

## SCIENCE AND TECHNOLOGY COMPLEX OF THE RUSSIAN FEDERATION IN THE TRANSITION PERIOD

<sup>a</sup>ELENA V. BODROVA<sup>1</sup>, <sup>b</sup>VIACHESLAV V. KALINOV

<sup>a</sup>MIREA - Russian Technological University, 19454, Moscow, Vernadsky Prospekt, 78, Russia

<sup>b</sup>Gubkin Russian State University of Oil and Gas (National Research University), 119991, Moscow, Leninsky Prospekt, 65, building 1, Russia

e-mail: <sup>a</sup>editor@ores.su, <sup>b</sup>info@ores.su

Abstract: on the basis of previously unpublished archive materials, the problem of the survival of the science and technology potential of the Russian Federation is explored immediately after the collapse of the USSR. The conclusion is that in the early 90s emergency measures to preserve the most important components of the science and technology complex, fundamental science, education and the remaining part of the human resources were taken. The main directions of this policy were targeted support directly to scientists and scientific groups; there were attempts to distribute extremely limited budget funds through competitive mechanisms. But these measures provided only the survival of a small part of the STC, focused on getting rid of "ballast", on training the young generation at the level necessary for the market and "knockdown production." The government's strategy, ignoring the recommendations of the scientific community, could not ensure the development. As a result, many world-class science schools disappeared, the process of "brain drain" intensified, the share of enterprises and organizations engaged in the development and use of innovations decreased. Sectoral science collapsed.

Key word: Collection of Science and Technology, Federation of Russia, Transition period

### 1 Introduction

Global challenges, which Russia faced, require a technological breakthrough and an activation of innovative processes. The sphere of science and technology is among the national priorities. Hence, the importance of science-based and consistently implemented by the government scientific and technological policy (GSTP) is growing. This requires the accumulation of all the most positive moments from the historical experience of its implementation and the formulation of lessons for the purpose of non-repetition of the previous miscalculations.

An analysis of the scientific literature shows that not all researchers believe in the possibility of the Russian Federation to modernize at the present time. For example, V.S. Martyanov is very skeptical about Russia's ability to "jump from the dilapidated industriality of classical modernity to the bright future of post-industrialism" (Martyanov, 2008). The Modern Stage of Modernization of the Russian Federation V.B. Pastukhov considers as the second edition of "transformation period", because in his opinion "the essence of the concept of "modernization" is reduced to the fact that without any crucial changing in the fundamentals of political and economic systems, with one strain of political will and the proper goal-setting it's possible to give a fresh impetus the development of society as a whole and the economy, in particular" (Pastukhov, 2011).

We investigated the main problems of the evolution of GSTP at various stages of national history in a number of publications (Kalinov, 2011). However, the relevance of the topic, previously unexplored aspects, the analysis of unpublished archival documents led us to the decision to consider the subjects connected with the functioning of the science and technology complex in the early 1990s in the context of the reforms implemented during this period, to evaluate their results and consequences for the fundamental and applied science, the personnel potential of the STC of the Russian Federation.

### 2 Methodology

As a basis for our research we defined the theory of modernization. The peculiarities of the model of multi-line modernization include: recognition of the possibility of modernization on its own path, taking into account and based on national characteristics; the exceptional importance of

sociocultural, external, subjective factors and the factor of historical randomness.

The historiography of the problem includes studies that analyze the main directions of the scientific and technological policy of the Russian Federation during the transformation period (Gusarova, 2013). The excessive negativity was typical for researches in the early 1990s. In our opinion, a significant role in this has been played by the social pessimism of a significant part of society regarding the implementation of policy in the scientific and technical sphere, its declarativity and incompleteness of projects. This period of the historiography of the topic differs in the variety of the problems studied and at the same time with insufficient attention to the problems of developing and implementing the GSTP, assessment of its efficiency, searching for inhibitory factors, and studying domestic and foreign positive experiences with the goal of developing practical recommendations.

