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Russian Federation Scientific Adaptation Programs to the Market Economy and the Results of Their Implementation

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Abstract

Various conceptual approaches to Russian Federation scientific sphere reforming and its adaptation to market conditions are analyzed on the basis of previously unpublished archival documents, statistical data and other materials; they assess the reaction of the academic community and the heads of large enterprises to the activities carried out by the government in the framework of developed program implementation. The conclusion is drawn that the results of the policy carried out during 1990s in Russian science are catastrophic ones in general. The country developed a fundamental contradiction between the purpose of science and the practical use of its achievements to overcome the crisis. The projects and recommendations of leading scientists were ignored. The programs were declarative ones, funding was reduced sharply, which led to the intensification of the "brain drain" process, the disintegration of scientific schools, and the degradation of production.

Keywords: Modernization, Scientific sphere, State policy, Transition to the market.

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1. Introduction

The need to activate innovative processes, the search for the most optimal strategy of Russian Federation further development, and the heated discussions in this regard, are extremely relevant now to study the problems associated with the development of state policy conceptual framework in the scientific sphere and the practice of its implementation in the 1990s. We discussed the issues related to the reforming of scientific and technical sphere during this period in a number of publications. The following conclusion was substantiated on the basis of archival and other documents: sectoral science was in a particularly difficult situation at the very beginning of the "transition period" (Bodrova & Kashkin, 2017; Bodrova & Golovanova, 2017; Bodrova & Kalinov, 2017). Meanwhile, the studied unpublished archival documents allow us to consider the various aspects of the program development for scientific sphere reformation after the USSR collapse even more objectively and more accurately, to assess the reaction of the academic community to the implementation practice of the measures planned by Russian Federation Government.

2. Materials and methods

We adopted the theory of modernization, formulated by S. Black, W. Rostow, S. Eisenstadt during the second half of the 50's - early 60's as the basis for the study. In our opinion, it determined a very fruitful approach to the history analysis in the 20th century, has undergone a long way of improvement and adjustment. Classical, primary theoretical and methodological structure of the linear model differ significantly (W. Rostow, A. Organsky, S. Black, S. Eisenstadt, M. Levy, D. Lerner, N. Smelser, etc.) and modern versions - unmodernization or postmodernization analysis (E. Tiriakyan, P. Shtompka, R. Robertson, W. Beck, K. Müller, V. Zapf, A. Turen, S. Huntington et al.) (Rostow, 1960; 1971; Turen, 1998; Eisenstadt, 1999).

Nowadays, the model of multi-line modernization (U. Beck, A. Turen, T. Piirainen, P. Shtompka) is among the most popular ones in the scientific community (Poberezhnikov, 2002; Turen, 1998). It has the following features: the recognition of modernization implementation possibility by own way, taking into account and based on national characteristics; an exceptional importance of external, social-cultural, subjective factor, and the factor of historical randomness. In general, modernization is considered as an extremely complex and contradictory process, which takes place under the influence of both external and internal factors.

A significant amount of works of the post-Soviet period is devoted to the general analysis of radical changes in Russian society during the 1990s, but they only touch upon certain issues of the topic of interest (Kodin, 2002; Osipov, 1999; Plimak & Pantin, 2000). The analysis results of various conceptual approaches, assessments and the characteristics of events interesting to us; the need to overcome the inhibition of modernization processes, primarily in the scientific sphere and in the process of innovation activity result introduction into production; the study of unpublished documents turned out to be the determining factors in the decision to study the problem of the program development for Russian Federation scientific sphere adaptation to market conditions and assess the results of their implementation.

3. Result

The USSR had a powerful scientific, technical and industrial potential on the eve of its disintegration, but the errors of the country leadership caused its technological lag (Bodrova & Kalinov, 2017). At the beginning of 1992, within an increasingly difficult economic situation, the Russian Federation Government was forced to acknowledge the existence of a deep structural crisis in Russian science (State Archive of

Russian Federation (SARF). F.10265. Inv.1 C.55. Sh.160-161). In order to provide financial support to large-scale intersectoral, as well as important scientific, technical and innovative programs and projects for the development of science infrastructure and scientific and technical information, an extrabudgetary Russian Fund for Technological Development was established under the Ministry of Science, university system and RF technical policy. For this purpose, the financing of basic scientific research and state scientific and technical programs was performed, but the means for their implementation turned out to be quite insufficient (SARF F.10265. Inv.1 C.55. SH.54).

