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Popovych, A.S.

Dobrov Center for Scientific and Technological Potential Capacity and Science History Studies, the NAS of Ukraine, Kyiv

THE URGENT NEED IN THE CAPITALIZATION OF SOCIAL AND PSYCHOLOGICAL COMPONENTS OF THE SCIENTIFIC AND ENGINEERING POTENTIAL CAPACITY

The problems of fall in the national science social capital have been analyzed, with attention focused on the fact that the level of science support by the state and the industry depends not only on the economic situation, but mostly on its authority in the society and the public confidence, i.e. on the external component of science social capital. The necessity of consolidating efforts of the scientific community towards popularizing the achievements of national science and the formation of large-scale program of activities to increase the authority of science, in general, and the National Academy of Sciences of Ukraine, in particular, has been substantiated.

Keywords: scientific potential, social capital of science, habitus, popularization of science and scientific knowledge, and confidence in science.

The term «*scientific potential*» for a long time has been used as a poetic image of a certain kind under which we meant possibilities of science. We are obliged to the founder of the Ukrainian school of science studies G.M. Dobrov with the introduction of this collocation into scientific use as a clearly defined scientific term. Dobrov separated four components genetically linked between each other in the system of scientific technical potential: *1)* personnel, *2)* teaching and learning, *3)* material and technical, *4)* organizational [1, 2].

In the *Principles of Science Studies* prepared by the international group of authors and issued as back as in 1965 edited by S.R. Mykulinskiy et al., attention was paid towards the fact that this list does not reveal the complete essence of the concept of scientific potential, «It is fully obvious that scientific potential of this society depends not only on the material resources which area available to the science at present, but also on the level and volume of accumulated knowledge and habits in research work, the state of the system of upbringing and education, cultural and historical traditions, on the way research is organized, the states of its information infrastructure, etc. And it all decisively depends on the attitude to science and its application which developed in this society, on its prevailing system of values. Level and rates of growth of scientific potential depend by far on how much this society is oriented at the development and application of science, if its needs and goals correspond to the internal needs of science development» (*author's translation* [3, 178]).

These statements did not raise any objections, though in actual research of scientific-technological potential, in particular, during comparative analysis of scientific and scientific-technological potential of different countries and regions, hard-to-measure socio-political components were ignored, as a rule. Perhaps because of that both today and in those days that great influence of *the attitude of the society to science, understanding of its*

role in economy, its prestige in the society on the possibilities of development of science and realization of its achievements in the interests of people was and still is greatly underestimated. Neoliberal transformation of economy, as well as the cult of individualism and competition which accompanied it and emerged on purely material stimuli contributed a lot to reduction of social capital of science. This finally led to reduction of support for science.

Analyzing the causes why science in the recent decades has been obviously displaced from the real priorities of our state, we will come to the conclusion that non-understanding by internal politicians of significance of science for the country development and their ignorance of possibilities of the internal scientific potential became the most important factors among those which caused this annoying fact. Besides, general public did not oppose the actions of the state political leaders in any way in the issue of humiliation of the role of science through insufficient level of its innovative culture. Reference to the economic difficulties and problems, in my opinion, is quite out of place here, as the funds which our state is spending on science are so negligible that one can neglect them as the value which does not exceed an error which is permissible at balancing of the state budget. In addition, we can tell with confidence that many of these problems could have been avoided, if that policy in the relation to science and application of its possibilities was different.

Quite obvious even for scholars of the sixtieth of the last century fact that scientific potential components must be supplemented with social-psychological component, is taken mainly in a highly philosophical, theoretical perspective, if evokes no objections, not giving in such a way this truth any practical importance. They say, both a motivation aspect for scholars themselves and the attitude in the society towards science and possibilities of application of its achievements — all these, of course, are per se important, but all these do not depend on us. Large-scale involvement of scientists to delivery of popular lectures in workers' associations, large circulations of popular science editions [4] — all this was considered to be general education, so to say, «*awareness-raising*» work. Although we unfortunately begin to understand with delay what great importance it had not only for the prestige of science in the society, but even for development of science itself. In particular, it determined a great status value of the profession of a scholar and, therefore, offered a real possibility to involve the most talented young people into scientific communities.

