Вестник РУДН. Серия: Юридические науки 2020 Т. 24. № 4. 901–918
RUDN JOURNAL OF LAW http://journals.rudn.ru/law

МЕТОДОЛОГИЯ ПРАВОВЫХ ИССЛЕДОВАНИЙ

LEGAL RESEARCH METHODOLOGY

DOI: 10.22363/2313-2337-2020-24-4-901-918

Research Article

PRECARIAT IN SCIENCE AND RESEARCH: LEGAL AND PHILOSOPHIC COMPREHENSION OF THE ISSUE IN THE GLOBAL CHALLENGES PERSPECTIVE

Maria V. Zakharova, Vladimir I. Przhilenskiy

Kutafin Moscow State Law University (MSAL),
Moscow, Russian Federation

Abstract. The article investigates philosophico-theoretical issues of legal regulation of labor relations in the scientific and research sphere in connection with increasing precarization in Russia and the rest of the world. Particular emphasis is made on the analysis of characteristic features of science as a social institution and on assessing the potential negative impact of labor relations precarization on the capability of this institution to perform its basic functions in the face of global challenges. The purpose of the study is to look at the ways of preserving the functionality of research as an institution in the knowledge economy environment using the means and methods of legal regulation in Russia and other countries worldwide. The focus is made on combining the philosophical and legal methods of research with philosophical reflection preceded by a comparative legal analysis of legislative regulation and assessment of its social and legal efficiency. The study has resulted in identifying the peculiarities of governmental and legal regulation of science as a social institution in different countries in the face of grand challenges, as well as the measures taken in different countries to limit the negative impact of the knowledge economy together with the assessment of its socio-legal and politico-administrative effectiveness.

Key words: legal regulation, precariat in science and research, academic capitalism, social security, grand challenges

Conflict of interest. The authors declare no conflicts of interest.

The participation of the authors: M.V. Zakharova — introduction, general overview; V.I. Przhilenskiy — analysis and scientific elaboration of the materials, conclusion, copywriting.

Funding information. The scientific research was carried out within the framework of the state assignment 075-00293-20-02 of 05/25/2020. Topic number — FSMW-2020-0030 "Transformation of Russian law in the face of great challenges: theoretical and applied foundations."

Article received 30 July 2020
Article accepted 15 October 2020

For citation:

Zakharova, M.V., Przhilenskiy, V.I. (2020) Precariat in science and research: legal and philosophic comprehension of the issue in the global challenges perspective. *RUDN Journal of Law*. 24 (4), 901–918. DOI: 10.22363/2313-2337-2020-24-4-901-918.

DOI: 10.22363/2313-2337-2020-24-4-901-918

Научная статья

НАУЧНЫЙ ПРЕКАРИАТ: ПРАВОВОЕ И ФИЛОСОФСКОЕ ОСМЫСЛЕНИЕ ПРОБЛЕМЫ В УСЛОВИЯХ ГЛОБАЛЬНЫХ ВЫЗОВОВ

М.В. Захарова, В.И. Пржиленский

Московский государственный юридический университет имени О.Е. Кутафина (МГЮА),
г. Москва, Российская Федерация

Освещаются философско-теоретические проблемы правового регулирования трудовых отношений в области научной деятельности в связи с ростом их прекариации в российском обществе и зарубежных странах. Особое внимание уделяется анализу специфики науки как социального института и оценке возможных негативных последствий прекариации трудовых отношений для способности данного института выполнять свои базовые функции в условиях глобальных вызовов. Цель данного исследования — рассмотреть способы сохранения функционала науки как института в условиях академического капитализма средствами и методами правового регулирования в России и за рубежом. При этом основной упор делается на сочетании философских и юридических методов исследования, когда философской рефлексии предшествует сравнительно-правовой анализ законодательного регулирования и оценка его социально-правовой эффективности. В результате рассмотрения были выявлены особенности государственно-правового регулирования института науки в разных странах мира в условиях больших вызовов, определены меры, принятые в различных странах с целью ограничений негативного влияния академического капитализма и дана оценка их социально-правовой и политико-административной эффективности.

Ключевые слова: правовое регулирование, научный прекариат, академический капитализм, социальная безопасность, большие вызовы

Конфликт интересов. Авторы заявляют об отсутствии конфликта интересов.

Информация о вкладе авторов: Захарова М.В. — введение, общий обзор; Пржиленский В.И. — анализ и научная проработка материалов, заключение, копирайтинг.

Информация о финансировании. Научное исследование выполнено в рамках государственного задания 075-00293-20-02 от 25.05.2020 г. Номер темы — FSMW-2020-0030 «Трансформация российского права в условиях больших вызовов: теоретико-прикладные основы».