A significant part of works of recent decades is devoted to a general analysis of radical changes in Russian society in the 1990s (Bykovskaya, 2005). A large number of publications are devoted to the problems of implementing economic policy (Kodin, 2002). In the works of A.G. Agadzhanyan, S.V. Kulakova, E.E. Mironets, N.N. Razuvaeva certain aspects of the topic of interest to us were studied: the results of the chosen version of social and economic modernization, the collapse of high-tech industries, stagnation in science and the education system, the "brain drain"; the results of a sharp social stratification of society, due to nomenclature privatization, the relationship between government and business.

The authors of this study attempted to consider one of the most important and still little studied reasons for the inhibition of modernization processes and at the same time to reveal the factors of the survival of Russian science at the very beginning of the implementation of reforms. We managed to significantly expand the source of research, primarily due to the introduction into the scientific circulation of unpublished documents of the State Archive of the Russian Federation (SARF), the Archive of the Russian Academy of Sciences (ARAS).

### 3 Results

A significant number of documents of 1992 indicate a crisis situation that has developed in the science and technology complex of Russia after the collapse of the USSR. On February 11, 1992, parliamentary hearings "Science and Education in Conditions of Price Liberalization" were held. After the reports and assessments of experts and deputies, the Committee on Science and Public Education of the State Duma appealed to the President of the Russian Federation, B.N. Yeltsin, asking to approve the Decree "On Urgent Measures to preserve the scientific and technological potential of Russia ...." (Gordon and Klopov, 2001). On the basis of projects developed by the Ministry of Science, Higher School and Technical Policy of the Russian Federation. This document, signed on April 27, 1992, formed the basis for the establishment of a multi-channel financing system (budgetary and extra-budgetary funds). It was envisaged through the competitive mechanisms to allocate extremely limited budget funds. Scientific organizations were exempted from paying taxes on land and property, enterprises ordering R&D got privileges for income tax, privatization of pilot production was prohibited.

With the characteristic of the critical state of the scientific and technological potential of the Russian Federation, given in early 1992 by experts from the Ministry of Science, Higher Education and Technical Policy of the Russian Federation, it is difficult not to agree that in reality, a powerful science and technology complex (STC), created in the USSR, entered the stage of decay. However as we now know, all the hardest moments were yet to come. And at that time organizations and enterprises of the

Russian Federation engaged in scientific and technological work amounted to more than 60% of all organizations and enterprises located in the territory of the former USSR and performing such work. In defense and academic science this share was 70-80%.

The number of workers in the main activity in scientific organizations of Russia decreased by 265.6 thousand people only during 1991. And as of January 1, 1992, there were 1,678,000 people, including 16,300 doctors and 119,200 candidates of science. By this time, the Russian R&D sector was characterized by features that were negative in nature: significant differences in the quality and results of R&D of the defense and civil branches of science, "metropolitan" and peripheral science. Most of the scientific organizations had a weak experimental base. 60% of scientific research institutes and more than 80% of universities did not have any experimental base at all. The need for scientific instruments was satisfied by 20-25%. The country received less than 1/3 of the world scientific and technical information.

In 1992 centralized purchases of foreign scientific literature practically ceased. There was a lack of stable funding for science, which made it impossible to conduct serious comprehensive studies and update the experimental base. In the first half of 1992, it was envisaged to allocate only 32% of the minimum amount of necessary funding, as it was estimated by the Russian Ministry of Science, from the republican budget for civilian R&D.

In February 1992, the Presidium of the Russian Academy of Sciences was forced, taking into account the inadequate allocation from the state budget for the first quarter of 1992, to take measures to concentrate resources on the main directions of basic research; to consider the reorganization of the institutions that make up its branches; eliminate specific research areas and inefficiently operating units; to allocate the divisions occupied with works in interests of separate branches, the enterprises, and to transfer them to financing at the expense of customers; to revise plans for holding scientific conferences, seminars, schools, commemorative and other events. The publication of previously planned scientific literature was stopped, the expenses and apparatus of scientific councils and commissions were reduced.

The measures aimed at saving all types of resources, reducing the costs of maintaining the management apparatus, and representative and other events were taken. It was intended to concentrate financial and material resources on the main directions of fundamental research, to provide support to established scientific schools.

