders. – 2010. – № 12).

Nowadays the category “modernization” is widely used in political speeches, periodicals, scientific researches and can be differently interpreted: as update, reform, development, positive changes, etc. According to the classical definition, that also corresponds to the author's position, under **the modernization** (from the Greek “modern” – the newest, the latest) we mean an improvement, development, updating object and its bringing in line with the new requirements and standards, technical specifications, quality indicators [20].

Today in the scientific literature there are many different interpretations of modernization in relation to the economy, which require extending theoretical analysis. It seems reasonable to consider some of the most typical definitions of an analyzing category (*tab. 2*).

The analysis of interpretations presented by the author allowed identifying the following common features of the modernization processes in the economy [14]: necessity, revolutionism, globalism, continuity, priority, system, complexity and standard approach (*fig. 1*).

At the same time, there are specific characteristics depending on *the object of modernization*, namely, on the characteristics of the economy at the macro-, meso- and micro levels. And the success of modernization in many respects depends on activity and coordination in actions of the state, private business, science and society (*the subjects of modernization*).

Table 2. Existing interpretations of the category "economic modernization"

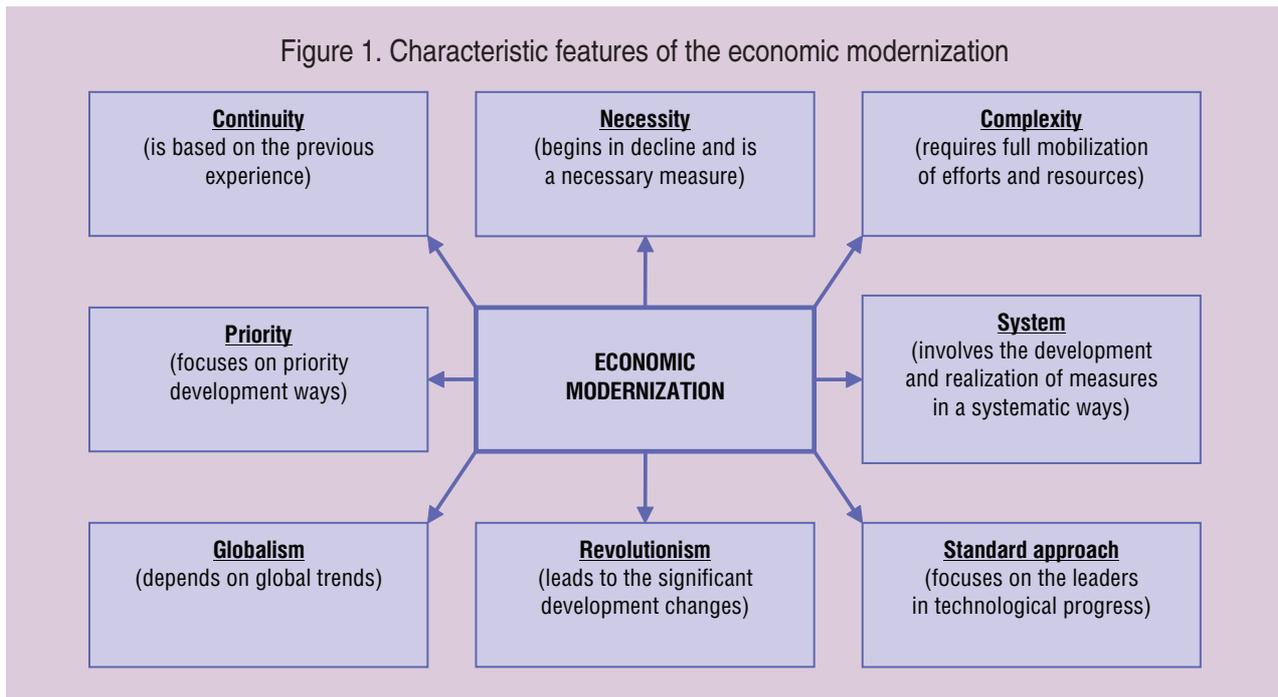
Author	Interpretation	Reference
A.G. Aganbekyan	Economic modernization is a structural reorganization of the national economy, first of all, for the purpose to create an innovative economy and to launch "the innovative mechanism".	Shcherbakova L.A. Modernization of the Russian economy: a multifactorial problem with many indeterminates / L.A. Shcherbakova// <i>Econometric society</i> . – 2010. – № 9. – Pp. 73-94.
V. Gelman	Economic modernization is a number of measures in socio-economic policy aimed at economic growth, prosperity and promoting human capital development.	Gelman V. Authoritarian modernization: what are its prospects in Russia [Electronic resource] / V. Gelman. – 2008. – Access mode: http://www.eu.spb.ru/ .
V.A. Ilyin	Economic modernization is a broad socio-economic concept including the restructuring of the organizational and economic relations, property relations and control relations between the center and the regions, and it is the process leading to the creation of an effective economic growth model.	Ilyin V.A. Modernization of the regional economy (according to the Vologda oblast): synopsis of a Ph.D. thesis in Economics: 08.00.05. – St. Petersburg., 1999. – 39 p.
V.L. Inozemtsev	Economic modernization is a process when the territory overcomes its socio-economic underdevelopment which can cause the loss of competitiveness and economic and political position on the world scene.	Modernization of the Russian Federation: conditions, preconditions, chances: The collection of articles and materials / ed. by V.L. Inozemtsev. – Vol.1. – M: The center of researches of the postindustrial society, 2009 – 240 p.
A.I. Kolganov	Economic modernization is the process of learning the most advanced industrial technologies, economic forms, social and political institutions etc. (according to this historical period).	Kolganov A.I. The experience of the four modernizations in the Russian economy and the problem of catching-up modernization in the post-industrial era / A.I. Kolganov // <i>Philosophy of Economy. Almanac of the Center for Social Sciences and the Faculty of Economics of Moscow State University</i> . – 2002. – № 1.
V.A. Krasilshchikov	Economic modernization is a set of economic and technological changes, leading the society to that position and level of development, which were reached by the leading countries.	Modernization of the Russian Federation: conditions, preconditions, chances: The collection of articles and materials /ed. by V.L.Inozemtsev. – Vol.1. – M: The center of researches of the postindustrial society, 2009. – 240 p.
V.A. Tsvetkov	Economic modernization is a number of structural, technological and institutional changes in the economy to increase its competitiveness in the world, not only in information technology and innovation.	Tsvetkov V. About the starting point of neo-industrial modernization / V. Tsvetkov / <i>Economist</i> . – 2010. – №11. – Pp. 16-26.
E.G. Yasin	Economic modernization means by itself 1)developing production in the modern technological level 2) modernizing production, replacing obsolete equipment and technology to modern, more productive one 3) an organic incusing in the world innovation, fully integrating into the global economy, using all important innovations 4) training, retraining or replacing personnel, retraining and rehabilitating people, learning different way of thinking corresponding to time requirements 5) implementing of structural changes in the economy, formation of industrial structure meeting the criteria of an advanced industrial country.	Yasin E. Modernization of the Russian economy: what is the agenda? / E. Yasin // <i>Society and Economy</i> . – 2001. – № 3-4. – Pp. 5-29.