The leaders of leading research institutes (RI) sent letters to Russian Federation President B. N. Yeltsin, described a very alarming financial situation that developed in their subordinated institutions, predicted a quick collapse of the branch science and asked about the profit tax rate reduction. They also suggested "... to permit stage-by-stage privatization of institutions, and transfer 50% of fixed asset value to the gratuitous ownership of collectives at the same time" (SARF F.10265. Inv.1 C.53. SH.41). They adopted the legislative acts on the release from the payment of value added tax concerning the research and development (R&D) works, carried out at the expense of the state budget. Besides, according to the RF President Decree "Urgent Measures to Preserve the Scientific and Technical Potential of the Russian Federation" issued on April 27, 1992 (See RF laws. 1992. № 18. Art. 1026), it was decided to allocate extremely limited budget funds through the competitive mechanisms. Ministries, departments, concerns, corporations and associations were allowed to develop and use extra-budgetary funds to finance branch and interbranch research and development activities for new types of products on the basis of Ministry of Science submission (SARF F.10265. Inv.1 C.55. SH.54-55).

As for privatization in the field of R&D, it was supposed to be organized according to a special program, which should provide for the main trends of research institutes and design bureaus (DB) reorganization, their integration with industrial enterprises and the firm science development. It was planned to create national scientific centers, the research and training centers for contract research, technopolis, technology parks and other new scientific and innovative structures. During privatization, the collectives of research institutes were offered "... to be guided by current legislation" (SARF F.10265. Inv.1 C.55. SH.54-55).

In our opinion, the current situation was assessed rather objectively by the President of the Russian Union of Industrialists and Entrepreneurs A. I. Volsky and offered the Russian Federation President "... to save industry science from the leaders themselves". According to his data, 1,819 experimental plants and pilot plants operated in the RSFSR as on July 1, 1989. These plants consisted of 4,600 SPA, research institutes and design bureaus the production volume of which made 1,212 billion rubles and the total number of employees was about 362,000. However, in 1992 he wrote that "... the established and justified mechanism of creative interaction and cooperation between scientists and designers of SPA, research institutes and design bureaus, on the one hand, and production and pilot plant experts, on the other, has started to collapse, which causes anxiety and concern for the future of branch science. The difficulties with the financing of sectoral research organizations in 1991 also affected the pilot plants" (SARF F.10265. Inv.1 C.53. SH.49). The most serious and critical phenomenon for the branch science and production was the repeated incidents of pilot plant uncoordinated escape from the structures of scientific research organizations and the re-profiling of pilot production for high-margin product output. As a rule, such actions were initiated by the leaders of pilot plants, which had independent balance sheet and had legal entity rights.

Taking into account that a legal entity right and the existence of an independent balance for a pilot plant, according to the current Russian Federation legislation on enterprises of that period, such actions of pilot plant managers were lawful, and, given the fact that 654 experimental and pilot plants among 1,819 ones (or about 30% of all pilot production) had the rights of legal persons (SARF F.10265. Inv.1 C.53. SH.49),

immediate steps should be taken to halt the process. The situation became actually threatening. For example, the team of managers and leading scientists of Scientific and Production Association (SPA) "Biotekhnika", established in 1986 and comprising the Efremov Experimental Mechanical Plant (Tula), as well as the experimental base of the Institute (Moscow experimental plant) and the main organization - "Biotekhnika" Institute, failed to comply with the Decree RSFSR Government "On urgent measures concerning the provision of RSFSR population and health care institutions with medicines in 1992" issued on December 26, 1991 due to the fact that on January 2, 1992, an indefinite strike was announced by the pilot experimental base operating personnel - the experimental plant of the head institute, caused by the presentation requirements of a legal entity status with the subsequent withdrawal from the association (SARF F.10265. Inv.1 C.55. SH.120). The demand for economic independence put forward by strikers secretly from the institute employees and without regard for their interests and the interests of the cause within the conditions of unfolding privatization in the country was perceived by the SPA team as an attempt to appropriate state property with an inevitable subsequent change of the pilot plant profile and its withdrawal from the system of the RSFSR Ministry of Health.

