

Scientific Migration in Russia in the early 1990's: Scale, Structure and Consequences

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For many decades the number of R & D personnel in the former USSR and, particularly, in Russia constantly increased. Though in the late of 1980s the rate of increase reduced perceptibly and in the early of 90s the reduction of R & D personnel in Russia became absolute, the approaches to analyzing this process remained practically unchanged until 1992. The substance of this analyses came down to the calculation of indicators for R & D personnel dynamics.

The radical economic and political reforms in Russia in the early of 90s were conducted under conditions of global social and economic crisis. This crisis deeply affected the R & D sphere and sharply changed the traditional mechanisms and tendencies of the R & D personnel reproduction. In 1992-1993, when the number of national R & D personnel in Russia dropped by 23 %, rigid dependence of the scope and structure of this indicator (number of R & D personnel) on parameters of the personnel mobility (especially on the parameters of outflow of the personnel from R & D sphere) became obvious.

As a result Russian and foreign analysts began to investigate processes of R & D personnel mobility in Russia. They started from the problem of the emigration of Russian scientists abroad and raised alarm on that aspect. The concentration of the analysts effort on this problem was inadequate to its real scope and importance in Russia. Indeed, according to Russian official statistics, 426 scientists emigrated in 1993 for permanent residence abroad. But total decrease in national R & D personnel during this year was more than 200,000 persons.

In recent years a number of studies on Russian R & D personnel mobility have been conducted, but each of them deals usually only with some aspect of the problem. In most cases their results are incomparable and sometimes contradictory.

The “ state of the art » in the field are determined mostly by the lack of aggregate official statistical data that could be used as a direct measure of process of mobility. The only exception is a general survey of R & D personnel mobility conducted in 1992-1993 by State Committee on Statistics (GOSCOMSTAT).

According to the survey the outward flow out of R & D sphere in that period was three times higher than the inward flow into it. That fact shows that both the scale and the structure of labor force in R & D were mainly determined by the peculiarities of the outflow ¹. The analysis of this data for 1992-1993 shows that the parameters of the outflow varied greatly as regards different categories of the personnel. Thus, if the number of engineers and constructors in R & D sphere have been reducing about 20 % annually, the number of the managers (heads of the organizations and their departments) dropped about 9 % each year. Naturally such differences in outflow meant the changes in the structure of R & D personnel.

Such a significant decrease of the number of engineers and in some lesser extent the number of technicians and supporting staff in R & D in Russia became the factor that prevented the conducting of experiments and tests, limited their complexity and scale. This, in its turn, led to

the gradual decrease in qualification, necessary skills and experience of those who remained in R & D sphere. The negative consequences of these trends are evident. The increase of the share of R & D managers against the background of significant general decrease of R & D personnel led to the situation when in 1994 some of the departments and even the whole R & D organizations did not have a “ critical mass ” necessary for effective research. There were facts when a department (actually or formally) consisted of only one employee - it’s head. The survey of GOSCOMSTAT exposed also the fact that most of the employees that had left R & D sphere had done it voluntary by their own will. In other words their dismissal was not the decision of managers or the consequence of liquidation or restructuring of their organization. This shows, in particular, that the decrease in the number of R & D personnel in Russian science in the 90s was spontaneous and happened without any purposeful influence of the state.

But certainly the parameters of mobility of R & D personnel were strongly influenced by the external (to the R & D sphere) factors : the general social and economic situation, the relative level of salaries and wages in R & D and other spheres of activity, etc.

Thus, the general survey of mobility in R & D conducted by GOSCOMSTAT made it possible to evaluate the scale and some structural characteristics of the process in 1992-1993 and in spite of the short period of observation to expose some tendencies.

The detailed analysis of R & D mobility in Russia after the 1993 was necessitated by principal non-inertial quality of the social and economic development processes in the country in the 90s, by the gradual and lagged character of the impact of the sharp drop in the number of employees in R & D in 1992-1993 and the further increase of the symptoms of it’s crisis. As there was almost no official information on the subject after 1993 the only possible way to get the data was the sample survey of R & D organizations

The survey was conducted in six regions of Russia. Two of them were the “ metropolitan ” regions of Moscow and St.-Petersburg (or the “ center ”)² and the others four though very different can be classified as “ periphery ” (Nijegorodskaya oblast, Saratovskaya oblast, Tomskaya oblast and Stavropolsky kray). Such sample enables to evaluate the regional differences of the mobility, to find out, in particular, the discrepancies between the parameters of mobility in the “ center ” and in the “ periphery ”.