In the research [4—7] it was justified, that attitude to science in the society, trust in its creators, and understanding of significance of new scientific knowledge for development of economy can be generalized in a category fairly deep in its sense — *social capital of science*, introduced by a famous French sociologist Pierre Bourdieu[1] [8—10]. His introduction of this term into sociological theory and practice of socio-economic analysis, beyond any doubt, was a very significant step forward in interpretation of mechanisms of interaction of science and society. It marked recognition of the fact that this virtual, hard-to-measure component of the public conscience is a real part not only of scientific life, but an important factor of development of economy, a direct production process, which one must consider equally to all other very material factors. This content was recognized to be revolutionary as it was a definite refusal of fairly widespread primitive and utilitarian views: they say, real economy has nothing to do with sentimentality.

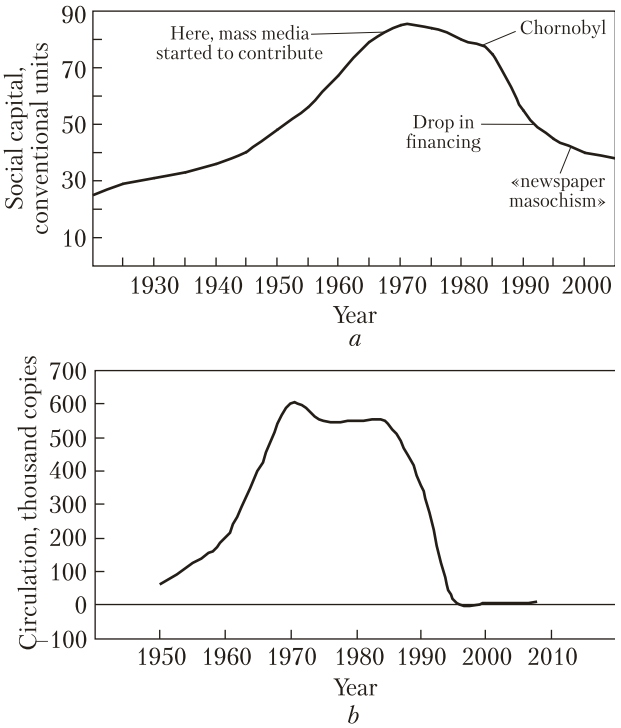
Research carried out by the employees of the G. M. Dobrov Center for Studying R&D Potential and Science History of the NAS of Ukraine in cooperative with Belarusian and Moldavian col-

[1] P.Bourdieu defined social capital at first as «*resources based on family relations within a membership group*» [8]. It means, he paid attention to existence of some virtual phenomenon inside of a scientific area which at all its symbolism and hard-to-measure nature has the ability to transform into certain advantages, possibilities and, finally, real resources. Soon in the research of many of its followers — both of sociologists, and economists (and Bourdieu himself) — the content of this notion was significantly enlarged.

leagues extended in a significant way the concept of social capital of science, so to say, over the boundaries of a scientific area. The authors [4—7] believe that not only socio-psychological aspects of relations between scientists, but also the place of science in public conscience of all the society of the country. It also can and must be regard as a component of social capital of science.

Unfortunately social capital of our science decreased considerably as a result of the whole range of dramatic situations which it had to experience [5,6]. Dynamics of this reduction is presented in the figure. It is confirmed by the results of monitoring carried out by the Institute of Sociology of the NAS of Ukraine: at present 35.2 %of our fellow countrymen trust science, and only 5.6 % trust it implicitly [11]. It is clear that this indicator is too low for formation of sufficient social capital of science.

It should be noted that contrary to deep mutual conditionality of the social capital of science and purely material components of scientific potential, a cause effect relation between them cannot be considered as such that can be described by simple linear or even more complex algebraic functions. Besides, their interaction often reveals itself with a considerable delay, its power and the implementation mechanisms change in time under the influence of many factors. To a certain extent it explains why the terms «*scientific potential*» and «*social capital of science*» even in scientific periodical publications (not even to mention mass media) are used in a very arbitrary fashion, bringing some confusion not only into the course of purely scientific discussions, but in the social conscience as well. All this preconditions the need in rethinking once more the mentioned concepts with consideration for evolution of a scientific process and current realities. In particular, we must point out, that such purely virtual value as «*attitude to science*» is an important component of scientific potential which, as sad experience of Ukrainian science suggests, we may lose to a significant extent. But we can and must expand it. It can be and must be done by scholars, scientific



Correlation of the conventional curve (*a*) showing the authors' conclusion on basic trends in the dynamics of social capital of the science [8] with the circulation of *Knowledge is Power* educational journal [9]. The similarity of the curves proves that the circulation of educational publications reflects the dynamics of social capital of the science.

associations and institutions themselves. Of course, both government authorities and mass media could participate in this process. But it is beyond reason to hope for them in the current situation.