Such cases were not isolated and entailed the destruction of the established process creating the prototypes of new technological equipment; the reduction of technological equipment production for machine-building enterprises and foreign exchange earnings under SPA contracts with foreign firms and the non-fulfillment of contractual obligations.

The document dated on November 26, 1991 and sent to the Deputy Chairman of the RSFSR Government A. N. Shokhin is very important for a more accurate assessment of the situation in the scientific and technical complex of the country by 1992, and the vision of production perspective by authorities and managers. The leaders of a number of large enterprises and scientific and production associations (SPA) believed rightfully that the changes in the economy and in the sphere of governance that take place in the country mobilize only a small fraction of the opportunities to achieve real growth in labor productivity, namely, the producer's social factor associated with production means privatization. Meanwhile, the use of scientific and technological progress advances would allow to increase the volume of commodity mass production by an order and more with less labor and material costs. The letter contains a very accurate forecast that the transition of Russian economy to market relations with foreign firms that have high scientific and technical and production potential will affect the survival of domestic industry and science adversely, brake technical progress and can turn the country into "a resource-supplying country for industrialized countries" (SARF F.10265. Inv.1 C.53. SH.103).

However, such documents and warnings did not have any effect on the Government. In particular, the Chairman letter of the Interdepartmental Scientific Council on the problem of "Computerized Integrated Production, Machines and Technologies of the Future" by the Vice-President of the USSR Academy of Sciences, the Academician K. V. Frolov, addressed to the head of the Ministry of Science, Higher School and Technical Policy of Russian Federation, B. G. Saltykov, testified to the serious author's concern due to the non-inclusion of the most important among them into the list of state scientific and technical policy priorities - the automation and the intellectualization of labor on the basis of high technologies and the latest types of technology (SARF F.10265. Inv.1 C.53. SH.105-106).

The leaders of Russian Academy of Science (RAS) institutes also addressed new government to save science. On January 16, 1992 they reminded the President of Russian Federation B. N. Yeltsin that the salary of scientific employees, for example, the doctor of science is two times less, and a candidate's salary is 3-4 times less than the salary of a bus driver, and the results of fundamental science are not needed by anyone; that the lack of funds excludes the possibility of international cooperation, and the outflow of the most active and talented people either abroad or in commercial, mainly intermediary structures is increased, the authors of the letter believed that "... with relatively small timely investments,

the government will prevent the collapse of science and will receive significant political dividends and economic benefits" (SARF F.10265. Inv.1 C.53. SH.110-111).

The leadership of the Russian Academy of Sciences, stating within the transition to market relations and a drastic reduction of funding, a significant reduction of promising research and development of fundamental, industry-wide and intersectoral nature, appealed to the Government to use the experience of countries (the USA, FRG, Japan) in which the overcoming of similar processes led to the creation of science support system, including from the state, as well as various innovative and investment funds, the system of economic and tax benefits (SARF F.10265. Inv.1 C.53. SH.136-137). It was about national innovation systems that could accelerate the modernization processes sharply.

At the same time, B. N. Yeltsin was also addressed by the President of RAS Yu. S. Osipov (SARF F.10265. Inv.1 C.56. SH.57), recalling his requests to help the Academy to solve the problems of financing, the material and technical provision of basic research; capital construction; the liberation of RAS institutions and organizations from taxes, fees and duties; to increase the social protection of scientific workers. Yu. S. Osipov was forced to admit that all his appeals and requests for hadn't any positive solution, and the state of affairs was deteriorating continually (SARF F.10265. Inv.1 C.56. SH.60). In his letter to E. T. Gaidar on January 17, 1992, the head of the Russian Academy of Sciences pointed out the situation criticality with the supply of scientific literature that isolated Russian science from the world (SARF F.10265. Inv.1 C.56. SH.63).