The later problem is very important for Russia where there are great historically formed differences between the “ central ” and “ provincial ” science³. The sample consisted of more than 60 R & D organizations conducting both basic and applied research and development projects in natural and engineering science⁴. For getting the information on mobility the following methods were used : the collection of the statistical quantitative data on each person released or employed during the year ; the questionnaire for the managers of the R & D organizations and interviews with them ; the questionnaire for the state officials responsible for the R & D sector in the regions. The results of the analysis concerned the situation in 1994 and 1995.

Against the background of general reduction of employees in the sample there were a significant variation of that indicator in different organizations. So, rates of decline in the organizations concerned with applied research were higher than the average rate, but in some organization of academic sector conducting the basic research there was even an absolute growth of number of employees (though the increase have not compensated as a rule the reduction of 1992-1993). As that fact have been true for all the 90s it can be looked upon as an indicator of the relative depth of the crisis in different sectors of R & D.

The rate of decrease of personnel during 1992-1995 gradually slowed. In the opinion of R & D managers it can be explained mostly by the fact that almost everybody who could and wished to leave R & D sphere did it in 1992 and 1993. Already in the beginning of 1994 many organizations had exhausted all possible reserves for reduction of personnel. Further decline in the

number of employees created a threat to their existence. The outflow from R & D was also restrained by the general decline in the national economy and of labor market, so chances of finding employment outside the R & D became more slim. A definite role has played the change in manager's attitude to so called secondary employment : R & D managers were strictly against it in the beginning of the nineties, but gradually came to realization the necessity of tolerance towards it and began to look at it as a mean to preserve the personnel of their organization.

The sampling survey showed that the tendency of higher rates of leaving for engineers, technicians and supporting staff that was exposed by the GOSCOMSTAT survey for 1992-1993 was more or less true for 1994-1995 as well. It's negative consequences were also confirmed : in 1994 the managers of R & D organizations (in the first place of a large ones that were leaders in their fields of research) stressed that the lack of experience and qualification of their personnel compelled the organization to abandon some complex and large-scale experiments.

Another negative consequence of sharp decline in R & D labor force was the change in the age structure of employees. The first indications of the growth of average age of researchers became already evident in the end of the 80-ies. The survey showed that the process gained speed in the nineties mostly because of the high share among those who left R & D persons of 31-40 and 41-50 age groups.

It means that the R & D sphere were loosing those who were the main bearers of the knowledge and experience. The opportunities for finding the replacement for that outflow, as showed the interviews with the managers, turned out to be rather rare. Especially it concerned the unique institutions that had no analogs in Russia. But even if it was possible to find the adequate replacement still the data showed that in place of five researchers in the age of 31-40 who had left only one in the same age group was employed. For 41-50 group that ratio was four to one.

The analysis of age distribution of persons who left R & D organizations and those who were newly employed showed that recently a gap between the youngest and eldest age group have begun to form. Even if the situation became more stable a gradual movement of this gap with time will greatly influence the age structure of R & D personnel for several decades.

Though the tendency of loosing researchers of middle age groups is true both for "center" and "periphery" there are significant differences between those two groups of organizations. The average age of newly employed was less than of those who left in both groups but in metropolitan area the difference was 3 year and in province 7 years. A somewhat unexpected result, considering a low salaries in R & D and low prestige of science in general, was a large inflow of persons of less than 25 years old into R & D organizations in the "periphery". Share that age group averaged 4,5% of the outflow and almost 30% of the inflow. It probably could be explained by the large regional differences in the rates and depth of the economic reforms and development. In metropolitan regions 1992-1995 was the period of the rapid growth of a private sector of economy (mostly in trade and banking) that created new working places for young people with wages several times higher than R & D organizations could offer. In most of Russian region opportunities for a young graduates without practical experience to find high-paid work were not very high so employment in R & D was for them the only alternative to unemployment. Thus, the "aging" of Russian R & D personnel in "periphery" is partly restrained by the low level and rates of development of a private sector.

Another grave problem for R & D organizations of "periphery", especially considering the historically formed gap in the quality of research between metropolitan and provincial science, is high rates (in comparison with the "center") of outflow from R & D organizations of researchers with doctoral degrees⁵. The main reason probably is that in Moscow and St.-Petersburg the degrees not only guarantee the higher security against loosing the job and relatively higher

salary but also gives larger opportunities for profitable secondary employment. Those factors restrained the outflow of high qualified researchers from metropolitan organizations. In the “ periphery ” the relatively low number of such specialists enables them to find relatively better jobs outside the R & D sphere, for example in regional governments and commercial organizations that have needs for specialists with degrees.