Meaningfully the category "modernization" is closely connected with the category "innovatization", reflecting the development and adoption of innovations⁴ in all spheres

⁴ Innovation is the end result of innovation in the form of new or improved final product that is introduced into the market, new or improved technological process that is used in practice, or in a new approach to management and social services (source: *Science and innovation statistic: a brief terminological dictionary* / ed. by L.M. Gohberg. – M: CSRS, 1996. – Pp. 30-31).

of human activity. Therefore, it is necessary to differentiate these categories: if under the category "innovatization" one means the accelerating territory's socio-economic development on the basis of something again created ("movement from the present to the future"), and the category "modernization" is the creation of fundamental infrastructural preconditions for a such development according

Figure 1. Characteristic features of the economic modernization



to already well-known achievements in science, technics and technology (“movement from the past to the present”). In sum, *modernization*, in our opinion, *is the basis for the territory transition to an innovative way of development*, where innovation plays the main role in ensuring the effective functioning of the economy and social sphere.

Thus, on the basis of the aforesaid, under **economic modernization** we will understand the process of overcoming by this or that territory its social and economic backlog in the development, that can cause the loss of competitiveness and economic and political positions on the world scene (according to the definition offered by Doctor of Economics V.L.Inozemtsev, the editor-in-chief of journal “Free thought”) [14].