The letters did not help, therefore, at the meeting of trade union committee chairmen of scientific institutions of the Russian Academy of Sciences held on March 24, 1992, the scientific community addressed sharply to the Sixth Congress of People's Deputies of Russian Federation, to Russian Federation President, to the Chairman of the Supreme Council, which was brought to the attention of the General Meeting of the RAS "and met understanding" (SARF F.10265. Inv.1 C.56. SH.170). The appeal stated the catastrophic position of fundamental science: "Its funding does not provide normal work and even the physical existence of scientists. If this state of affairs is not changed within the next 3-4 months, then the existing scientific collectives will collapse and, accordingly, the scientific schools that were recognized by the world will be destroyed. The consequences of this process are obvious ones: it is impossible to access to the world technological level without fundamental science - Russia will become a resource colony ... The neglect of science cannot be justified, and it will require great efforts and costs to restore the potential of Russia. From our point of view, Russia cannot afford such a "luxury" once again. In all countries, the financing of basic research is carried out mainly by the state. If at present the leadership of Russia cannot (or does not want to) deal with the problems of science, we demand to state this officially and definitely" (SARF F.10265. Inv.1 C.56. SH.170-171). If this appeal is ignored, scientists reserved the right to mass protests.

Some rare answers of high-ranking officials had either general arguments about mutual concerns by the state of affairs in domestic science and about the confidence in the soonest correction of the situation, or the letters were supplemented with some more details. In particular, the thesis was copied that "... the principle of selectivity for the support of both research and scientific organizations should become one of the fundamental ones" (SARF F.10265. Inv.1 C.56. SH.74). A more detailed response was sent in April 1992 to a group of employees of the Moscow Medical Academy who wrote the Appeal to the President of Russian Federation. They wrote that some laboratories of the most authoritative institution - the Institute of Problems of Mechanics of the former USSR Academy of Sciences - had only 10% of scientists, others went abroad because of "humiliating" salary, the inability to continue the research in the face of material base drastic reduction and the absence of a government program regarding the development of science in Russia (SARF F.10265. Inv.1 C.56. SH.78).

The appeals with the statement of an impossible financial situation were sent to the Government by the leaders and ordinary employees of a significant number of research institutes. The analysis of such document array, currently stored in the State Archives of Russian Federation and in the funds of other archives, makes it possible to determine the general provisions contained therein: the authors wrote about a significant reduction of centralized budgetary funding for research and development; on the almost universal cessation of state capital investment allocation for productive and social development; on the violation of traditional scientific, technical and production ties; about the disinterest of enterprises to use scientific and technical products within the conditions of monopolism and deficit; about the mass output of pilot plants from research, development, design, technological and training organizations and institutions for the sake of commercial profit, which had no relation to the development of scientific and production potential; on the debts of many scientific and technical organizations on state-owned bank loans, formed due to the lack of funding sources; about significant growth of tax and other allocations to the budget (SARF F.10265. Inv.1 C.55-56).

However, these warnings and recommendations were ignored by the power of the new Russia. According to the concept of reform developers, the ministries and the departments of Russia were ordered to "stimulate the reorientation" of scientific organizations in relation to market economy conditions and "to release from the support of inefficient R&D and ineffectively working research institutes and design bureaus" (SARF F.10265. Inv.1 C.55. SH.114). The state support of applied works had to "... be limited by large innovative programs and the most important interdisciplinary R&D that can bring increasing economic returns and improve the export potential of Russia in the sphere of high technologies" (SARF F.10265. Inv.1 C.55. SH.115).