Дата поступления в редакцию: 30 июля 2020 г.
Дата принятия к печати: 15 октября 2020 г.

Для цитирования:

Захарова М.В., Пржиленский В.И. Научный прекариат: правовое и философское осмысление проблемы в условиях глобальных вызовов) // Вестник Российского университета дружбы народов. Серия: Юридические науки. 2020. Т. 24. № 4. С. 901–918. DOI: 10.22363/2313-2337-2020-24-4-901-918.

Introduction

The precariat — a new *social* class breaking the classical canons and stereotypes — is becoming an increasingly noticeable phenomenon in the life of people and society.

Precarity is a concept denoting an acute psychological state of life instability caused by a lack of job security and confidence in the future. Due to the developments in labor relations in recent decades, the number of temporary employed people who are deprived of stable and guaranteed earnings has considerably increased. Earlier this form of employment relations was characteristic of the low-skilled labor market but today it is actively spreading to other spheres, including science, research, and education. "The concept of *precariat* is derived from the Latin *precarium* (unreliable, unstable, unguaranteed) … The precariat is a fundamentally new formation representing a social stratum that personifies alienation not only from the results of their labor, but also from the whole society, sizeable social groups experiencing peculiar and sophisticated forms of exploitation of their labor, their knowledge, and their qualifications, which ultimately affects the quality of their life" (Toshchenko, 2018:6).

This phenomenon was noted more than two decades ago, and it is of growing concern in the countries considered to be among the most stable in terms of social stratification (Campbell, Burgess, 2001:85–108). Although this period looks quite substantial, there is still neither a reliable methodology for studying the precarity relations, nor even a well-tested method for its measuring (Cranford, Vosko, Zukewich, 2003).

It is observed in the sphere of science and research as well. However, identifying the precariat characteristic features as a phenomenon in the sphere of science and research encounters certain difficulties. This is, first of all, due to the fact that, unlike other spheres of labor, precarization in the scientific sphere impacts not only the life standards of those involved and their families but leads to the social well-being deterioration of a vast social stratum or class. On the one hand, research is the type of activities that needs as much legal protection as any other with hired workers, businessmen or civil servants. On the other hand, precarization of science and research labor jeopardizes the very existence of science and research as a social institution, at least in the form in which it has developed and functioned over the centuries. (Gebel, Baranowska-Rataj, 2012)

In most spheres of human activities, which have recently seen a rise in precarious (non-guaranteed and short-term) labor relations, the ongoing changes do not directly jeopardize national security, however, in the era of grand challenges the risk of research and development institutions to lose its functionality can be really dramatic. At the same time, the growing number of scholars whose employment is regulated by market economy rules inevitably leads to deterioration of their potential both in research and expert and analytical activities. That is why it is so important to correctly assess the implications of the changes in modern science (which, being essentially a dynamic system) cannot remain unchanged, and subsequently develop an efficient strategy for legal regulation of labor relations in the sphere of science and research and the adjacent sphere of higher education (Kalleberg, 2012; Rodgers, Rodgers, 1989; Standing, 2015).

Turning Science into a Direct Force of Production

In most philosophical systems of the 18th and 19th centuries, science was defined as the highest type of cognition or as one of the forms of social consciousness. The philosophy of science of the 20th century added some new dimensions to scienticifity: researchers looked at science as a separate social institution, a specific kind of activity, and/or a special phenomenon of culture. In the 21st century, yet another mode of science is becoming more and more clearly visible: at the age of technology, science can also be seen as a technology. This thesis may not seem very original; however, it is not totally free of novelty. The matter is that science has always been a source of technology, but at the same time, by itself, seemed to be something different. It has been argued that science development is the source of technology advancement, and that technology, in its turn, generates scientific thought and can even influence the choice of its priority directions. But the idea that science should change qualitatively, that its structure and content should be altered, is quite new.

Karl Marx, when analyzing society and assessing the prospects for socio-economic transformations, wrote about science as a “variable element of production” and combined it with nature while opposing these two “forces of capital” to workers. Behind all his reflections about the nature of social production and the essence of productive forces under capitalism, a non-trivial point view on the role of science and scientific knowledge in this process can be discerned. “The development of fixed capital,” — Marx wrote, — “indicates to what degree general social knowledge (wissen) has become a direct force of production, and to what degree, hence, the conditions of the process of social life itself have come under the control of the general intellect and been transformed in accordance with it; to what degree the powers of social production have been produced, not only in the form of knowledge, but also as immediate organs of social practice, of the real life process" (Marx, Engels, 1969:468–469).