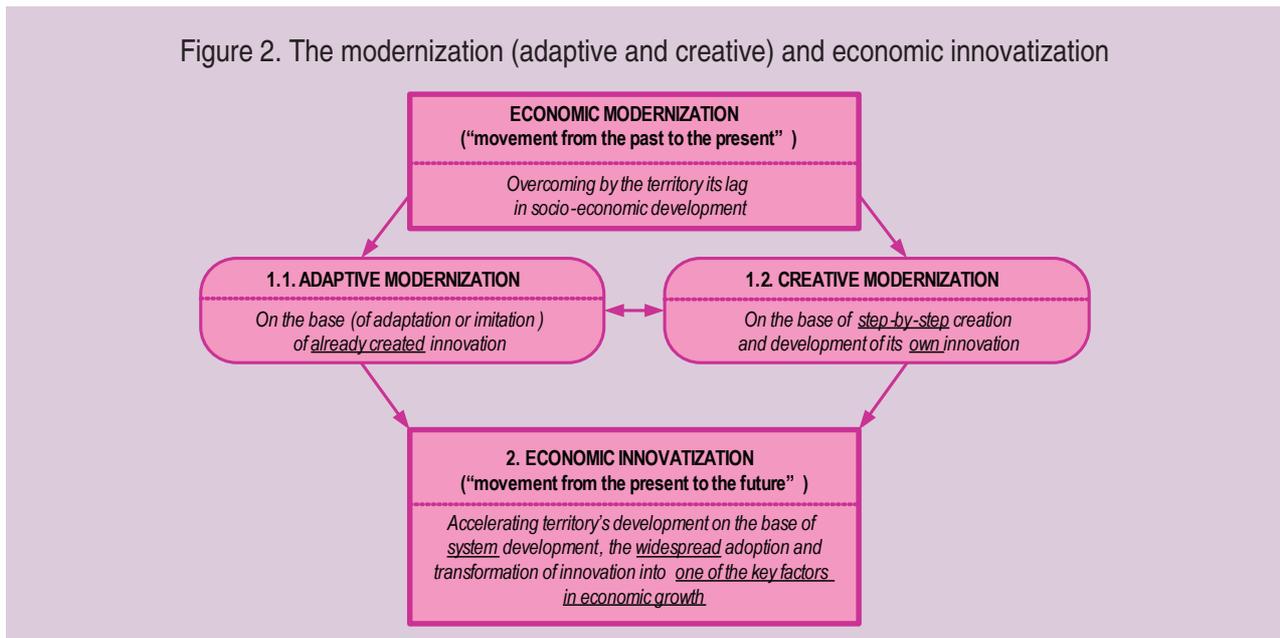
It should be noted that economic modernization can be subdivided into *an adaptive and creative one* [1, 2].

The former is implemented by borrowing (adaptation / simulation) already created innovations that are closely connected with buying of copyrights, licenses, etc. The latter one is implemented in conditions of step-by-step creation and implementation of its own technological developments.

Creative modernization involves not only high financial costs, but it also makes a great demands on the scientific and technical potential of the territory. Thus, this type of modernization is a kind of intermediate stage from borrowing to the system designing, developing and transforming innovation into one of the key factors in economic growth, i.e. innovatization (*fig. 2*). As a rule, the both types of economic modernization are combined in different proportions, reflecting the level of innovative development of the territory.

Awareness of the need to realize the economic modernization arises when a gap in the development level of the territory compared to the best experience, becomes obvious, and even critical. It should be noted that the problems of economic modernization in different countries arise in different contexts. Thus, for developing countries to serve as benchmarks advanced nations that took a leading position in the world. Thus, the highly-developed countries taking a leading position in the world set the example for developing nations. In turn, from time to time even the most advanced countries faced with the impossibility of further development on the basis of previous economic, social and political arrangements.

Figure 2. The modernization (adaptive and creative) and economic innovatization



In this case, the ability to use the full potential of the economy at every stage of historical development is the criterion of the modernization for the leading country [11].

Industry changes forming a technological mode⁵ are at the heart of the economic modernization (according to the theory of “long” waves by N.D. Kondratiev, to an innovative theory by J. Schumpeter and G. Mensch). It must be said that the technological level of development in the last four decades belonged to the fifth technological mode, which core consisted of electronics and computer engineering, telecommunications, robotics, information services. Technological leadership in this way of life belongs to Japan, the USA, Germany, Sweden and other EU countries. Now begins the fundamental development of the next – sixth technological mode that is based on the introduction of computer technology into all stages of the reproductive process, and the development of nano- and biotechnologies (tab. 3).