Some officials offered even more rigid option. Thus, the deputy chairman of the Higher School Committee, V. M. Zhurakovsky sent the letter to the First Deputy Minister of Science, Higher School and Technical Policy of Russian Federation, A. G. Fonotov, in which he called the following approach poorly justified. According to this approach it was necessary to carry out "financial pumping" in the vital sectors of Russia, bringing the technology of their production level to the world level and further selling of these productions through an auction, i. e. "... to implement their transfer from state to other types of property gradually." He believed that "... large-scale investments into the public sector of production are ineffective from the standpoint of scientific, technological and economic level of enterprises development" (SARF F.10265. Inv.1 C.55. SH.263). It is possible to overcome it using emergency crisis measures and initial preparation for the market area deployment, which implies: the limitation of growth in a number of industries; the reduction of investments; the liberalization of prices; a strict tax policy; the regulation of incomes and wages; the minimization of budget deficit; the liquidation of loss-making and unprofitable enterprises, organizations and industries; the reduction of vocational institution activities that are weak in the professional sense, and the low-productive topics of research. It was proposed to "release the scientific and technical sphere from ballast", also through the use of such systems and assessment methods as the rating system, the certification of scientific and technical organizations and universities using independent expert commissions with the participation of relevant foreign organizations and experts (SARF F.10265. Inv.1 C.55. SH.263-264). However, the author saw the overcoming of the crisis in the middle of the 90s, when the stage "... of economic growth highest rates, an intensive, effective development of machine building and the introduction of new technologies, the rise of prices for new equipment, the profitability and savings, primarily through the STP will be started." It was planned that the main economic engine of scientific and technological progress and applied science would be an adequate motivation of development, distribution and the use additional profits from scientific and technical innovations adequate to market economy. During this period self-financing market-based methods were to be included: an active self-financing of scientific and technological

progress and applied science, a high demand for R&D, the growth of state savings, venture capital and wages among scientific and technical workers (SARF F.10265. Inv.1 C.55. SH.265).

In our opinion, such projects testify not only about the fake nature of reformer plans, but also about the fact that the situation could be much worse than in fact. Nevertheless, a significant part of such proposals formed the basis for the approved government documents aimed at getting rid of "the ballast" and which thrown out "the child with water" - the branch science as a whole and the fundamental one in large part. The principle of scientific organization "regrouping" was at the heart of government decisions in order to ensure the most "optimal" way of their financing. At the same time, it was always stressed that structural reorganization in science requires the implementation of measures for the social protection of scientists, the adoption of a set of measures was supposed to regulate intellectual migration from Russia. The integration of the scientific and industrial potential of the country into world economic relations was determined as one of the most important tasks (SARF F.10265. Inv.1 C.59. SH.39). The authors of the projects were confident that "... the measures taken and planned create the preconditions to prevent an irreversible destruction of Russia scientific potential. Although they predicted that it will be temporarily weakened in general, the possibility remains that the losses would not be so great, and at the same time the basis would be created for the future technological revival of Russia" (SARF F.10265. Inv.1 C.59. SH.39).

The planned results appeared to be very far from reality. The salvation of the world leading scientific schools in the field of fundamental and applied research can be attributed, rather, to phenomenal phenomena.

The measures were developed to stimulate the work of scientists materially, to identify and maintain the priority of scientific directions and schools (61 state scientific centers were established), to contain the migration of scientific and technical personnel at the governmental level (Archive of the SD at FA of RF. F.10100 Inv.2 C.704 SH.10; C.703 SH.1-3). But these were the measures that allowed only the survival for some separate parts of the scientific sphere (as it was predetermined), but not the development. Actually, the goals were only declared, separate measures were taken from complex programs, the reforming of the scientific and technical complex with the aim of its adaptation to the market model format of the social system operation resulted in significant social costs, resource, personnel, spiritual and moral losses. In fact, the scientific potential of the country was disconnected from the solution of the most important tasks for country development and was viewed as a hindrance rather than a positive factor for their solution. The innovation activity in industry and other branches of material production has decreased significantly.

The documents currently stored in the archives confirm the illusory plans of the reformers. Thus, the letter from RFBR Chairman, the Academician V. E. Fortov to the RF State Duma evaluated the reduction of basic science funding by the mid-1990s as a catastrophic one: "... Most research institutes do not function almost. There is the disintegration of the science infrastructure, the breakdown of scientific schools and even priority areas, a "brain drain" outside the country and into business. The "brain drain" has taken the form of a mass flight among scientific youth, which loses interest in science, which fundamentally undermines our future. A few more years - and we will lose our science definitively. It will take decades to restore it... We really came to the line, after which we will have comatose destruction phenomena and the death of science in Russia" (Archive of the SD at FA of RF. F.10100 Inv.2 C.704 SH.204). During these years, the project of privatization of objects within scientific, technical and educational sphere, which was stopped hardly, also caused the concern of the scientific and university community and some of State Duma deputies. It is obvious that the crisis situation in the scientific and technical complex was caused not only by the general paralysis of the social and economic sphere, but also by the absence of a conceptually elaborated state industrial, scientific, technical and innovation policy, a weak legal framework and

completely different priorities. Only the contours of reforming its separate subsystems have formed: science, education, production.