Today, more than a century and a half after the thesis about the transformation of science into a direct force of production was first voiced, the meaning of this statement is beginning to alter, complemented and specified, sometimes in the most unexpected way. It is obvious that not only production should change to become *advanced* enough to comply with the present-day science, but science should also change to meet the production needs to the maximum extent possible. Notably, this involves changing not only the forms of organizing scientific research, but also the structure of scientific knowledge, and even its content.

No one expected that the very essence of science and scientific knowledge would undergo a critical reassessment, that the ideals and their criteria would undergo revision. No one expected that that philosophically justified, methodically perfected and experimentally tested models regulating the correlation between the theoretical and the practical, the fundamental and the applied, the hypothetical and the apodictic, would be reassessed and revised from the point of view of organizational and managerial feasibility as well as financial and economic efficiency. Basically, everything was limited to the analysis of the economic growth data, which inspired optimism: implementation of technical inventions resulted in production growth and rise in research intensity; this increased the dependence on information and information-processing machines, and led to extended use of equipment with computer numerical control, robots and artificial intelligence. All of the above was most obviously associated with the concepts of growth of the intellectual and social power of science, as well as its cognitive and transformative abilities.

External and Internal Management of Science in the Knowledge Society

Today the authorities, the society, and the researchers themselves are in search of a new image of science securing the unity of form and content. For example, the image of a scientific community of "mobile" scientists forming research teams created for short-term projects and funded on a competitive basis is in sharp contrast with the traditional idea of a scientist or a researcher, whose ideal image, like the entire new-European myth of science, is deeply rooted in the culture of the industrial society and successfully adapted to mass consciousness. In 1998, the article entitled "*From the World of Science to the World of Research?"* was published in Science Magazine. Bruno Latour, the author of the article, expressed his wish to derive a formula for the changes that have occurred in scientific knowledge. "In the last century and a half, scientific development has been breathtaking, but understanding of this progress has dramatically changed. It is characterized by transition from the culture of "science" to the culture of "research". Science is certainty; research is uncertainty. Science is supposed to be cold, straight, and detached; research is warm, involving, and risky. Science puts an end to the vagaries of human disputes; research creates controversies. Science produces objectivity by escaping as much as possible from the shackles of ideology, passions, and emotions; research feeds on all of those to render objects of inquiry familiar. There is a philosophy of science, but unfortunately there is no philosophy of research. There are many representations and clichés for grasping science and its myths; yet very little has been done to illuminate research. An association was created 150 years ago for the advancement of science, but what would an Association for the Advancement of Research look like?" (Latour, 1998:77).

The image of science as a common cause to which one serves to the extent of their own understanding of their tasks and goals is being replaced by a new reality, where collective discipline and ability to work in a team is gradually turning into the main virtue, and the freedom of choice is reduced to the freedom of choice of a project offered by a grantor. Such concepts as "devotion to scientific duty" or "selfless devotion to truth" seem hopelessly archaic for describing what is happening within the walls of research or educational institutions. The pompousness has been replaced by the routine practices of regulating activities of scientists and researchers pertaining to the sphere of professional ethics.

As Kevin McClure, a US researcher, pointed out in an interview with Rebecca Koenig, knowledge-based economy influences research goals and objectives, as universities need to compete for grant money. Teachers have to give way to pressure from the management that can set the number of applications and the requested amounts of money necessary to determine the duration of the contracts signed with them. At the same time, some disciplines are becoming more in demand than others due to the market trends. Participation in commercially successful educational programs predetermines teachers' research interest. Moreover, teachers are asked to think about what and how they teach, and IT and online teaching define not only the structure of knowledge in the courses taught, but also the structure of scientific knowledge in general, including the fundamental one (Koenig, 2019).

Thus, science turns into a factory producing knowledge, just as the scientists, who bravely entered the industrial era, desired. However, the heirs of the Enlightenment found themselves to be neither spiritually nor psychologically ready for what science would become in reality, seeing it turn into a direct force of production right before their eyes. As Steve Fuller wrote, "academics have been caught off-guard because they have traditionally treated knowledge as something pursued for its own sake, regardless of cost or consequences. This made sense when universities were elite institutions and independent inquirers were leisured" (Fuller, 2018:37).

This myth and the image of the scientist behind it is busted not only by the system of funding with maximally depersonalized and highly untransparent money distribution mechanisms. The development of science no longer offers global topics and fundamental directions, and scientific knowledge in and of itself no longer looks like a regular geometric shape with theoretical foundations securely keeping in subordination a variety of experimental data and facts (Becker, Mayer, 2019:147–168).