⁵ Under the *technological mode* one understands the technology-associated production united by general technological principles, labor culture and production organization, its orientation on the appropriate type of public consumption and lifestyles of the population (source: Glazyev S.Y. Strategy of accelerated development of Russia in the global financial and economic crisis. – M.: Economics, 2010. – 255 p.).

An analysis of the world experience of modernization and innovation development suggests that now there are *three main strategies of development* [17]: a) “transferring”, b) “catching up development”, c) “increasing” (tab. 4).

The strategy of “increasing” is characterized for highly-developed countries and it suggests the active exploration and development of innovation through the use of existing scientific and technological potential. Developing countries widely use strategies of “transferring” and “catching up development”, implying the borrowing (adaptation) of technologies and development (imitation) of production have been previously released in highly-developed countries.

At the heart of a strategy may be *two alternative ways of modernization* [26]:

1) “*from above*” – the way of the strong state power influence on achieving goals of modernization (typically for developing countries, where there is a strong role of the ruling elite);

2) “*from below*” – the support of private initiative and everybody’s energy and in this case the state creates the conditions and institutions promoting modernization processes (typically for countries with open free economies).

Table 3. Chronology and characteristics of technological modes

Characteristics of the mode	The number of the technological mode					
	The first mode	The second mode	The third mode	The fourth mode	The fifth mode	The sixth mode
Periods of dominance	1770 – 1830s	1830 – 1880s	1880 – 1930s	1930 – 1970s	1970 – 2010s	2010 – 2050s
Technological leaders	Great Britain, Belgium	Great Britain, Germany, the USA, France, Belgium	Great Britain, Germany, the USA, France	Western Europe, the USA, the USSR, Japan	the USA, Japan, the EU	the USA, Japan, the EU, China
Core of the technological mode*	Textiles, textile machinery, iron smelting, iron processing, construction of canals, water engine	The steam engine, railway construction, transportation, car- and shipbuilding, coal-, machine-tool industry, ferrous metallurgy	Electrical and heavy engineering, steel production and distribution, power lines, inorganic chemistry	Car- and tractor building, non-ferrous metallurgy, production of durable goods, plastics, organic chemistry, oil manufacturing and oil refining	Electronics, computer, fiber optic equipment, software, telecommunications, robotics, gas production and gas processing, information services	Nano electronics, molecular-and nano photonics, nano materials and nano structured coatings, nano biotechnology, nano system technology
Key factor**	Textile machinery	Steam engine, machines	Electric motor, steel	The internal combustion engine, petrochemicals	Microelectronic components	Nano technology, cell technologies
Advantages of this technological mode compared to the previous ones	Mechanization and the concentration of production in factories	The increase in volume and in concentration of production on the base of using the steam engine	The increasing production flexibility through the use of an electric motor, the standardization of production, urbanization	The mass and serial production	Individualization of production and consumption, increasing production flexibility, overcoming the environmental constraints on energy - and material consumption on the base of CALS-technology	The sharp decline in energy- and material production, construction of materials and organisms with predetermined properties
Modes of economic regulation in the leading countries	The destruction of feudal monopolies, restriction of trade unions, free trade	Freedom of trade, restriction of state interference, the emergence of sectorial trade unions, the formation of social legislation	Expansion of government regulation institutions, state ownership on natural monopolies, basic infrastructure, including social one	The development of state institutions of social security, the military-industrial complex, indicative planning and policy	State incentives for research and development, increase of spending on education and science, the liberalization of the regulation of financial institutions and capital markets	Strategic planning of scientific and technological and economic development, e-government, development institutions and funds financing innovative activity

* *The core of the technological mode* is a complex of basic sets of conjugate technology industries.

** *A key factor* is technological innovation involved in creating the core of technological mode.

Table 4. Analysis of strategies for developed and developing countries [17]

	The type and content of the strategy	Disadvantages of the strategy	The basic requirements for strategy realization
Modernization	The strategy of "transferring" (the Japanese experience in the mid-twentieth century). Use of existing foreign technical and scientific capacity and transfer (borrowing / adaptation) of innovations into its own economy	Dependence on highly developed countries and a threat to national security	The need for significant financial costs to acquire licenses
	The strategy of "catching up development" (the experience of China and South-East Asia). Development (simulation) of production have been previously released in the developed countries	Inability of "catching up" nation to create structures and institutions, signaling correctly to the public about the declining trend, and thus preventing the system from "overheating". Inability to concentrate the efforts on modernization of all sectors of the economy	Sector development of small businesses in innovation. The sharp increase in investments due to current consumption (for example, the share of savings in GDP of leading countries in South-East Asia is 35-37% against 14-17% in the USA). It is necessary to borrow technologies and to attract foreign capital
Innovatization	The strategy of "increasing" (the experience of highly developed countries). One uses its own scientific and technical potential with the participation of foreign scientists and engineers, the integration of basic science and universities of applied sciences	–	With limited funding it should be based on the implementation of a narrow circle of highly innovative projects. It is necessary to provide a system of government orders issued on a competitive basis, in the conditions of guaranteed state financing and equity participation by private investors