Speaking at the meeting of the Presidium of the Russian Academy of Sciences, the physicist, academician of the Russian Academy of Sciences, V.M. Tuchkevich had to admit: "I believe that we are on the brink of the death of the Academy of Sciences. ... The most valuable in the Academy of Sciences is the creativity, which is contained in the team of scientists of the Academy of Sciences. What can we see now? What is being done with this creativity? It decreases catastrophically. Qualified people, who are not provided with material or sufficient conditions for work, go abroad, where they are provided with completely different working conditions, and the material existence is perfectly secured there. We do not have any of this ... I believe that retaining cadres is our task number 1, and we must direct all our efforts to retain the present cadres and educate new ones".

As a result of the continuing increase in the prices of goods and services, especially municipal ones, during 1992, the repeated increase in the wages of workers, not fully compensated by the growth of budgetary allocations, the reduction in the volume of contractual work, the financial situation of the Academy institutions continued to deteriorate. According to the accounting reports, only for the first half of 1992 the institutions and organizations of the Academy actually stopped buying equipment, drastically reduced current expenses for scientific

work. An expeditionary work, including marine, was practically eliminated in many institutions, and the acquisition of materials, reagents, and scientific literature decreased.

The average salary of employees of scientific institutions of the Russian Academy of Sciences in August was about 4 thousand rubles, which was significantly lower than the average salary for the national economy of the Russian Federation (more than 5 thousand rubles). The level of medical, housing and household provision of the RAS staff was decreasing. This caused the outflow of the most qualified, creative part of scientific and engineering workers abroad and in other areas of activity. The actual reduction in the number of workers in the RAS, mainly for these reasons, amounted to 9.8% for the half-year.

In the current situation, the leadership of the Russian Academy of Sciences appealed to the Government of the Russian Federation with requests to increase the amount of funding for its institutions, but, in fact, did not expect to receive additional appropriations, since they were aware of the state of the budget of the Russian Federation for 1992, at deficit of 906 billion rubles (about 30% of all budgeted expenses).

The situation, indeed, became threatening. And the questions about financing were put forward on the foreground. A number of institutes, organizations and enterprises of the Russian Academy of Sciences leased out premises and other property of the RAS on a large scale, receiving considerable additional funds. At the same time, other academic institutions were forced to spend huge sums for renting the premises they occupied.

This put the leadership of the Academy in front of the need to "make very tough decisions on the reorganization of scientific institutions and organizations, the restructuring of financial policies in order to maximally retain the most highly qualified personnel, key assets, primarily unique research facilities and equipment that formed the basis of the high scientific potential of the Russian Federation Academy of Sciences". As additional potential sources of funding were called: Foundation for Fundamental Research, scientific and technical and other government programs, budgets of republics and territories, means of industry and commercial structures, expansion of mutually beneficial scientific cooperation with foreign countries, active work of institutions, scientific groups and individual scientists on the conclusion contracts for research and supply of R&D deliverables to foreign consumers, grants and subsidies of international and foreign scientific foundations and organizations.

A particular concern was caused by the slow introduction of certain new forms of scientific activity that gave rise to certain hopes, including the contract form for attracting scientists and specialists, and the plans and expectations related to the activation of foreign economic relations were not realized. Many of the concluded contracts and contracts with foreign partners did not correspond to the prevailing world prices for R&D deliverables and services, which undermined the prestige of domestic science, causing economic damage.

However, in the spring of 1992 among other representatives of the scientific communities of the countries of Central and Eastern Europe, the leadership of the RAS was invited to the NATO Science Committee. Considering it inadmissible for the Russian Academy of Sciences to act as a petitioner, its representatives suggested that Western scientists take part in serious projects. Germany promised to help Russian scientists pay for travel, participation in conferences, when invited to individual centers. The leadership of the German Research Society believed that it was possible to partially finance the movement of German scientists in Russia.