Replacement of subordination of knowledge forms by coordination that have destroyed the hierarchy of theoretical and empirical, fundamental and technological, led to the situation when the advancement of science is regulated by the same "invisible hand" that regulates the post-industrial economy. The problems of management have come to the fore, and self-consciousness of scientists is being reoriented towards the issues of professional survival through the ability to "procure" or "produce" knowledge. It is impossible to manage science using scientometrics alone, but the old standards of assessment are also demonstrating their inefficiency in the new conditions (Hillmert, Jacob, 2003).

History of science and/or history of knowledge

In order to understand or at least get an idea of what exactly is happening with science, two things are required: to look at science in a historical perspective and put it into a broader context, considering it as the dominant form of knowledge in a given epoch. Indeed, knowledge has always been seen as the greatest value, the possession of which may be a means of improving life under normal conditions, and a means of survival in emergency situations. The extremely simple understanding of knowledge is viewing it as something that allows making the right decision, taking effective action, explaining what is happening and foreseeing the future. Knowledge understood this way is the result of the experience of interaction with nature and other people. Its purpose is successful adaptation to the environment, in terms of both nature and society.

As the complexity and technological capabilities of society increase, the amounts of knowledge grow along with the associated problems: it is becoming increasingly more difficult to accumulate, preserve, evaluate, reproduce, and use knowledge. Cognition is becoming an increasingly complex collective action, involving division of labor, narrower specialization, more complex communication system, and the need for more efficient management. The interaction of the people of knowledge with society becomes a special issue: as one epoch gives way to another, the self-description as well as the system of self-reproduction are being transformed.

A special topic is the evolution of ideals and values of the people of knowledge. Ancient philosophy creates its own ideal of knowledge, which, in addition to pointing out the path to obtaining true freedom and dignity, also explains why theoretical reasoning leads to understanding individual and collective welfare. In medieval Christianity, the functional role of knowledge changes. Now it is the key to soul salvation, and cognition is aimed at personal immortality, although the most successful share their thoughts and experience.

The cult of science and scientific knowledge that was formed in Europe over the past four centuries and subsequently spread throughout the world, has significantly enriched the entire previous set of concepts and imagery, updating the notions and meanings of cognitive activity. The era of industrial production gave birth to a new metaphor — the metaphor of knowledge production, resulting, inter alia, in the emergence of such concepts as *spiritual production*, *knowledge production*, *knowledge management*, and *knowledge economy*. Thus, knowledge is no longer discovered, born, or revealed — it is created. Therefore, since the technologies for making things are improving, knowledge production can be likened not even to the work of an artisan or an artist, but to the work of a conveyor factory, or rather a robot-based production complex (especially taking into account that modern technology clusters combine research and production, which presupposes single management, and, hence, unification). All the above is bound to affect the life of employees, even if they previously relied on different standards of work behavior. “Characteristics of the essential meanings of life of the present-day Russian employees”, — Zhan Toshchenko writes, — “are connected with the analysis of value orientations, which determine their consciousness and activity, commensurable with their social experience, characterize the main relations with the external world and with understanding of their personal mission” (Toshchenko, 2018:220–221).

Scholars did not become immediately aware of this circumstance, but those who were concerned about the efficient use of funds, including the funds allocated for science and education, started looking into the issue of the discrepancy between the image of science and the fundamental trends and symbols of the current epoch. The world where the idea of efficiency dominates over others cannot allow financing science that is perceived through images borrowed from previous epochs and cognitive practices that prevailed in those times. An amazing symbiosis of symbols and meanings, found and cultivated by philosophers and preachers, poets, and artists, migrated to science as far back as when it was an integral part of philosophy, theology and/or art. This transfer of symbols and meanings of the past provided the ethics of science with efficient tools for a long time, until it came into conflict with the spirit of the era of technology and total digitalization (Gorshenin, Zatsarinny, 2019).

Is science a servant of technology?

In order to understand what exactly is happening “today”, one needs to compare it with “yesterday”, “the day before yesterday”, etc. For instance, the intellectual history of Europe had some periods when philosophy was a self-sufficient form of cognition, which subsequently gave way to periods of various kinds of “service”. For example, in the Medieval Period, philosophy turned into a servant of theology, and in modern times it has to turn into a strict science, which essentially means just another version of service. The present-day Europeans “modernized” and “utilized” the Christian religion as well, actively involving the church in solving social problems, and directing its organizational and communication capacities towards strengthening ideals and values of humanism. Transformation of church service into a combination of lecture and concert, as well as transformation of confession into a counseling [psychotherapy] session, just like inversion of philosophy from freedom to service, can only be explained by the fact that in the era of religion triumph everything becomes religion, and in the era of science everything turns into science. Perhaps, the current era of technology requires that everything, including philosophy, religion, and science, should be looked upon as technology. Certainly, these are not production technologies in the original sense of the word (i.e., the knowledge and skills enabling to produce things with predetermined standard parameters). These technologies belong to the category of social and intellectual technologies at the same time or, speaking in terms of Marxist philosophy, these are the technologies of spiritual production. The only remaining question is whether the era of the dominance of technology will turn science into something directly opposite not only to the original project, but also to the previously produced "product" (Polyakova, 2016).