Thus, for developing countries, unlike developed countries (where the modernization was realized most often spontaneously, as a result of the gradual accumulation of spontaneous assumptions, which connection gave impetus to develop), and its characteristic feature was a transferring to modernization through the conscious efforts of individual, influential groups in society (often elite) who realized destructiveness of the existing socio-economic and political situation in the country [24].

The need to **modernize the Russian economy**, especially its industrial production, is of particular importance in the post crisis period. Currently country is experiencing a difficult time, and it is on the important stage of development: the future of Russia and its position on the world stage depend on that, how successful its modernization will be realized.

What chances does Russia have to make the next breakthrough, and what should be done for this? Let's consider it.

Firstly, it should be decided what is the purpose of modernization, and what result is supposed to achieve.

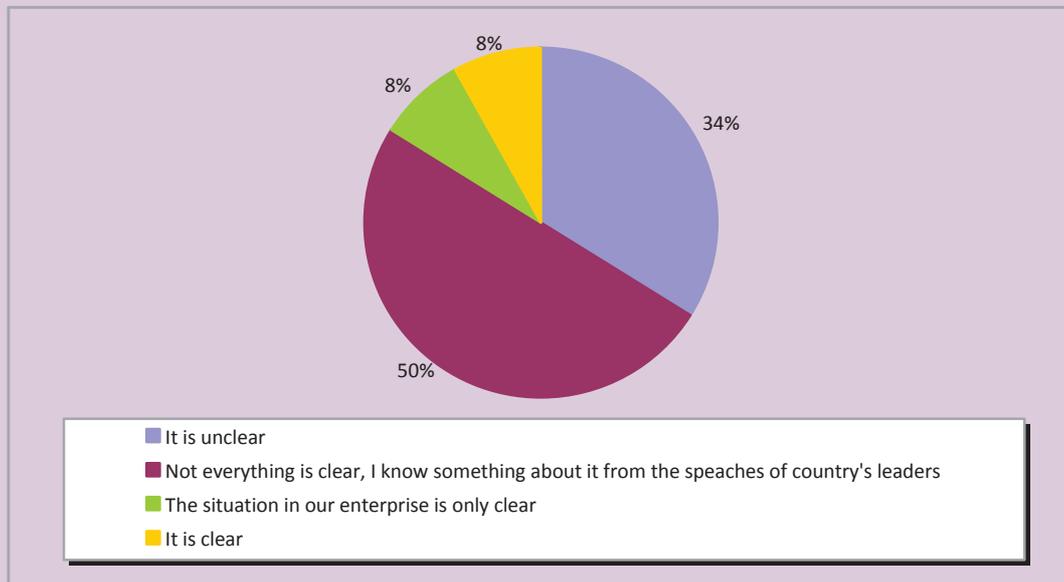
This will allow developing a strategy of modernization and the appropriate set of criteria, tools and mechanisms for its realization.

On the federal and regional levels, the authority takes a number of specific measures to revive the economy, to re-equip economic branches, to establish modern industries. However, a long-term strategic guidance and a clear program of actions that would unite the efforts of all participants in the modernization process, has not yet been established by the government.

As the results of the questionnaire [12] show, the representatives of business (as well as the Russian society in general) do not have a clear conception on that how the economic modernization should be realized (*fig. 3*).

However, it should be noted, that there is not a single model of modernization and it cannot exist, as the internal and external development conditions of the territories are different (determined by the results of historical heritage and long-term political development, socio-economic opportunities and needs for scientific and technical potential, etc.).

Figure 3. Answers to the question: "The state has declared about realizing modernization of the Russian economy. Do you understand the practical measures of this realization?", % of respondents



Therefore, it is necessary to develop our own strategy, taking into account the local experience of the past years⁶ and the examples of successful modernization in other countries⁷.

In our view, *the task of Russia's modernization* should be to overcome the lag in the socio-economic sphere and to create conditions for the next transition of the country in an innovative way of development.