The socio-psychological component plays a significant part in the innovative potential of a country, a region, or a separate enterprise. Innovative culture is its key element. Besides the educational level of people, the level of their qualification, accumulated knowledge and skills, we must include into innovative culture their understanding of the innovative process and, therefore, their realization of the role of science for the development of economy.

Innovative process, as a rule, takes place with the participation of a significantly larger number of active subjects than the process of research. And at each stage during transition from one of

them to another we must take into consideration new social and psychological problems conditioned by specific features of a corresponding social area. This is usually neglected at assessment of innovative potential, sticking mainly to the analysis of big statistical indicators. Let us point out that such assessment makes practical sense at problem oriented evaluation of possibilities of realization of a specific innovative project.

We can dispute if scientific potential is a part of innovative potential, or they must be considered separately. But without doubt such a virtual value as «*attitude to science*» is an important part both of scientific and innovative potential. Contrary to the fact that prestige of science for scholars is a matter of survival at present, we must acknowledge that only the very few from quite a numerous cohort of Ukrainian scientists followed a more or less active position in attempts to establish a dialogue with the public. By far more often one can see in the columns of national newspapers statements of the overconfident dilettantes for whom unfounded disregard towards national science (about which they have no idea in reality!) became a way of self-assertion following the principle: «Ouch, pug-dog, probably it is strong...» (*Here the author refers to the famous fable by Ivan Krylov «Elephant and Pug» — translator's note*). I am confident — the majority of our scholars know that today future of our country depends on development of science to a considerable extent. They understand it quite well, with bitterness and even with sarcasm they discuss disastrous dynamics of scientific potential of the country in their circle (in the *area of science*) as it was called by P.Bourdieu. But no more.

One can find explanation to this phenomenon, relying on the methodology of the mentioned Bourdieu who repeatedly emphasized that the real practical actions of individuals in any situations are determined not only by new circumstances and challenges, but to significant extent with that socio-psychological and ethical stereotype which emerged in them historically on the basis of the experience of their own life and own perception of history of their social area and generation. Bourdieu offered to call it «*habitus*», emphasizing that it reflects a sort of «socialized subjectivity» of every person ([10], 88). This concept acquires special relevance in cases when there is «non-coordination between habitus and the area where the behavior remains incomprehensible if you do not put in sight of habitus both its specific inertia and its hysteresis». [ibid, 92].

So it is easy to understand how the «average Ukrainian scientist» felt, when from a stable and comfortable environment in which he was aware of himself as of a representative of one of most respected professions, (and its prestige was approved at the state level, emphasized by all mass media[2]), he suddenly found himself in the conditions, when science became a «scapegoat» which met no expectations. Costs on the development of science (and, therefore, the wage of scholars comparatively to other professions) were decreasing, the admired feedback of mass media disappeared. Instead of that, more and more often they were protruding the following opinion to the public: doesn't it look like our science is too big for Ukraine, is it worth spending so much on it?! — The most widespread reaction of scholars was a certain «grudge against injustice», and many people, even those who actively worked to promote science, withdrew into the shadows being insulted. Especially because the majority of popular science editions lost their readers, some of them even stopped existing.

And very slowly this habitus is evolving in our country: social-ethics orientations on the active struggle for recognition of science by the society have not yet formed in mass consciousness of scholars at sufficient level. One can hope that at least clear realization of one's own interest in this common matter will also become a great stimulus for scholars. Perhaps it will help many to get rid of

[2] Let us point out that here lies a fundamental difference between habitus and scientific area of, let's say, France, where a scholar during his whole career has to fight for grants and orders, going through severe competition of his own colleagues, etc.

fairly widespread in the scientific environment if not contemptuous, then a bit neglectful attitude towards promotion of scientific results and hypertrophied modesty (it's like, why should I praise myself, I will wait until others do it!). These are all remainders of the habitus of the national area of science which was formed in the quite different historical era, under the conditions that today do not exist anymore.