The relationship between theory and technology in the classical model of science seemed simple and clear: technology developers use theory in its entirety (or some individual fragments, components, or theoretical constructs) to build a system of actions or design equipment. They can turn to theorists for explanations as often as necessary, but they can influence neither the structure nor the content of theory. Since the time of the first philosophers, the notion of theoretical knowledge has undergone a long evolution. This notion proceeded from the initial idea of theoretical speculation based on experience of figurative-poetic attitude to the world, towards methodological description of scientific theorization involving a detailed analysis of such processes as generalization, axiomatization, visualization, formalization, abstraction, modeling and many others, which represent this type of intellectual activity as the highest form of knowledge. Theory exists for practice, but it also has an independent value. At the same time, theory, in terms of substance, is independent from practice in the sense that research carried out by theorists should not be determined by implementation of the anticipated results. One of the most important ideals of scientificity is the ideal of objectivity, the essence of which implies separation of theoretical point of view from practice impact, and independence from any pragmatic considerations and interests.

Summing up the above, we can conclude that the meaning of classical cognitive paradigm was reduced to the following formula: *follow all the instructions and your knowledge will be objective*. This is what theorists think, but those who create artificial intelligence systems, or those who discuss the strategies for their development, see theory as one of the types of knowledge that interacts on an equal footing with empirical, experimental, and technological knowledge. For instance, Nick Bostrom, the American researcher, when analyzing the emulation technology development prospects, looked at theoretical knowledge as a resource that can compensate for weaknesses and shortcomings of technology. "Just how much technology is required for whole brain emulation depends on the level of abstraction at which the brain is emulated. In this regard there is a tradeoff between insight and technology. In general, the worse our scanning equipment and the feebler our computers, the less we could rely on simulating low-level chemical and electrophysiological brain processes and the more theoretical understanding would be needed of the computational architecture that we are seeking to emulate in order to create more abstract representations of the relevant functionalities" (Bostrom, 2016:66). Thus, theory and technology turn out to be "equal players" in the creative space.

Theoretical knowledge is not identical to theoretical understanding, but technologies use theoretical knowledge in such a way that it acquires new features: it is fragmented, operationalized, and functionalized. In addition, theoretical knowledge is often interpreted in the context set by technology in such a way that interpretations go far beyond its experimental verification or empirical comparison with facts. As Bostrom points out, "compared with the AI path to machine intelligence whole brain emulation is more likely to be preceded by clear omens since it relies more on concrete observable technologies and is not wholly based on theoretical insight" (Bostrom, 2016:71).

At the same time, reference to antiquity ideals as applied to theoretical knowledge is more related to self-description of science than to reality. For instance, the question of what Galileo was searching and striving for when choosing between scholastic physics and Pythagorean tradition of searching for numbers that govern nature, has been answered by historians of science in different (and sometimes opposite) ways. Scientific revolution of modern times is often seen as a series of brilliant discoveries united by a common idea of mathematical description of nature. Alexandre Koyré directly called it Plato's revenge, referring to transition from rational (but without mathematical formulas) physics of Aristotle (that prevailed in medieval scholasticism) to Galilean science allowing calculation, prediction, and design. Plato is unlikely to have had the idea of combining mathematics, physics and mechanics, which formed the basis of Galileo's method. It looks like the great Italian rendered the observed natural phenomena into mechanical models allowing their measurement and calculation. This point of view is very widespread today, although it is not supported unanimously.

Prestige of the profession of a scientist in Russia and the rest of the world: systemic and dynamic trends

Modern science is far more than mere research and is not limited to implementation of scientific discoveries in technologies, production processes and other professional practices. Today, economy has come to be based on knowledge, which has led to the emergence of an entire new sector: knowledge economy. Education and professional qualification have turned into economic resources, and, as a result, the state and society have to look for new approaches to the task of legal regulation of scientific activity. As Valentina Skvortsova and Alexey Skvortsov point out, transformation of knowledge into a key economic resource of highly developed societies occurs for four reasons: a) natural resources are replaced by artificial ones; b) mechanization and automation of labor increase its efficiency; c) sophisticated machinery turns it into a means of investment; d) smart technologies are gradually replacing the traditional ones that are associated with processing of natural resources (Skvortsova, Skvortsov, 2014:14).