Innovative economies of the most developed states were firstly on the industrial stage of

⁶ History of Russian modernization shows that the country was a leader in the global economy. Most researchers believe that Russia, as a minimum, three times went to the international level as a result of catching-up development modernization: the reforms of Peter I at the end of 17th – at the beginning of 18th century; Agrarian reform in 1861 and the subsequent transformation by S.Y. Witte and P.A. Stolypin at the end of 19th – at the beginning of 20th century; the widespread industrialization of the 1930s. (source: Nikologorsky D. Modernization as a stage of development // The Economist. – 2010. – № 6. – Pp. 25-32).

⁷ Russia is interested in modernization that developed in the XX century, firstly in the USA, and then in the middle of the century overtook leading Western European countries and in its last third part - a number of Latin American and Asian countries. This modernization has produced an industrial basis and preconditions for the transition on the innovative development way by these countries (source: Modernization of the Russian Federation: conditions, preconditions, chances: the collection of articles and materials / ed. by V.L. Inozemtsev).

development, therefore, *a priority task of Russia's modernization* should be to create a modern and competitive industry, which position in the domestic and foreign markets in recent decades have suffered (the information on this issue will be presented later). Only the real sector of the economy (industry with agriculture and construction) now actively developing is able to perceive innovation, to create lines of future breakthroughs into the global markets.

Among other important *tasks of economic modernization of the country* there should be also creating comfortable environment for world-class research, developing labor potential of the population, providing favorable investment climate, developing competitive environment, etc.

It should be noted that a large-scale industrialization⁸ was realized in the Soviet Union, its result was the development of industries of the fourth technological mode.

⁸ Industrialization is the transfer of the economy on industrial tracks, a significant increase in the share of industrial production in the economy, the creation of a large-scale machine production throughout the economy and in its individual sectors (Modern dictionary of Economics / B.A. Raizberg, L.Sh. Lozovsky, E.B. Starodubtseva.).

An outstanding feature of that industrialization was the creation of some companies that made up the complete technological chain (from raw material extraction to final product output) in conditions of its own research and development base. As a result, the Soviet Union took the leading positions on a number of technologies, mainly for military purposes (e.g. manufacturing of small arms and nuclear weapons, armored vehicles and multiple launch rocket systems, space industry, etc.), and then in terms of the peaceful use of existing developments (for example, nuclear power, heavy engineering, automobile and aircraft manufacturing, medicine, etc.).

But during the past decades the success of Soviet modernization was virtually neutralized: the industry did not develop but also actively destroyed. For example, if in 1990 the average life of machinery and equipment accounted 12–13 years, then in 2010 it increased to 19 years (in Western Europe – 8 years). The level of labor productivity in Russia in comparison with developed countries is lower in 2.5–3.5 times, and energy intensity of the GDP is higher in 2–3 times, material intensity is higher in 1.5–2 times [25]. Costs of scientific organizations and industrial enterprises on research and development and their further transformation into innovations are also insignificant compared to the abroad leaders (tab. 5).

As a result, in the economy of modern Russia about 50% of industry belongs to the fourth technological mode, 4% – to the fifth mode and less than 1% – to the sixth one. The third and the fourth technological modes are dominant in most industries. As a result, the share of high-tech, a science-intensive and innovative industry in the national GDP reaches only 10–11% (in developed countries – more than 30%) [10].

The crisis demonstrated the problems in industrial production and in the Russian economy in whole accumulated during two decades of economic reforms. The main ones are: a) the dominance of primary industries and industries with a low degree of processing, b) raw material export orientation and high dependence on the domestic market from imported products, c) the low competitiveness of enterprises, and d) the dominance of large- and mega-sized companies with small share of small- and medium-sized businesses, etc.

According to some experts, in particular, V.L. Inozemtsev, A.I. Kolganov, V.A. Krasilshikov, N.Y. Petrakov, L.G. Simkina (that corresponds to the author's position), *under these circumstances, Russia needs a new industrialization, that consists in creating a competitive industry producing most of the necessary products*. After this will be a need for innovation and the conditions for significant technological breakthroughs.