The Secretary-General of the Humboldt Foundation, Professor Faer, confirmed the agreement on the allocation of 200 scholarships specifically for Russia in the humanities. He also assured that our young scientists (physicists, biologists, mathematicians) who were scholars of the Humboldt Foundation will be supported in the future, when they return to their

homeland, in the form of delivery of instruments and literature. Special attention was paid to the Russian Academy of Sciences by French scientists, suggesting the organization of trips of their researchers to our institutes and laboratories in order to search for topics for cooperation, new projects or expansion of existing projects, and support this financially.

The French academy has promised to send to RAS all published scientific works. France demonstrated great interest in the space research that was being carried out at that time in Russia. In addition, a memorandum of cooperation between the Russian Academy of Sciences and UNESCO was signed. UNESCO allocated 300 thousand dollars to the RAS. From the Soros Foundation the Russian Academy of Sciences received one hundred thousand dollars to subscribe to foreign journals.

Discussing the financial problems, the leadership of the Russian Academy of Sciences simultaneously counted on the Soros Foundation, which proposed not only allocating funds for science (8 billion rubles), but also recommended the most optimal mechanisms for the distribution of these funds. A specialist in Nuclear Power and Thermophysics, Academician of the Department of Energy, Mechanical Engineering, Mechanics and Control Processes of the Russian Academy of Sciences, V.I. Subbotin, however, did not believe in disinterestedness and characterized such a gesture as follows: "This means buying everything from us for cheap stuff, that's what it really is".

At a meeting of the Presidium of the Russian Academy of Sciences on March 17, 1992, the director of the General Physics Institute of the USSR Academy of Sciences, the Nobel Prize winner, Academician A.M. Prokhorov admitted that the British sent him a clipping from a French newspaper that the Institute of Atomic Energy was purchased by the Americans, while offering him to sell one of the laboratories. "They are going to buy "in the harshest possible way", - he concluded.

The necessity of adjusting the tax policy and introducing tax incentives that facilitate the development and commercialization of new science-intensive and complex technologies was proved in the proposals received from ministries, departments, RAS, scientific organizations, enterprises and entrepreneurs. Experts rightly warned the Government: "The lack of funds for science in 1992 creates a real threat of irreparable destruction of scientific and technological potential. This would mean the transition of Russia to the category of states incapable of independent development".

On February 17, 1992 the Department of Science and Technical Policy of the Government Office of the Russian Federation was forced to inform Deputy Prime Minister A.N. Shokhin "... about the mass receipt of appeals about the need for urgent state support of branch science".

On February 28, 1992, the Ministry of Industry of the Russian Federation also recorded a particularly difficult situation with pilot production and with testing centers and organizations: "In an effort to maximize profits and increase wages, these organizations sell expensive test and research equipment, including imported equipment; refuse from the production of labor-intensive experimental products and switch to the production of conventional serial products, which practically excludes the possibility of creating and mastering the production of new types of equipment developed by research institutes and development organs.

These and other facts allow us to state that the liberal reformers lack a clear and justified program of transformations in the scientific and technical sphere. It took, indeed, urgent measures to save what had not yet been disintegrated. The Ministry of Science, Higher School and Technical Policy of the Russian Federation proposed a concept of reforming the country's scientific and technological potential, the main provisions of which were the following: rejection of the slogan of saving science in general: the principle of selectivity for supporting both research and scientific organizations was one of the fundamental; preservation of the best Russian scientific schools

in the field of fundamental research, which needed to maintain stable budgetary financing; demilitarization and conversion of the R&D sphere of Russia, which constitute the main strategic directions of its structural reorganization; denationalization of the sphere of R&D and its adaptation to market principles of management; transition from the financing of scientific organizations to the financing of targeted projects and programs; providing multiple sources of funding; the creation of regional funds to support scientific and technical development, formed mainly from local budgets with relatively little federal support; ensuring the social protection of scientific-and-technological community.

It was planned to integrate the scientific and industrial potential of Russia into world economic ties, for which it was necessary to ensure the openness of the domestic science, the development of mutually beneficial scientific and industrial cooperation, the development and implementation of measures to stimulate the transfer of high technology, favorable tax and other conditions for foreign investors.