The state program of the Russian Federation entitled *Scientific and Technological Development of the Russian Federation* approved by Decree No. 3773 of the Government of the Russian Federation on 29 March 2019 (as amended on 31 March 2020)[1] defines the government policy in the sphere of science and its interaction with the economy, state, and society. The text of the program demonstrates awareness of current situation specifics, which have been defined as *grand challenges*, replacing the concept of current global issues. The basic vector of the program is the need to ensure that science performs its main role in the new conditions. The fundamental tasks of science existing from the moment of its birth are to explain what is happening, to forecast the future and to assist the authorities in making effective management decisions. Today, another important aspect is added to these tasks: the national community of scientists, researchers, experts, and analysts must be ready to timely recognize the grand challenges and participate in developing effective response. At the same time, the previous task of ensuring the country's independence and competitiveness through creating efficient system to strengthen and utilize the nation's intellectual potential[2] is not canceled but clarified.

So, the tasks are set. But are there sufficient resources for their implementation, given the situation in which the employees engaged in science, research and education have found themselves (we refer to the hard times of the 1990s and the reform in education at all levels, which is still underway)? Surveys show that the social prestige of the profession of a scientist or a researcher, which has fallen extremely low after the collapse of the USSR, has not recovered yet, and some scholars believe that the downward trend has not reversed yet (Pavelyeva, 2016:146). The legal status of a scientist or a researcher is an integral part of the social status, and, hence, the social prestige. One can agree with the moderately optimistic point of view that "the soil for raising interest in science still exists in Russia; there is also rather high level of scientific literacy. Thus, if we wish to build innovative economy, develop cutting-edge technologies, have strict public control over their application, provide people with high-quality education and access to scientific knowledge through popularizing science instead of pseudoscience, we must act immediately" (Shuvalova, 2015:39).

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[1] Ob utverzhdenii gosudarstvennoy programmy Rossiyskoy Federatsii "Nauchno-tekhnologicheskoye razvitiye Rossiyskoy Federatsii" (s izmeneniyami na 31 marta 2020 goda) [On approval of the State Program of the Russian Federation *Scientific and Technological Development of the Russian Federation* (as amended on 31 March 2020)], available at: http://docs.cntd.ru/document/554102822.

[2] Strategiya nauchno-tekhnologicheskogo razvitiya Rossiyskoy Federatsii, utverzhdennoy Ukazom Prezidenta RF ot 01.12.2016 № 642 [The Strategy of Scientific and Technological Development of the Russian Federation approved by Decree No. 642 of the President of the Russian Federation dated 01 December 2016], available at: http://kremlin.ru/acts/bank/41449 (Accessed 21 June 2020).

Labor regulation in science, research and education: issues of compliance

Federal Law No. 443-FZ (*in Russian:* № 443-ФЗ) dated 22 December 2014 *On Amending the Labor Code of the Russian Federation and the Federal Law On Science and State Scientific and Technical Policy*[3] introduced an important amendment establishing some special aspects in regulating the work of specialists, heads of science and research institutions and their deputies; under this law the legal status of an employee in the sphere of science and research in Russia depends on one of the three categories. The first category is formed by the so-called "budgetary" employees: scientists and researchers employed by a science and research institutions funded from national or municipal budgets. The second category includes scientists and researchers employed in higher education institutions and further professional training/education organizations funded from the budget as well. Although both the former and the latter can be funded through grants, such funding, irrespective of their amount, is qualified as additional; it is also additional in terms of law. The third category involves employees engaged in the sphere of science, research and education who are remunerated otherwise (not from the budget). These are members of temporary teams financed from various sources, including governmental and non-governmental research funds, venture capital companies, etc. Research and development projects can be commissioned by both commercial structures and government agencies.

Article 52 of the *Law on Science and Scientific and Technical Policy* stipulates that employees do not have to comply with professional standards, including, inter alia, rather stringent requirements in terms of professional qualification. At the same time, the *Law on Education* contains such requirements for all employees of educational organizations, including science and research. As pointed out by Nadezhda Chernykh, "if we assume that the professional standard for employees in the sphere of science and research is approved without amending the *Law on Science and Scientific and Technical Policy*, a paradoxical situation will arise where the professional standard will apply to some scientists and researchers, while not applying to some others" (Chernykh, 2019:70).

