ФІЛОСОФІЯ PHILOSOPHY

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ON ADEQUACY OF RESEARCH DEFINITIONS IN THE LAW ON SCIENCE TO CONTEMPORARY COGNITION

Законом України «Про наукову і науково-технічну діяльність» визначено поняття наукової діяльності, фундаментальних і прикладних наукових досліджень, прикладних розробок як норм для суб'єктів наукового пізнання. Проблема полягає у невідповідності цих визначень широкому спектру сучасних систем пізнання і виробництва знань. Метою дослідження є проаналізувати визначення і напрацювати пропозиції щодо їх коригування. Нашою ідеєю також є розширення представлення у Законі понять дослідницької діяльності на основі сучасних систем пізнання і виробництва знань. Корисним для цього може бути застосування типології Аристотеля, запропонованої у «Нікомаховій етиці», яка на даний час використовується при створенні систем практичних знань. У статті запропоновано визначення на цих засадах наукових, філософських, технологічних і практичних досліджень.

Ключові слова: *Закон про Науку, наукова діяльність, наукове знання, фундаментальні (базові) дослідження, прикладні дослідження, практичне знання.*

Законом Украины «О научной и научно-технической деятельности» определено понятие научной деятельности, фундаментальных и прикладных научных исследований, прикладных разработок как норм для субъектов научного познания. Проблема заключается в несоответствии этих определений широкому спектру современных систем познания и производства знаний. Целью исследования является проанализировать определения и разработать предложения по их корректировке. Нашей идеей также является расширение представления в Законе понятий исследовательской деятельности на основе современных систем познания и производства знаний. Полезным для этого может быть применение типологии Аристотеля, предложенной в «Никомаховой этике», которая в настоящее время используется при создании систем практических знаний. В статье предложено определение на этой основе научных, философских, технологических и практических исследований.

Ключевые слова: *Закон о Науке, научная деятельность, научное знание, фундаментальные (базовые) исследования, прикладные исследования, практическое знание.*

The Law of Ukraine «On scientific and scientific-technical activities» establishes concepts of scientific activity, fundamental and applied research, applied (experimental) development as the norms for subjects of scientific cognition. The problem consists in the inadequacy of definitions to a wide range of modern systems of cognition and knowledge production. The aim of the study is to analyze the definitions and to work out proposals for their correction. Our idea is also to expand the scope of definitions and to represent research on the foundations of modern systems of cognitions and knowledge production. Useful for this application should be Aristotle's typology, proposed in the «Nicomachean Ethics», currently used in the creation of practical knowledge systems. On these foundations in the article we propose the definitions of scientific, philosophical, technological and practical research.

Keywords: *Law on Science, scientific research, scientific knowledge, fundamental (basic) research, applied research, practical knowledge.*

Introduction

Scientific activity in a modern cognition is often seen in the form of fundamental (basic) and applied research. As well known, the legislation of Ukraine [*The Law of Ukraine*] and international standards [*Proposed, 2002*] paid

much attention to this forms of research. However, separation of research on fundamental and applied in our legislation lacks rigor and certainty. This incorrectness to some extent prevents proper use of these concepts in the practice of scientific research and expertise. Fuzzy certainty of unity and distinction of fundamental and applied research, experimental development can lead to impropriety on the use of these concepts in science policy. This regards to definitions of research activity and related activities, represented in the Law of Ukraine «On scientific and scientific-technical activities» (hereinafter - the Law on Science).

The aim of the study is to analyze definitions of scientific activity, fundamental (more used for this purpose - basic) and applied research in the Law on Science and working out proposals for these adjusting in accordance with current epistemological and methodological concepts.

Literature review and conceptual framework

Definitions of basic and applied research involve their separation by ability of practical applications of results. This is the tradition in the field of science. Disputes regarding the unity and distinction of basic and applied research taking place despite the fact, that they are artificial intellectual constructs, interpretation of which should be coordinated by scientific community.

According to the Law on Science [*The Law of Ukraine*]:

«scientific activity – intellectual creative activity, focused on obtainment and application of a new knowledge. Its main forms are basic and applied research;

basic scientific research – scientific theoretical and/or experimental activity, focused on obtainment of a new knowledge about regularities of development of nature, society, human being and their interrelation;

applied scientific researches – scientific activity, focused on obtainment and application of a new knowledge, that can be used for practical purposes».

The Frascati Manual [*Proposed, 2002*] presents definitions of basic and applied research, experimental development in a form:

«***Basic research*** is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view. ***Applied research*** is also original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective. ***Experimental development*** is systematic work, drawing on existing knowledge gained from research and/or practical experience, which is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed».