On December 3, 1998, through the letter sent to the Chairman of Russian Federation Government E. M. Primakov, the Accounts Chamber of RF State Duma reported on the results of a February-August 1998 check of scientific organization potential state and effectiveness, the provision of basic technologies and unique production development. The auditors were forced to state that "... after an ineffective management of scientific and technical activities, uncontrolled privatization, operating financial and credit, tax and pricing policies, an inadequate state support, the delays in structural reform performance, Russian fundamental and especially applied science was brought to the state of deep crisis, it loses the accumulated potential irrevocably, which, will lead to the loss of the science-intensive sector of the Russian economy, and will bring an irreparable damage to its national security" (SARF F.10265. Inv.1 C.736. SH.102).

4. Discussion

A number of authors argue that "... the radical liberal stage of modern Russian modernization", which provides the transition to market relations, "... passed relatively quickly, bloodlessly and surprisingly effectively" (Sogrin, 2001). Other researchers, in particular the Director of the Institute of the USA and Canada, S. Rogov, wrote that after ill-conceived reforms in the 1990s a significant part of the branch science was privatized and disappeared without a trace. In his opinion, the current situation is the result of neoliberal economic concept implementation in Russia, according to which any state intervention in the economy leads to negative consequences (Independent Newspaper, February 8, 2010).

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

They are forced to agree with those authors who argue that a drastic reduction in R&D funding was related not only to the crisis processes in the economy. It was justified theoretically. The following conclusion followed from the "economic determinism" (and was implemented in Russia in practice during the first half of the 90s, when economic reforms were carried out without social shock absorbers) about the need to reduce budget expenditures on education, medicine, science and other branches of the social sphere, about the sufficiency of compulsory seven-year education for our country, etc. (Varshavsky & Sirotkin, 1999).

5. Conclusion

The conducted research gives us the grounds to formulate the conclusion that the result of liberal reforms in the scientific sphere at the turn of the 20th-21st centuries is the situation that can generally be described as catastrophic, indeed, if compared with the state of affairs on the eve of the USSR collapse. Taking a detached and a lenient position, obviously underestimating the potential of the people, the reformers were guided by the principles of Stalin's times that they condemned in fact: "the aim justifies the means", "you can't make an omelet without breaking eggs". Russia was offered privatization for the sake of "effective managers", "screwdriver" production and the sale of raw materials. Science was only

meant to serve. There was a fundamental contradiction in the country between the purpose of science and the practical use of its achievements to overcome the crisis. The projects and the recommendations of leading scientists were ignored. The programs were declarative ones. The scientific dissenters with such a humiliating position, designers and experts went abroad. Over the last decade of the twentieth century the budget funding for science decreased 17-20 times. Not a single country has known such a significant reduction of financial support for scientific activities. In terms of the costs on science, Russia was 5-7 times inferior to the advanced countries of the world (Independent Newspaper, March 28, September 18, 1998; February 1, 1996).

A sharply reduced funding for research has led to a rapid reduction of science human resource potential. Only during 1991-1993 the number of scientists working in government organizations has decreased almost by 40% (Dezhina & Kiseleva, 2008). Most research institutes, especially industry ones, lost more than 70% of their employees (See: Tsapenko & Yurevich, 1995). Immense destructive processes occurred in the field of research and development. During the 90s unique and world-class scientific research teams, outstanding scientific schools collapsed in our country. Only in 1991 and 1992 the number of scientific organizations working for the economy of the country fell by 60-70% in different sectors (Independent Newspaper, February 1, 1996).

The state policy did not provide an appropriate institutional transformation of the scientific and technical sphere in the conditions of the transition to the market social model. The federal programs of restructuring at various levels of management were not developed to promote, above all, the transfer of technology.

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