The solution of these problems required, from the point of view of the authors, the implementation of a number of urgent measures (partly specifically designated, and partly un-written and declarative). Among them are the creation of the Russian Foundations for Fundamental Research and Technological Development, the Foundation for the payment of scholarships to talented young scientists, the implementation of measures to prevent the withdrawal from the Research Institute for Experimental Production (subsequently, an appropriate decree was issued, but somewhat belated); preparation of a package of laws and regulations governing the activities of scientific organizations and relations in the field of intellectual property (only partially implemented); the definition of individual tax incentives for scientific and innovative activities (so far, they are clearly not enough).

The authors of the concept believed that such measures in the field of R&D would create "... background for preventing the irreversible destruction of the scientific potential of Russia." It was recognized that, in general, this potential "... will be temporarily weakened", but the possibility that "the losses would not be so great and at the same time a basis would be created for the future technological revival of Russia" remains. "The tasks of the next (following the normalization of the socio-economic situation in the country) stage that will be accompanied by the restructuring of the scientific and technological potential," - the reformers believed - "should be: a new level of resource saving, increased labor productivity, the achievement of high product competitiveness and, as a consequence, a radical transformation of the structure of the national economy, a rise in production and a qualitatively new level of life for the population".

It is a bitter to quote these words in 2018, but probably the authors were full of optimism and, perhaps, believed that only 2-3 difficult years were ahead.

The study allows to state that the real support to the scientific community during this period was provided by the Russian Foundation for Basic Research. Its director was an academician, A.A. Gonchar. In the statute of the RFBR, along with supporting initiative research projects of fundamental research, other forms of activity were envisaged: the possibility of supporting institutes and universities conducting fundamental scientific research in the development of their material and technical base; support of young scientists; international cooperation; information and publishing activities in the field of basic research.

The Foundation for Fundamental Research helped, in particular, to survive the institutions and scientists of the Russian Academy of Sciences. In 1992 on a competitive basis about 2 billion rubles were received from its funds. (Presidential Decree, 1992). An extrabudgetary Russian Fund for Technological Development was also created, it was formed by transferring by ministries, departments, concerns, corporations and associations of 25% of

the money of special funds for financing scientific-research, design and experimental works and development of new types of science-intensive products formed by allocations by enterprises the amount of 1.5% of the prime cost of goods (works, services).

It was decided to form a special fund for the payment of personal scholarships to talented young scientists, having allocated in 1992 50 million rubles of the total amount of allocations for funding science on the republican budget of the Russian Federation.

However, such measures only allowed to stay afloat, but, quite often, they turned out to be a declaration. The Presidium of the Russian Academy of Sciences in March and September 1992 adopted two resolutions in which the heads of specialized departments and scientific institutions were invited to undertake a number of rather tough measures to reorganize the institution of the Russian Academy of Sciences, to restructure the financial policy in order to maximally retain the most qualified personnel and fixed assets, in the first place - the unique research facilities and equipment. But many institutions sought to postpone the implementation of these very painful decisions aimed at preserving only the most important and promising research works and supporting individual scientists (Presidential Decree, 1992).

In this situation, the Presidium of the Russian Academy of Sciences on September 22, 1992 invited the president of the Russian Academy of Sciences, academician Yu.S. Osipova, to address the President of the Russian Federation and the Supreme Council of Russia with a request to consider "... the critical state of institutions and organizations of the Academy" in the IV quarter of 1992 and instruct the Government of the Russian Federation "... to take the necessary measures to save the scientific potential of the Russian Academy of Sciences, in the first place, to increase the material security and social security of scientists and specialists of the Academy's institutions and to preserve the unique scientific objects of the Russian Academy of Sciences, which are the national treasure of Russia".

In the resolution of the leadership of the RAS, the departments and presidiums of regional centers of the RAS were asked to approve the amounts of funding for scientific institutions that make up the corresponding departments and centers without using the actual number of employees of institutions as a basis for determining the amount of their funding, but proceed from the urgency and priority of research directions, their conformity to the modern world level. It was necessary to take a decision on the reorganization of scientific institutions, "... bearing in mind the preservation of particularly priority scientific areas, units and scientific schools with the highest scientific potential, and the liquidation or transfer to legal and economic autonomy and economic calculation of the other structural units"; prepare proposals on the consolidation of the placement of institutions that make up the offices and centers, in order to reduce the volume of rent of buildings and premises, and more efficient use of areas. It was proposed to create labor exchanges specifically for researchers who lost their work.