Jane Calvert and Ben R. Martin [*Calvert, 2001*] proposed interesting results in the background document for workshop in 2001, where they discussed the correctness and usefulness of use of the basic research concept. They include

unpredictability, novelty, generality and theory as epistemological features of basic research. But they note that these features are not strictly separate basic research from applied research. These forms of research delineating intentionally, but then the same fragment of knowledge can be noted as basic or applied. Distance from application is fuzzy feature for separation of knowledge fragments. Dichotomy «published – patented» is not correct, because results of applied research also can be published. Institutional feature (where the research is done determines the type of research) is false, because basic research can be undertaken in industry. Philip Kitcher [*Kitcher, 2001*, p. 86-87] also showed this; he said, that industrial laboratories have some kind of «pure» researchers, and there are scientists in universities who devoted themselves to technology. In conclusion, Calvert and Martin noted [*Calvert, 2001*, p. 22], that many experts don't want to change the terminology for basic and applied research believing they are «center of crystallization» in solving problems of science.

Note, that according to Kitcher's «Science, Truth, and Democracy» [*Kitcher, 2001*], distinction between «pure science» of basic research and applied research based on «the myth of purity» − idea, that basic science must be isolated, independent of social context, and without liability to external moral and social values. Such basic science does not exist, it is a false ideal.

Nils Roll-Hansen [*Roll-Hansen, 2009*] emphasizes the distinction between basic and applied research and notes that the choice of problems in applied research depends on the external social values. He discussed a difference in criteria to judge the success or failure of the research, in effects on social processes and in organization, especially in degree of autonomy to political and economic interest and goals. He argued that distinctions makes good sense philosophically when not interpreted in terms of rigid and exclusive metaphysical categories.

Calvert in her important article [*Calvert, 2006*] notes, that scientists use the notion «basic research» for distancing from application, but if it is necessary for these, highlight the potential application. It is difficult to accuse scientists of hypocrisy or determine if in fact the work has both basic and applied components. Scientists can adapt their work to make it more applied. Flexible position of scientists is a response to growing pressures in modern requirements of research funding. Scientists use the term «basic research» as a safety resource to protect themselves from requirements to use the results and their evaluation by external bodies. But beyond this, involving the ideal of basic research, scientists make their actions meaningful to themselves and legitimize their activities.

Roger Pielke Jr. notes [*Pielke, 2012*], that «basic research» has functioned as the key political symbol in discussion of science policy. The rise of basic research as a political symbol was coincident with the transition in the locus of political power at the highest levels of government within the scientific community. Dissatisfaction with this model is one of the key factors which has

led to a search for a new model of science policy. However, to-day no such model.

Analysis of the modern landscape of research indicates a development of forms of practical knowledge and return to the typology of Aristotle [*Ross,2009*], in which practical wisdom takes its important place among the scientific and philosophical knowledge, techniques and technologies. We can say that research is increasingly becoming the part of social practice to the overall process of development and improvement [*Porev 2012*].

Our study and results

As described in the Law on Science definitions, basic and applied researches have similar cognitive goals. The difference is only in the orientation of the further use of acquired knowledge. Common to both concepts of activity - research - is a human activity in which the processes of nature and society are observed, described and explained, understood by researchers. The main result of the study is to obtain knowledge of the subject. Significantly different activity is presented in the Frascati Manual as an experimental development.

Philosophers of technology [*Philosophy, 2009*] mostly agree that applied research and technology have both common features and differences. A «Truth» of research is an alternative to a «usefulness» of technology. Science provides research and creates epistemic constructs - hypotheses, theories, descriptions, explanations – as main results. Technology aims to create artificial things and processes, but uses the epistemic constructs as additional facilities. We agree with this and believe that there is more reasons to talk about unity of basic and applied research than about proximity of science and technology.

We believe that creation of definitions, which represent knowledge and activities in legislative documents should be based on existing systems and forms of research and development, other kinds of cognitive activity prevailing in the world's science. Today the Law on Science can't be deprived of the concepts of fundamental and applied research despite their controversial nature. However, the current research activities largely focused on social practices and can't be represented only by science and technology. If the Law on Science should have definition of philosophical research more for academic interest, obtaining professional and practice-methodical knowledge now becomes important in cognition and in deployment of social practices.

Note some incorrect definitions in the existing Law on Science. It is not good to use «focused on obtainment and application of a new knowledge» because not everything that directed to aim, leads to it exactly and immediately, in this case - to obtain knowledge. For example, financial employee of research institution in the long run also «aimed at» obtaining knowledge by providing money for research activities. Second, the «use of knowledge» - too broad concept, which makes the definition is not clear. To use knowledge can both scientific researcher and practitioner, but in the second case, his work will not necessarily scientific. Thirdly, «new knowledge» can be scientific or common, technical and practical.

The definition of applied research is done incorrectly for several reasons. For example, applied research is partially determined through the scientific activity, but the last one - partly through the applied research. However, the main methodological incorrectness represents the phrase «obtaining new knowledge that can be used for practical purposes», but this knowledge can be not only scientific. We should note, that this definition binds a scientific activity with applied research very fuzzy and is not creates an exact sense.

In our view, the definition of scientific activity as a central concept in the Law on Science has the drawbacks that it is based on the fuzzy base of fundamental (basic) and applied research, includes the incorrectness. In defining of research activity as creation of knowledge in general, the law represents science, so to speak, «in the broadest sense».