Table 5. Indicators of science and innovation activity in Russia and developed countries [18, 19]

Indicator	2005	2006	2007	2008	2009	Leaders*
The share of domestic expenditure on research and development in GRP (GDP),%	1.07	1.07	1.12	1.04	1.24	France – 2.02 Germany – 2.53 Japan – 3.39
The amount of the produced security documents on inventions and the useful models per 100 thousand population, units	19	21	20	22	26	France – 22 Germany – 26 Japan – 111
The share of expenditure on technological innovation in the GRP (GDP),%	0.66	0.79	0.71	0.73	0.92	France – 2.3 Germany – 2.5 Japan – 2.8
The share of organizations realizing the technological innovations, in the total number of organizations, %	9.3	9.4	9.4	9.6	9.4	Japan – 33.0 France – 36.1 Germany – 62.6
The volume of innovative products in total production volume, %	5.0	4.7	4.6	5.0	4.5	Germany – 10.2 France – 10.9

*Presented in 2009 or in the years in which data are available.

Modernization of the economy will determine the reforms in other activities; the successful experience of modernization in Japan, South Korea, Singapore, China, etc. shows it.

First of all, Russia needs to acquire and to develop the most advanced technologies, to modernize the infrastructure, to attract investors. It is necessary to rely on fundamentally new developments of the fourth and fifth technological modes, that would require replacement of physically and morally obsolete funds in all sectors of the economy into the latest technological systems that provide the cost-effective use of resources, high economic efficiency and production competitiveness. And as we reach the level of developed countries we should increasingly switch into innovation, focusing on the formation of the key ways of the sixth technological mode, and choose from them such ones, where Russia can become a leader and find its niche in the global market⁹.

Thus, in modern conditions for the development of Russian economy and of the country in general it is reasonable to combine the strategies of “transferring” and “catching up development” according to production previously manufactured in developed countries, and to adopt the strategy of “increasing” in terms of active development and exploration of their own innovation on the base of using existing scientific and technological capacity.

Secondly, it is necessary to define, who will carry out modernization, and what means for this purpose are required. As in many respects this depends on a choice of the main participants of modernization processes, their condition and resource support.

⁹ The world has already the experience of technological breakthroughs by such countries as China, India, Singapore, Taiwan, and others, that show that the state can increase its level of innovation and become one of the most technologically advanced countries in the next phase of growth technological mode (source: Modernization of the Russian Federation: conditions, preconditions, chances: the collection of articles and materials / ed. by V.L. Inozemtsev).

Currently in Russia there are two main concentration centers of significant financial resources (the potential modernization subjects that could be an accelerator for economic development): state and primary monopolies, formed in the last decade of the twentieth century due to the privatization of the most profitable, mainly primary, enterprises. Academic institutions and small¹⁰ and medium-sized businesses are of great importance in terms of research and advanced development and implementation of these results into the production.

In the current socio-economic conditions, the situation is the following one: the Russian government reaches to save being afraid of wrong investments and the danger of “burying” of funds (which are restricted as a result of the crisis), as it has happened in the USSR. Not less carefully the large-sized capital behaves, estimating the high cost of any technological projects, their high risks and the delayed economic benefit in comparison with investments into oil, gas or trade. And small- and medium-sized businesses are passively involved into the design and development of innovation. According to surveys in Russia in whole [8], this situation has the following reasons: lack of own funds and poor financial support from the state, lack of qualified personnel, the imperfection of the legal framework, lack of demand, etc. It's not a secret that in the past decades the insufficient attention was given to the development of Russian science, and this is evidenced by the decrease in funding and numbers of scientific personnel, reduction of inventive activity, aging laboratory facilities, etc¹¹.

¹⁰ Small business has a greater mobility and flexibility to respond to changing conditions and demands in the market (market demand, inflation, unemployment, etc.), than medium- and large-sized enterprises, so now it is one of the main tools for solving social and economic problems (source: Glazyev S.Y. Strategy of accelerated development of Russia in the global financial and economic crisis.).

¹¹ More information about the scientific and technical sphere in Russia is shown in the works by such researchers as A.E. Varshavsky, B.N. Kuzyk, G.A. Lakhtin, V.L. Makarov, L.E. Mindeli, Y.V. Yakovets etc.

State leadership is very necessary in this situation, and political will and professionalism of state leaders gain exceptional value. In addition *the state* must fulfill its primary function in the economy – to identify priorities and to create conditions for development of private initiative, free market, fair competition, creating an investment climate under which in Russia it would be profitable and safe to produce goods and services. In turn, *small-, medium- and large-sized businesses* should be the main agent for future modernization, undertaking the role of the acquisition, development (with the active participation of representatives from the science), distribution and introduction of advanced achievements.