Meanwhile, the strict regulation of the teachers' activities is essentially aimed at strict demarcation, convenient from the point of view of record keeping and administration, but completely unacceptable from the point of view of the professional specifics of the activities in the sphere of science, research, and education. One can agree with the point of view of those authors who emphasize the right of higher education

[3] Federal'nyy zakon ot 22.12.2014 № 443-FZ «O vnesenii izmeneniy v Trudovoy kodeks Rossiyskoy Federatsii i Federal'nyy zakon "O nauke i gosudarstvennoy nauchno-tekhnicheskoy politike"»] [Federal Law No. 443-FZ dated 22 December 2014 *On Amending the Labor Code of the Russian Federation and the Federal Law On Science and State Scientific and Technical Policy*], available at: http://base.garant.ru/70826604/ (Accessed 21 June 2020).

teachers to engage in science, research and development, which is an essential contribution to their education outcome. As Zoya Dashchinskaya and Natalya Putilo point out, "in the course of their activities, all the teaching staff can exercise the freedom of research creativity guaranteed to them, as well as to all the citizens, by the Constitution of the Russian Federation. However, in order to apply the provisions of the legislation on science to university teaching staff, they must either have the characteristics of science and research employees, or their activity must conform with characteristics of science and research activity in accordance with Russian laws on science" (Dashchinskaya, Putilo 2012:52).

In conclusion, we can refer to a medieval university, where professors were distinguished from schoolteachers by not only sharing knowledge they acquired through similar teaching but by being originally involved in the process of creating new knowledge. Therefore, they could show students where new knowledge came from and how it was created. Such distinction has been challenged by the era of the knowledge society and knowledge-based economy (Slobodskaya, 2018).

Inevitability of new labor regulation for science and research employees: French experience

The problems concerning modernizing regulation in the sphere of science and research are coming to the fore not only in Russia. For instance, France realizes the need for its radical reform as well as renovation of higher education that is intrinsically linked. The draft multi-annual research programming law (Loi de programmation pluriannuelle de la recherche — LPPR[4]) has been submitted for discussion. Although the plans and intentions of the reformers are not limited to this project, it occupies an important place in the strategic plans of the ruling French elite due to the fact that it has a powerful potential for the development and even transformation of the whole system of science, research and education. Among other laws and regulations directly or indirectly governing the sphere of research, which have come into effect in France over the past two decades, particularly noteworthy are the following: Law No. 2007-1199 dated 10 August 2007 on Liberties and Responsibilities of Universities (sometimes called the *law on the autonomy of universities*); Decree No. 2009-460 dated 23 April 2009 on the legal status of research lecturers, as well as Law No. 2006-450 dated 18 April 2006 on research evolution (research guidance). However, it is LPPR that (if adopted in the version proposed by the government today) is likely to have a significant impact on the evolution of science, research and education administering in the country.

In accordance with the French national tradition, the relations between scientists (researchers) and managers should be based on the principles of unconditional

[4] Vers une loi de programmation pluriannuelle de la Recherche, available at: https://www.gouvernement.fr/sites/default/files/document/document/2019/02/dossier_de_presse_-_vers_une_loi_de_programmation_pluriannuelle_de_la_recherche_-_01.02.19.pdf (Accessed 19 June 2020).

involvement of the state in the activities of the employees in these spheres. French professors were civil servants who held their mandate-based positions for the entire period of their careers until retirement at a certain age. Their salary included a guaranteed fixed amount and various additional payments considering the specifics of the sphere they were engaged in. A set of guarantees completely excluded the possibility, on the part of universities (and the entire state represented by them), to terminate contracts with professors, except for cases of gross incompliance with professional ethics or job descriptions. This secured the social position of professors, allowing them to fully concentrate on research, expertise, and creative approach to work.

At the turn of the millennium, it became clear that the time of unchallenged dominance of scientific and educational autonomy is becoming a thing of the past, when differences in the national systems of science, research and education began to grow in the once united European space. As a result of the Bologna Process, the European integration and general globalization, the French national system of science management faced the problem of modernization; its core essence is harmonization of principles and approaches in the context of restoration of the lost European unity in the sphere of science, research and education.

The project for the modernization of the research and education sphere announced by French Prime Minister Edouard Philippe in 2019 left no doubt concerning managerial intentions. The issues of finance, employment and innovative development were highlighted as reference points. Speaking to the public, Edouard Philippe confirmed France's status as one of the global leaders in both research and education.