We assume it would be useful to define not only scientific activity, but a scientific knowledge in the Law on Science. Not only because the scientific knowledge is the main result of scientific activity: this type of knowledge should have certain epistemological features. But the definition of scientific knowledge is difficult, because necessarily includes epistemological, methodological and ontological notions. In accordance to needs of cognition, science creates scientific knowledge in the forms of descriptions, explanations and predictions. As S. Porev [*Porev 2012*] notes, scientific knowledge is presented as:

– regularities (some of them qualified as laws), principles, mechanisms of the world;

– theoretical, abstract, ideal and modeled;

– intersubjective, directed to represent objects and subjects of research;

– hypothetical, not finished, but enough justified by induction and deduction;

– approximately true in the sense of truth as correspondence to research object;

– empirically adequate, that provides by replication, verification and falsification;

– mainly consistent, systematic and coherent.

Bulkiness makes the definition of scientific knowledge methodically opaque and too difficult to use. Therefore, in the Law on Science as a major can offer more exact definitions of scientific activity and research, the last one should be viewed in a broader sense.

But more important is that advanced scientific and professional community in the world in recent decades create and use new knowledge systems [*Porev 2012*] and so-called knowledge production [*Gibbons, 1994*]. Practical knowledge of «phronetic planning research» [*Flyvbjerg, 2004*] represents the idea of «practical wisdom» of Aristotle's typology outlined in the «Nicomachean Ethics» [*Ross,2009*]. In our view, the Law on Science should contain definitions of research types, based on these developments.

Thus, we propose the following definition of research activities for the Law on Science.

Research activity - intellectual creative activity of obtaining new knowledge through research. Its forms are philosophical, scientific, technological and practical research and combinations thereof, including scientific-technological and scientific-practical research.

Philosophical is research of obtaining philosophy knowledge of the most general foundations, laws and principles of being and knowledge of the world and man in it.

Scientific is research of obtaining scientific knowledge about the laws, regularities and mechanisms of nature, society and man, their relationship.

Technological is research of obtaining technological knowledge for creating human artificial things, the definition of methods and tools for their design, engineering and manufacturing; main component of this knowledge answers the question «how to create».

Practical is research of obtaining practical knowledge about an activity, its types and forms, goals, objectives and characteristics of the realization in all spheres of society and economy, the creation and application of methods and tools; main component of this knowledge answers the question «how to act».

Note that the separation of scientific, practical and scientific research points to the fact that cognitive activity that exists in social practice, need not be scientific or is it in fact.

Next, we define fundamental (basic) and applied research accordingly to the Frascati Manual, but specifying the terms of use in the context of other propositions of the Law on Science. Knowledge gained in fundamental research can be used only for next research or education, knowledge gained in applied research should contain direct explanation of use.

Conclusion

1. The Definitions of concepts of scientific activity and applied research in the Law of Ukraine «On scientific and scientific-technical activities» are incorrect, and the definition of fundamental research - is somewhat inaccurate. Therefore, they need improvement, but what we should take into account - the new realities of cognitive systems development.

2. We assume, it is appropriate to offer to form basic definitions of the Law on Science on the basis of the concept of «research», considering these as an extensive cognitive structure according to the known and relevant typology of Aristotle, which presents philosophical, scientific, technological and practical research.

3. Our study confirms that the unity of basic and applied research has a more profound reason than their separation. At the same time, the applied research significantly separated from (applied) experimental development that focused on the artificial things, technologies, on the new forms of practical activities and techniques. Applied research aimed at obtaining knowledge, characterized by truth, while development assessed according to its usefulness.

Directions for future research. Our propositions to improve the Law on Science can be considered as preliminary because it is necessary to work out the

basic principles of science development in Ukraine not only according to political considerations, but also on the epistemological and methodological basis. It should be also defined, how the proposed representation of Aristotle's typology can be combined with the concept of fundamental and applied research.

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Артур Гангал

ФІЛОСОФСЬКІ ПРИНЦИПИ АНАЛІЗУ ІНТЕРІОРИЗАЦІЇ СТУДЕНТСЬКОЮ МОЛОДДЮ СОЦІАЛЬНИХ НОРМ

У статті проаналізовано основні філософські принципи аналізу інтеріоризації соціальних норм: вивчення міжіндивідної взаємодії на засадах символічного інтеракціонізму, інституційний підхід до аналізу умов інтеріоризації, доповнення діяльнісного підходу комунікативним. Проаналізовано державну політику щодо створення належних умов для інтеріоризації, сутнісний зв'язок процесів інтеріоризації та соціальної адаптації, а також значення досліджень світогляду для розкриття ціннісних підстав інтеріоризації.

Ключові слова: *інтеріоризація соціальних норм, студенти, освітні норми, міжіндивідна взаємодія, інституційний підхід, державна політика, соціальна адаптація, світогляд, цінності.*