In order to achieve a desired result, in the process of their activities the authorities and government bodies should rely on various forms of public-private partnerships that are profitable for the both sides – government and business, *with a maximum use of competitive advantages that the country possesses* [6, 10]:

- a high level of education and spiritual traditions that guide people to the creative artistic work;
- abundant natural resources that provide the largest part of domestic demand for raw materials and energy resources;
- a vast territory and large domestic market that provide a wide variety of vital functions and needs of population;
- a large amount of unbound savings, which are engaged into economic turnover and it can increase the level of investment activity;
- advanced scientific and technical potential, possession of significant technological developments in a number of promising scientific areas;
- free capacity to quickly increase production with negligible costs, etc.

According to the academician A.G. Aganbegyan, *sources of additional investments to modernize the Russian economy can be:*

a) increase of the investment share in the consolidated budget by reducing operating costs;

b) use of a part of gold and exchange currency reserves of the country;

c) privatization of non-strategic public enterprises;

d) bonded investment loan released by the government and profitable for the population and foreign investors;

e) loans provided by Russian banks after the decision to strengthen the incentives for the implementation of “long” money, including at the expense of pension, insurance and mutual funds; e) use of economic entities funds in the case of reduction of taxes, customs duties, etc [25].

Thirdly, it is necessary to select the priority ways of economic development (defined by the state), on which the success of the modernization depends.

The possibilities are always limited, so it is reasonable to determine the vector of force application, and to build an effective scheme of allocating resources and coordinating efforts of modernization subjects.

At the first meeting of the Commission on Modernization and Technological Development of Economy¹² from 18.06.2009 the Russian President named five lines of modernization and technological development of economy, such as medical technology, energy efficiency, nuclear technology, telecommunications and space industry, information technology. However, the contribution by nuclear energy, space segment, pharmaceuticals and computer science in GDP is around 3.5%, but less than 3% of all workers in the country employ in these industries. One can get the impression that the planned targets reflect the “residual” approach to the problem of modernization [9].

According to many experts (V.L. Inozemtsev, B.Y. Titov, V.A. Tsvetkov, M.M. Spiegel and others), these five priorities in the coming years will not change the situation in the economy and in the country in whole.

¹² Established according to RF Presidential Decree from 20.05.2009 № 579 to considerate problems of public policy in the modernization and technological development, to define priority lines, forms and methods of state regulation, to coordinate activity of executive power in this area.

It is necessary to develop the traditional economic sectors providing high potential of growth, productivity and demand for innovations:

- machinery-producing industry, including machine-tools and other precision industry, transport and power engineering, shipbuilding, aerospace and automotive industry, including production of its components;
- chemical, biotechnology industry: the production of polymers and composite materials, new fuels, fine chemicals, including pharmaceutical and cosmetic industries;
- food industry: extensive processing of agricultural raw materials, primarily domestic ones;
- information and communication technologies, including instrument making industry, electronics, development of software, telecommunications equipment and medical devices;
- production of consumer goods, etc. [3].

At the same time, it should focus on the elements of the future technological mode, i.e. on the new “growth points”: the extension of active human life, nano- and biotechnology, alternative energy, etc. And, considering features of the Russian economy development, it is necessary to work according to internal requirements (import substitution, national safety), and to occupy exclusive niches in the system of global demand.

Summing up the consideration of theoretical aspects of the category “modernization” and the possibilities of its carrying out in the conditions of the Russian economy, it would be desirable to note the following:

1. Modernization as the pulling up of the society’s development level to the level of the most developed countries, relates to a greater degree of health improvement problem, economy development to further transition of the territory to the innovative way of development, where innovation plays a main role in effective functioning of the socio-economic sphere.

2. Modernization is not an one-stage step, but a complex problem which requires a realization of the coordinated actions in a broad range of issues. So there must be developed a strategy with a clear program of actions that will provide the mobilization and concentration of all resources of the country to carry out the modernization.

3. By the developing strategy it must be taken into account that modernization is being carried out in the concrete country and takes into account the historical and cultural traditions of the people which should organically fit into the modernization process, increasing their potential. And in this case, the state fulfills a function of setting priorities and shaping the conditions for the further development of the national economy, and business sector with the active participation of science carries out the reproductive activities in the given orientation.

4. Russia has a chance to make innovation and technological advance, focusing on the acquisition of new achievements of the fourth and fifth technological modes, and as it reaches the level of developed countries it will develop the basic technology of the sixth mode taking into account its own unique potential and historical experience.

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