

The problem of the basic unit of social organization of science: do we need to have one?

Vasily A. Sartakov

12.07.2015

I. Introduction

The history of science is very long. Originating in the Middle Ages, constantly evolving, it has become a huge "industry" of production of new knowledge, turned into a variety of institutional and organizational forms. While in the Middle Ages unique and rare persons were involved in science, millions of people in the knowledge production industry are employed around the world now. Massive involvement of people in science has had a great impact on it: while important problems related to obtaining objective knowledge were covered in the past by philosophical discipline called "epistemology", by the middle of the twentieth century science received a new aspect - sociological. In this aspect sociologists and philosophers try to understand social processes taking place in the academic world, in the interaction of society and knowledge, in the impact of science on society, and vice versa, and so on.

The greatest discoveries of the past were almost always associated with names of certain people directly engaged in research. These men worked independently, without having, as we say now, dense and competitive communication environments with the same scientists. They were authors and sources of scientific knowledge, and we have immortalized their names in names of formulas (Morlet wavelet, Fourier transform) and units (Ohm, Amps). Now, when science is a mass social phenomenon, can we also be identified as authors of scientific knowledge? Does the basic unit of social organization of science exist?

II. The problem of the basic unit

Research activities are carried out by people who are a part of society. These activities are institutionalized in the form of a hierarchical structure of a scientific institute or university. The lower level of the hierarchy is represented by PhD students and research staff as a part of a group supervised by Professor (leading researcher). Research groups, in their turn, are united in research areas, and then, depending on the size of the institution, in scientific disciplines. The scientific institution itself, created for some purpose (function), and the organizational structure of this institution is built in accordance with the functions, goals and challenges that the scientific institution faces. Historically, many scientific institutions combine administrative and academic hierarchy, for example, research institutes in the Soviet Union were headed by Academics.

Can an entire scientific institution be the basic unit of social organization of science? As an organizing space for activities, transforming money into scientific knowledge, research institutes still cannot be the minimum unit of social organization of science. There are several reasons for that: firstly, not all components of a scientific institution participate in creation of knowledge. There are many additional employees like engineers or administrative personnel that are a part of scientific institution. Moreover, research in various areas can be conducted inside one institution and, thus, we have to distinguish the basic units for each area of knowledge production.

Can an individual be the basic unit now, like it was at the initial stage of science establishment? An individual cannot be such a unit no matter who it is - whether a professor or a researcher. Research is a collective activity that creates communities around the research area and / or discipline. From the perspective of STS, a scientific community is required to form ideas about the concept of scientificity, trueness, and evaluation of research findings. It is not enough to complete a research and receive new knowledge - a community of scientists shall accept this knowledge. Another reason for the lack of a single source of knowledge (in the form of a man) is that the research of discoveries shows that for the great majority of scientific evidences it is difficult to identify a single author, particularly, in relation to research conducted in the 20th century. Even the greatest discoveries of the early 20th century, which are usually referred to individuals, can be considered as teamwork after a detailed look. For example, studies on the structure of the atom made by Rutherford, in institutionalized form looks as the work of a postdoc researcher in cooperation with other two researchers - Geiger and Marsden [1].

The presence of a community around a scientific discipline performing the function of scientific knowledge evaluation does not allow (seemingly) using a scientific group as the basic unit of social organization of science. Without being evaluated by a scientific community, knowledge does not

become scientific, consequently, scientific knowledge is created by a community rather than by one of its subsets. On the other hand, from the point of view of expenses, it is always possible to identify those who exactly carried out studies. In addition, when you create a codified product – an article, its authors are direct authors of the study and are easily identified. In other words, a scientific group working over a research project and publishing a scientific article accepted by the community can be considered as the basic unit of social organization of science in the context of the scientific institution (a university, a research institute), but with some restriction - the choice of this unit is primarily motivated by the ability to measure the results of scientific activities and conceptually, the work of the scientific community shall also be taken into account.

Can the scientific community be the basic unit of social organization of science? From a conceptual point of view, it seems to me that yes. This unit combines two main functions - creation of knowledge and its evaluation. This new knowledge is generated and exists within a specific unit. This unit differs from other similar units by specialization: firstly, by the knowledge area within which this unit is expert and, secondly, by certain people who participated in communication during knowledge creation and validation. But at the same time, this unit can be referred to the only one specific knowledge at a particular time, since people involved in communication and knowledge evaluation may be present in different communities. In other words, the head of a scientific group and authorities present in a peer review close on a multitude of communities. And when considering the social and scientific landscape over time, the unit ceases to be atomic (indivisible), because for the purposes of its description we have to take into account its component parts, i.e. the same people present in different scientific communities.

A peer evaluation [2] is institutionalized in the form of a program committee of conferences and the mechanism of a blind peer review aims at making evaluation of works to be anonymous and objective. Thus, it is impossible to identify of what specific community units consists the basic unit. 3-5 persons out of 20-30 members of the program committee usually participate in an anonymous peer review for every paper. In addition, the process of peer evaluation has time duration, as knowledge acceptance by the community can be determined in course of time - whether the article is criticized, cited or remains ignored. It means that despite the fact that, conceptually, we can consider the community as the basic unit and, in retrospective, considering some research projects, we can identify the desired unit, for the purposes of evaluation of the present, we cannot offer any of the measured characteristics that can clearly describe the basic unit in the form of a community.

III. Conclusion

In this essay I tried to identify the basic unit of social organization of science.

I found that in terms of evaluation of the results of scientific activities, a research group or a group of authors of a scientific article can be considered as the basic unit of social organization. This group can be identified, all its elements participate in scientific work, and these people are also easily identified within the hierarchy of the scientific institution.

At the same time such a basic unit cannot be compared with scientific knowledge as the process of obtaining scientific knowledge includes not only the process of its generation but also the process of its evaluation. This means that the basic unit shall include not only the people who participate in preparation of this knowledge, but also the environment that accepts knowledge, and in which we can not reveal specific material objects.

In other words, for the purposes of monitoring and evaluation of the results of scientific activities the basic unit can be defined with certain restrictions and within the framework of the social institution. The scientific community that is formed around scientific challenges, paradigms and disciplines, to a greater degree suits the concept of the basic unit but it consists of unmeasured (materially unidentifiable) components.

References

- [1] Frederick Betz. *Managing Science: Methodology and Organization of Research*, volume 9. Springer Science & Business Media, 2010.
- [2] Richard Whitley. *The intellectual and social organization of the sciences*. 2000.