However, despite the impressive success, the need for optimization is obvious and prompts the reformists to focus their efforts on the following three targets: ranking French universities with subsequent introduction of a system of differentiated funding based on ranking; changing the composition of expert committees dealing with research funding (scientists and researchers are to be replaced by government "appointees" and representatives of large corporations); increasing the share of fixed-term contracts in higher education institutions (this model is proposed, in particular, for younger researchers). The above shows that the extremely prosperous France, which protected its science and research professionals from labor precarization longer than others, nevertheless, must move in the general direction.

In this respect, Russia, looking at its western neighbor and accustomed (not without good reason) to borrow positive legislative practices, can hardly consider the vector of precarization of science and research professionals described above to be a successful social project.

Conclusion

Summarizing our analysis, we can argue that precariat in the sphere of science and research is a present-day necessity, and the main task of the Russian society is to make this process manageable and mitigate its negative social consequences as much as possible. Management and science funding mechanisms should not affect science itself, or its outcome. Classical examples of science testify that a discovery made by researchers under certain conditions may not be made under other conditions or may be made later by other researchers. If not a Catholic, but a Protestant or a Muslim, not a European, but an African or an Asian, had sailed to the American shores, not in the 15th, but in the 16th century, the same continent would still have been discovered. The discoverer might have landed in a completely different place, and the sequence of collection of information, exploration, and mapping might have been completely different. Even the study and exploration of those lands might have been carried out "from the other side" (i.e., starting from the west coast instead of the east coast). However, the newly discovered continent would have been the same and the result of study and exploration would have been the same — the geographical map of North and South America does not depend on the nationality of the mappers, or on their religion, or on who funded and under whose flag exploration and research expeditions were carried out. This key metaphor of discovery outlines various possible ways of science and technology development.

The experience of science development in different countries shows that today the successes and failures of this process depend on many factors, including political system and specifics of administration, current conditions of science, research and education, social institutions, and cultural values. Moreover, scientific life to a very large extent depends on the degree of its integration into technology and (which is essentially the same thing) extent of its involvement in economic development. For instance, the current system of research funding was introduced in the US in the middle of the 20th century and is spreading today with varying speed and intensity throughout the rest of the world. It stems from business management methods of organizing science and research activities, and its by-product is a gradual change in the structure and content of scientific knowledge.

The total digitalization and almost total robotization of production, which occupies the minds of managers today, gives rise to the image of science of the future, where knowledge is produced by robots, and people only control them. It is likely that there will be a place for the "traditional" forms of acquiring knowledge (still unique and exclusive) in that science of the future. It is likely that in order to preserve the historical past of science, special support programs, similar to the current national programs of conservation of endangered languages and cultures of indigenous small-numbered peoples will be developed. It is likely that visiting "traditional" laboratories, seminars and conferences will even become a profitable kind of entertainment business, like today's medieval workshops or entire villages reconstructed for tourists, where they can see and even *touch* the past. Such images of the future of science, no matter how fantastic and unrealistic they seem today, fully correspond to the interests of those who finance and direct scientific research today.

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About the authors:

Maria V. Zakharova — Doctor of Public Law (France), Candidate of Legal Sciences (PhD in Law), Associate Member of the International Academy of Comparative Law, Head of Research and Education Center for Comparative Law, Kutafin Moscow State Law University (MSAL); 9 Sadovaya — Kudrinskaya str., Moscow, 123995, Russian Federation

ORCID ID: 0000-0002-4527-980, SPIN-code 4006-0617

e-mail: Avis_777@mail.ru

Vladimir I. Przhilenskiy — Doctor of Science (Philosophy), Full Professor, Department of Philosophy and Sociology, Kutafin Moscow State Law University (MSAL); 9 Sadovaya — Kudrinskaya str., Moscow, 123995, Russian Federation

ORCID ID: 0000-0002-5942-3732; SPIN-code 7170-399

e-mail: viprzhilenskij@msal.ru

Об авторах:

Захарова Мария Владимировна — доктор публичного права (Франция), кандидат юридических наук, член-корреспондент Международной академии сравнительного права, руководитель НОЦ Сравнительного права, Московский государственный юридический университет имени О.Е. Кутафина (МГЮА); 123995, Российская Федерация, г. Москва, ул. Садовая-Кудринская, д. 9

ORCID ID: 0000-0002-4527-980, SPIN-code 4006-0617

e-mail: Avis_777@mail.ru

Пржиленский Владимир Игоревич — доктор философских наук, профессор, профессор кафедры философии и социологии, Московский государственный юридический университет имени О.Е. Кутафина (МГЮА); 123995, Российская Федерация, г. Москва, ул. Садовая-Кудринская, д. 9

ORCID ID: 0000-0002-5942-3732; SPIN-code 7170-3995

e-mail: viprzhilenskij@msal.ru