There are also differences between the “ center ” and the “ periphery ” in mobility in some fields of science that have been exposed by the survey. So, the intensity of mobility in R & D organization specialized in medical research was significantly higher than the average. General indicator of mobility (the ratio of a sum of outflow and inflow to a number of employees in the beginning of the year) was for that group of organizations about 50 % and the average indicator was only 19 %. Quite another picture was in mathematical, physical and technical organizations : there the mobility was significantly lower than the average. It’s hardly probable that the intensity of mobility by fields of science is reflecting the relative depth of the crisis in them. It’s more likely that it depends on the regional peculiarities of labor market. A rapid growth of “ insurance medicine ” and private medical services that was common for all regions enabled the medical researchers, especially those with medical degrees to find jobs not only better paid but also correlated with their interests and qualification. In other words, even during the general economic crisis the opportunities for medics were better than for mathematicians or specialists in engineering science where the available alternative jobs depends to the greater extent on the situation of the economy.

All these facts let us to formulate a conclusion that the dynamics and parameters of R & D employment in regions, fields of science or sectors are mainly influenced not by the relative level of salaries or general crisis but by the situation on the local labor market. In other words, a lot of people remain in R & D sphere not because they don’t wish to leave it but because they have nowhere to go.

We have analyzed the reasons for leaving the R & D jobs using the official standard forms in personnel departments of organizations. According to those standards there could be following reasons of discharge : as one wishes, transfer to another organization, staff reduction or reorganization, retirement, other grounds.

In metropolitan areas 62 % left the organizations with the wording “ as one wishes ”, in other regions this share was 51 %. As we have already mentioned above such high share shows the unregulated character of R & D personnel reduction. The difference between two groups of regions is also due to the larger number of jobs opportunities in metropolitan regions (first of all in private sector). Those who were dismissed in connection with the transfer to another organization went mostly to state-owned organizations (or example to other R & D organizations). In “ periphery ” regions the transfer as a ground to dismissal is twice more common than in metropolitan ones. It also confirms the relatively low possibilities for finding job in commercial sector in province.

The number and the share of those who left in connection with staff reduction or reorganization (including it’s liquidation) for Russia could be used as indicators of intensity of restructuring processes in R & D sphere. Though these indicators for “ center ” and “ periphery ” differ considerably (5.7 % for the first group and 16 % for the second one) both values seem rather low considering the scale of reduction and mean the lack of regulation of the process not only on the state level but also on the level of organizations. So, the main conclusion from the analysis of reasons for outflow from R & D sphere is that as a rule the dismissal was voluntary and people left their jobs because the situation in the sphere was relatively worse in comparison with other sectors of the national economy.

Conclusions and forecast of the mobility

We have mentioned in this paper only some results of the sampling survey of R & D personnel mobility. The survey itself was a part of large-scale research project that was conducted in 1992-1995. Carrying out of the project make it possible to evaluate parameters of the scientific mobility in Russia, to distinguish its internal and external components, to estimate scales of interbranch and territorial elements of the process. To obtain these results we have to work out an approach to complex analysis of R & D personnel mobility in Russia, that has been realized in the project.

The sharp reduction of R & D employment in Russia in the 90s was one of the most evident symptoms of the crisis of R & D sphere. That reduction affected all regions, all fields of science and almost every organization. The dynamics of the process was determined by the external factors and limitations and the decrease in rates in 1994-1995 was due to the deterioration of the labor market in other sectors of the economy. It means that any changes in the economic situation to the better may provoke another “ splash ” of the mobility and further reduction in number of R & D personnel that could be a grave danger for Russian science.

The only thing that can prevent such a “ splash ” is a sharp raise in the priority of R & D in national policy. That priority must not be just declarative but should be confirmed by concrete measures and actions that would led to the growth of demand for the R & D services and results both from the state-owned and private enterprises. If the current trends in this sphere continue for two or three years longer it will led to the final and irreversible degradation.

Thus, both the inertial scenario of economic development and the improvement of the situation could mean changes to the worse for R & D organizations. If we consider a major role of the state in financing research in Russia nowadays and a very low expectations for considerable private sources of finance for R & D in the nearest future, it becomes evident that the only way to stop or at least to slow down negative tendencies is to change radically a governmental science policy. It should be admitted that today such hopes are rather unfounded.

¹ A detailed analysis of the results of this survey is published in Russian Economic Studies, N 4, 1995.

² Results of the survey for Moscow and St.-Petersburg is published in Russian Economic Studies, N 5, 1995.

³ The differences were not only a quantitative ones (more than 40% of total employees in R & D were concentrated in two metropolitan regions) but in many cases concerned the quality of research.

⁴ The surveyed organizations conducted research projects in following fields : physics and mathematics, chemistry, biology, geological sciences, technical sciences, agricultural sciences and veterinary, geography, medicine and pharmacology.

⁵ The shares of persons with doctoral degrees among those who left their jobs and among newly employed for Moscow and St.-Petersburg organizations were 6% and 8% accordingly. For the “ periphery ” the same indicators were 15% and 10%.