As for the authorities, the Ministry of Science insisted on prioritizing and supporting only the national centers created on the basis of this list. The position of the RAS was reduced to the fact that the formation of national centers within the Academy of Sciences was possible only with full control over them by the Academy of Sciences.

Minister B.G. Saltykov, speaking at the RAS in September 1992, identified two forms of implementing priorities for science. The first was a program-targeted approach, the concentration of resources on relatively large scientific or scientific and technical problems. The second way of implementing priorities was institutional, when scientists declare certain institutions to be the most priority, important in science. Referring to the experience of the United States, he explained that the centers for priority state support were created primarily in the sphere of state support for defense, space, nuclear research, where, of course,

only state support could facilitate the implementation of long-term studies and, even more the implementation of scientific and technical large-scale developments. The minister assured that the goal of the government "is not to sow discord within".

We were moved to this idea by life itself, by the need either to die together slowly or quickly (depends on life), or to preserve the core of the scientific potential that would transfer knowledge, know-how, if it is about to applied works, etc. through these difficult years ". At the meeting of the Government, the status of scientific centers was given to two institutes: the Obninsk Institute and the Institute of Nuclear Reactors in Dmitrovgrad. According to the speaker, the discussion of such projects was intended to "... shake up an academic atmosphere of relative peace". It seemed expedient to create expert groups, expert commissions, which would determine which scientific centers at that time were the reference centers. The Government's ability to raise the salaries of the remaining scientists would also depend on their number.

V.E. Sokolov, an academician-secretary of the Department of General Biology of the Russian Academy of Sciences, director of the Institute of Ecology and Evolution named after A.N. Severtsov RAS, asked the minister a question that was not quite convenient but precise in nature: can we say "we do not have enough money, let's cut the Academy by one-third and reduce institutions".

The physicist, member of the Presidium of the Russian Academy of Sciences, academician, G.A. Mesyac, was against the creation of a system of scientific centers offered by officials in the Russian Academy, believing that such an approach "will lead to the seizure and collapse of it. The best institutions will be withdrawn from the Russian Academy, they will be financed centrally; cadres will be determined by quite different people." He also objected to the pressure of the authorities on the Academy: "We are always told: let's urgently undergo transformation, otherwise we will not pay you money.

Relations between the scientific community and the new government were very complex. Academician N.G. Basov, for example, in December 1992 expressed dissatisfaction with the nature of these relationships: "In fact," he declared, "all decisions of the Ministry of Science are against the Academy today. Vice-President of the Russian Academy of Sciences, mathematician, academician, A.A. Gonchar, suggested still avoiding harsh statements and take into account that the government "strained and sought" means for the RAS. In this situation, he believed, "all those emotions that we throw out, all those complaints, all those cries for help that we pronounce ..., you can not continue to say exactly with the same emotions and with the same experiences continuously, as this will cause only a negative reaction". They were offered to state all appeals to the Government in a more constructive way (Folarin & Folarin, 2018).

N.G. Basov objected to A.A. Gonchar: What's going on? Today we in comparison with America have allocations for science thousands of times less than in America, and this is not mentioned anywhere. That's the main thing. This is the salary, because of which our people leave our country; this is the lack of funds, the destruction of the defense industry. We can not live like that. There are two ways out of this situation: either have some "islands" and feed them to full saturation, and thus preserve science, or ask for full support. There is no third option. We can not have a good science in these conditions, and our leadership should know about this. We barely make ends meet - our researcher gets a thousand times less than in America. This must be reported to the government. As far as I know from conversations with high authorities, no one really understands this.