Under such conditions realization of the fact that the attitude of the society to science actually makes its social capital which to the significant extent determines the level of its support by the state, must become a powerful stimulus to specific actions aimed at enhancement of science prestige, in other words, at a socio-psychological component of scientific potential, and must become its real capitalization. Because under the current conditions this becomes a matter of life or death for the national science. Such understanding brings problems of scientific prestige from a fairly fleeting sphere «of personal glory» and the attributes and regalia attendant to it into the sphere of purposeful activity aimed at salvation of the country's scientific potential and, therefore, at providing decent future to the state as well and adequate level of life to its people. It is understandable that at such presentation of the problem the sense of a scientist's personal responsibility, the necessity for maximum efforts to be added for confirmation of the proper prestige of the national science, increase of its social capital come to the fore.

At the same time reading scientific and pseudoscientific publications, sometimes very positively talking about science, we often have doubts if those who apply this term really realize what can be called *social capital* in general and *social capital of science*, in particular? Let us remember that Adam Smith defined *capital* as a part of property which is employed for *profit generation* (let us emphasize: not the part which can be used in theory, but the part which is actually employed). This significantly important provision relates to any type of capital, including, social capital of science. At the same time, analyzing the nature of this socio-economic phenomenon, some authors in practice talk only about how the real place of science can be used in social conscience for its development and they are not trying to estimate at all to what extent it is actually happening, in other words, what part of this «*virtual property*» actually works for resolution of the problems that science faces.

To make the analysis of particular problems which need to be solved better aimed, it is reasonable to introduce a term separation of the concept of «*social capital of science*» and socio-psychological factors which could become such capital. For example, the latter could be called «*a social component of scientific potential*» or «*a potential of social influence on the development of science*». It would give a possibility not only to look for the ways of enhancement of this capacity, but also to approach in a more structural way the formulation of particular directions of its capitalization — transformation into the real social capital of science and innovative development.

In practice promotion of scientific knowledge and explaining the important role of science in socio-economic development through mass media, education, and other socio-political technologies create the potential of social influence, and its capitalization happens to a certain extent automatically. But this process happens differently in different societies. It depends on common innovative culture of the society as a whole, administrative machinery in a particular, and on the level of democratization of the country and possibilities of constructive influence of the civil society on regime. And it means that in each specific case one can and must look for specific levers of constructive influence on the process of capitalization of social potential.

Analysis of the causes of extremely negative dynamics of social capital of the national science allows us to make a conclusion that besides the above mentioned factors of its reduction we cannot overlook considerable disadvantages of the approach itself to promotion of scientific knowledge. Under the influence of a highly journalistic attraction to a sensation we have developed an original

style of writing on science. It was customary to present materials on the scholars' achievements as something almost fantastic: it must inspire, surprise and attract. At the same time the newest scientific knowledge, and more over the way which researchers used to come to it, was moved away to the background. Such admired tales of «miracles of science» which were the rocket science to the «rank and file» formed not a willful confidence in scientific knowledge in public conscience, but something like religious faith into the omnipotence of science, its incomprehensible and inclusive competence. So one must not be surprised that such faith could not withstand the trials which our generation went through. Particularly demonstrative in this case is Chornobyl disaster. As nuclear physicists were convincing the atomic station reactors were completely safe and they turned out to be not. And the fact that their error was conditioned by underestimation of ignorance and striking incompetence of the station employees (in other words, insufficient respect to scientific knowledge) appeared to be far on the margins of public conscience.

So we need to promote new scientific knowledge, but not «miracles of science», and only the people who take direct participation in acquisition of such knowledge can do it.

Recently opinion poll of the students of several higher schools was organized in Kyiv and Kamianets-Podilsk for the purpose of evaluating their attitude to science [12]. It appeared that young future specialists of Ukraine have the high level of confidence in science (on the second place after the family), and this level is significantly higher than almost in all the rest of state institutions, public organizations, and bodies of mass information. But to the question: «*Are you aware of at least one achievement of Ukrainian world class scientists made in recent 10 years?*»30.2 % of the total number of respondents answered «*No*», and 38.8 % confirmed they had heard about some achievements, but did not remember what it was about. Thus, information vacuum on the activity and achievements of the national science dominates even in the circle of the most enlightened and socially active youth. And the first thing we must do is to eliminate this vacuum.