Speaking at the General Meeting of the Russian Academy of Sciences on December 22, 1992, President of the Russian Academy of Sciences, academician, Yu.S. Osipov, acknowledged that the past year was a very difficult period in the

history of our country: "It was a year of hopes and disappointments, reforms, creation and destruction, a year of acute economic crisis and impoverishment of the people. We experienced a deep political crisis, when the country, according to the President, was on the brink of a precipice ... It was bad for almost everyone in the country, including us." Yu.S. Osipov acknowledged that the main positive result of the activity could be recognized as the survival of the Academy, due primarily to the dedication of scientists to their cause.

But all forms of expeditionary work were curtailed. The inflow of the experimental material caused by this decrease was equivalent to the curtailment of works in a number of scientific areas. As a result of the nationalization of the property accumulated on the territory of the former republics, many stationary stations, test sites, points that played a supporting role in various fields in the Earth sciences were closed or lost. The scientific institutions of the Academy of Sciences, leading fundamental and applied research related to the study of various natural and anthropogenic processes occurring in the hydrosphere collided with great difficulties in 1992 (Osipov, 1993).

The president of the RAS was forced to talk about... a real impoverishment of science and our Academy." Stating that this tendency began earlier, in 1990, he believed that "... the real collapse occurred in 1992, when the funds were allocated monthly, usually with a long delay. Even taking the most modest conversion factors, and taking into account only official, centralized wage increases, the volume of financing in comparable prices decreased by at least 2.5 times in 1992 compared to 1990. The most serious problem of this year for the Academy's institutions was the cost of heat and electricity, water, rent, security of premises and other mandatory costs, without which the very functioning of institutions, the maintenance of housing and social facilities, and the maintenance of the infrastructure of academic towns were impossible. For specified uses the agencies began spending up to a third of the funds allocated to them. The deterioration in the economic situation of institutions and organizations was manifested most in the provision of their instruments, materials and scientific literature purchased abroad. There was no money for international cooperation (Villalobos Antúnez, 2016).

The cooperation with the academies of sciences of the countries of the Near Abroad also became a problem. In many scientific areas, the RAS communications with them were practically interrupted; they were preserved only at the level of individual institutions and scientists (Osipov, 1993). There were objects of the Russian Academy of Sciences on the territory of the former republics which were destroyed. But some agreements on the joint use of these facilities were signed. To solve this problem, the President of the Academy of Sciences of Ukraine, academician, B.E. Paton, initiated the establishment of an association of academies with the goal of coordinating overall activities. The goal was the restoration of a single open scientific space for academies of sciences of all CIS countries. This proposal was supported by most academies of the republics.

As one of the most important goals of the leadership of the Russian Academy of Sciences, it was determined that it was necessary to carry out an examination of reforms within the country and foreign policy actions. It was pointed out that independence and absolute freedom from the influence of the ruling structures would be an indispensable condition for the activities of our scientists. It was planned that the Academy of Sciences and its institutes would propose various new programs and projects aimed at the benefit of the Fatherland and the most important among them was the Program of the National Revival of Russia. It was also pointed out that it was necessary to protect and ensure the rights and existence of the RAS in relations with the authorities: The government should have a clear understanding at all levels of government, that the support of science and the academic community is not charity and favor, it is the mission and function of the state that exists in the whole civilized world.

Yu.S. Osipov rightly warned: "New Russia inherited from the USSR world-class science, and only the science of the United States could compete on equal terms with it. The creative potential of the Russian Academy of Sciences is not only a huge universal value, but it is the most important strategic resource of the Russian State. An appeal to Russian history shows that science in Russia has traditionally been one of the foundations of statehood. If our state does not take quick and decisive measures to support science, it will lose this strategic resource. Destruction of the scientific potential and its core-fundamental science - will throw Russia into the category of third-rate states" (Osipov, 1993).

Unfortunately, the academician was right. The disintegration of the USSR led to a break in the existing scientific and technical ties with scientific, educational and production organizations developing in the former union republics, the loss of structures and personnel in many areas of science and technology. There was not only a significant reduction in the funding of the scientific sphere. The transition to the planned post-industrialism, liberalization and criminal privatization was constantly accompanied by the problem of survival and preservation of the active part of the country's scientific and technical potential. As a result of liberal reforms, processes of deindustrialization and demodernization of post-Soviet Russia were unfolded.

#### 4 Discussion

In connection with the inhibition of modernization processes in the last decade, issues related to the development and implementation of state scientific and technical policy, choice of priorities both in the period under study, and in subsequent years have become the subject of heated discussions. In the opinion of N.I. Kutepova, a sharp decline in R&D funding in the 1990s was associated not only with the crisis processes in the economy. It was justified theoretically. There was the conclusion from the "economic determinism" (and it was implemented in practice in Russia), about the need to reduce budgetary spending on education, medicine, science and other sectors of the social sphere, on the adequacy of compulsory seven-year education for the population of our country, etc. During two years after the beginning of reforms there was a reduction in the number of employees by 32% only in academic science. It was associated with a decline in production in the 90's, and was due to structural shifts in the economy (reduction in demand for high-tech products) (Osipov, 1993).

Director of the Institute of the USA and Canada RAS, S. Rogov, wrote that as a result of ill-conceived reforms in the 1990s, a significant part of the branch science was privatized and disappeared without a trace. The budget financing of R&D was sharply reduced. The number of scientific researchers has decreased almost three times. There was a loss of whole scientific schools. The current situation, according to the author's point of view, is the result of the implementation of neoliberal economic concepts in Russia, according to which any state intervention in the economy leads to negative consequences. According to S. Rogov "the last twenty years we lived at the expense of the scientific and technological backlog created in the Soviet Union" (Kutepova, 2009)

According to A.E. Warsawskiy and O.S. Sirotkin, in 1990-1997 years the country's scientific potential has decreased by 35-40%. The monetary estimation of its losses in this period amounted to at least \$ 60-70 billion. The number of design, engineering, and planning and surveying organizations decreased 2.8 times. The share of expenditure on R&D (internal costs) in Russia's GDP in 1999 was in line with the level of the 1950s, while the absolute value of total expenditure on R&D was close to the level of the early 1960s. In general, the share of R&D spending in Russia's GDP during the period of reforms has dropped to the level of Egypt, India, Portugal, although in the late 1980s this indicator was consistent with the level of the USA, Germany, Japan and Sweden, where the science spent 2.5 to 3.1% of GDP (Gazeta, 2010).

Political scientist, A.A. Zhdanovskaya, confirms that the neo-liberal reforms that have been implemented in Russia since the early 1990s were the standard reforms of the IMF and the World Bank: "Development through external loans" is an illusion - Russia is increasingly drawn into debt dependence, despite the fact that the reforms themselves, for which loans are allocated, do not bring development of the country, but consolidate and deepen the position of Russia as a periphery in the world capitalist system and the redistribution of resources outside the country from the poor to the rich " (Varshavsky and Sirotkin, 1999).

### 5 Summary

Agreeing with a number of the above judgments, the authors of this study believe that the crisis situation in the scientific and technical complex was caused not only by the general paralysis of the socioeconomic sphere, but also by the absence of a conceptually elaborated state industrial, scientific, technical and innovation policy, the weakness of the legal framework and completely different priorities of the Government.

In general, evaluating the development of the 1990s conceptual documents relating to the scientific and technical sphere, we formulate the conclusion that the task of modernizing the country was not even declared there, there was talk of saving only a small part of the STC, getting rid of "ballast", educating the younger generation at the level necessary for the market and SKD, but not a technological breakthrough. Where there is a disintegration of strategy, there is still a decay strategy. It was possible to stop the deindustrialization and the collapse of the NTC, having a scientifically based and clear program of action. Unequal projects were offered to the Government, but were discussed only in a scientific environment. Domestic experts were not honored by the reformers.

As a result, the demand for production for scientific and technical products fell sharply, the collapse of orders created a dramatic situation in defense science. The outflow of scientists and specialists from the scientific research institute and design bureau was growing noticeably. The social status of the scientist was steadily declining, the prestige of science was falling, the liberalization of prices caused a sharp (by 10-15 times) increase in material costs and overhead costs for maintenance of R&D. In fact, the creation of new objects of science was stopped; the amount of unfinished construction in the scientific and technical sphere of Russia was 1.5 billion rubles. (in the prices of 1991).

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