Taking into consideration the fact of unpopularity of scientific periodicals (the old ones stopped to exist, and the new ones would not get onto the level of sufficient circulation), it would be reasonable for the National Academy of Sciences to begin issuance of something like «a whitebook of scientific achievements», where in understandable words the wide audience will get the information on the most important scientific achievements of Ukrainian scholars in the recent years.

So, perception of science, trust to it, understanding of the need of its existence are not just the sociality-ethics categories which characterize the level of public comfort for existence of science or even the level of civilization development of our society. Today these are the components of the social wealth, which we can and must turn into social capital of our science: the capital which works for its development. Because all the decisions, including the decision as to financing of science or implementation of other forms of its support, are taken by flesh-and-blood people. They, to a greater or a lesser extent, try to be guided by objective factors, some calculations, take into consideration real possibilities, but in the end it is a subjective factor that becomes decisive most of the time. And, if funding of science in Ukraine decreases from year to year, it, first of all, characterizes the attitude of the regime to sciences, non-understanding by the national bureaucracy and, regretfully, by the whole society, of significance of science for development of economy and prosperity of the country.

However, we cannot say nothing is done to buildup social capital of our science. In particular, there is a wonderful idea, to hold regularly science festivals. Unfortunately, this is a drop in the ocean, and alas, their real influence on public opinion weakens from year to year. We think that the NAS of Ukraine should have formed and started to implement firmly and purposefully a big programme of actions aimed at enhancing science prestige. One must not interpret such activ-

ity as implementation of the purely corporate interest — they say, the scholars are interested in tearing off a tasty morsel of the national pie. The public must believe there all the actions of scientists are aimed at the increase of social capital of Ukrainian science in general, and the National Academy of Sciences in particular, as in the struggle for bright future of all the Ukrainian people.

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О.С. Попович

Центр досліджень науково-технічного потенціалу та історії науки ім. Г.М. Доброва НАН України, Київ

ПРО НАГАЛЬНУ ПОТРЕБУ АКТИВНИХ ДІЙ, СПРЯМОВАНИХ НА КАПІТАЛІЗАЦІЮ СОЦІАЛЬНО-ПСИХОЛОГІЧНИХ СКЛАДОВИХ НАУКОВО-ТЕХНОЛОГІЧНОГО ПОТЕНЦІАЛУ

Аналізуються проблеми падіння соціального капіталу вітчизняної науки, акцентується увага на тому, що рівень підтримки науки з боку держави і промисловості визначається не тільки економічною ситуацією, а й значною мірою її авторитетом в суспільстві, довірою до неї з боку громадськості, тобто зовнішньою складовою соціального капіталу науки. Обґрунтовується необхідність активізації зусиль наукової спільноти в напрямку популяризації досягнень вітчизняної науки та формування масштабної програми дій, спрямованих на підвищення в країні авторитету науки взагалі і Національної академії наук України зокрема.

Ключові слова: науковий потенціал, соціальний капітал науки, габітус, популяризація науки і наукового знання, довіра до науки.

А.С. Попович

Центр исследований научно-технического потенциала и истории науки им. Г.М. Доброва НАН Украины, Киев

О НАСУЩНОЙ НЕОБХОДИМОСТИ АКТИВНЫХ ДЕЙСТВИЙ, НАПРАВЛЕННЫХ НА КАПИТАЛИЗАЦИЮ СОЦИАЛЬНО-ПСИХОЛОГИЧЕСКИХ СОСТАВЛЯЮЩИХ НАУЧНО-ТЕХНОЛОГИЧЕСКОГО ПОТЕНЦИАЛА

Анализируются проблемы падения социального капитала отечественной науки, акцентируется внимание на том, что уровень поддержки науки со стороны государства и промышленности определяется не только экономической ситуацией, но в значительной степени и ее авторитетом в обществе, доверием к ней со стороны общественности, то есть внешней составляющей социального капитала науки. Обосновывается необходимость активизации усилий научного сообщества в направлении популяризации достижений отечественной науки и формирования масштабной программы действий, направленных на повышение в стране авторитета науки вообще и Национальной академии наук Украины в частности.

Ключевые слова: научный потенциал, социальный капитал науки, габитус, популяризация науки и научного знания, доверие к науке.

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