В. И. МЕНЯЙЛО

Интеграция в европейское исследовательское пространство: украинский кейс

На основе анализа нормативных документов Европейского Союза и законодательной базы Украины рассмотрены результаты реформирования научно-технологической и инновационной сферы Украины по основным направлениям, определенным Дорожной картой Европейского исследовательского пространства 2015-2020, в частности: участие Украины в формировании стратегии развития науки и технологий ЕС и согласование с ней соответствующей национальной стратегии; внедрение европейских принципов независимого оценивания научной деятельности и процедур по обеспечению его качества; определение приоритетных направлений развития инновационных секторов экономики в рамках Стратегии разумной специализации; согласование государственных целевых научных и научно-технических программ с программами стран ЕС; доступ к современной исследовательской и электронной инфраструктуре ЕС; присоединение к единому рынку исследователей; доступ к открытым данным и знаний в цифровом Едином рынке Европы; обеспечение перехода от коммерциализации результатов исследований к их совместной реализации и использованию в совместных инновационных экосистемах. Показано, что Украина добилась определенного прогресса на пути интеграции в ЕИП, но еще в недостаточной степени использует те возможности, которые представляет Евросоюз и программа Горизонт 2020, ассоциированным членом которой она является. Последующие шаги в этом направлении требуют от страны наличия сильной политической воли и соответствующего финансового обеспечения этих процессов.

Ключевые слова: европейское исследовательское пространство, европейская интеграция, научно-технологическая сфера, инновации, Дорожная карта Европейского исследовательского пространства 2015-2020

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V. I. MENIAILO

Integration into the European Research Area: The Ukrainian Case

In this paper, based on an analysis of EU regulatory documents and the legislative framework of Ukraine, we consider the results of reforming the scientific, technological and innovative sphere of Ukraine in the main areas specified in the on the European Research Area Roadmap 2015-2020, in particular: participation of Ukraine in the formation of the EU science and technology development strategy and coordination with the corresponding national strategy; implementation of European principles of independent assessment of scientific activity and procedures to ensure its quality; identification of priority areas for the development of innovative sectors of the Ukrainian economy in the ERA within the framework of the Strategy of smart specialization; coordination of state targeted scientific and scientific-technical programs with programs of other EU countries; access to modern EU research and electronic infrastructure; joining a single market for researchers; access to open data and knowledge in the European Digital Single Market; ensuring the transition from the commercialization of research results to their joint implementation and use in joint innovation ecosystems. It has been shown that Ukraine has made some progress towards integration into the ERA, but the opportunities that the European Union and the «Horizon 2020» program provide, of which it is an associated member, are still not sufficiently used. Subsequent steps in this direction require the country to have a strong political will and appropriate financial support for these processes.

Key words: European Research Area, European integration, science and technology, innovation, European Research Area Roadmap 2015-2020

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Introduction

The European Research Area (ERA) is a universal space based on the Single EU market for the free movement of knowledge, technologies and specialists, because only in the conditions of serious international cooperation it is possible to build a strong competitive economy and increase the well-being of society. To develop effective national systems of both EU countries and associate members, the European Commission has developed the European Research Area Roadmap of the 2015-2020 [1]. In this regard, it is interesting to consider what challenges have been faced and what progress have been made in its implementation by those countries that are not members of the European Union, in particular, Ukraine.

The purpose of this article is the analysis of the results of the reform of the scientific, technological and innovative sphere of Ukraine for its integration into the ERA.

Materials and Methods

A descriptive method and a theoretical analysis method have been used in the research. The informational basis is the regulatory documents of the European Union, the legislative framework of Ukraine, the Report of the Ukraine-EU Civil Society Platform «Implementation of Euro-integration reforms in the field of science and technology», expert conclusions, scientific publications.

Results and Discussion

Let us consider what steps Ukraine has taken towards integration into the ERA over the past five years in eight main areas stipulated by the of the European Research Area Roadmap 2015-2020.

Participation in the formation of the EU science and technology development strategy and coordination with the corresponding national strategy. The foundations of the national strategy for the development of the scientific sphere are laid down in the new version of the Law of Ukraine «On Scientific and Scientific-Technical Activities» adopted in 2015 [16], in which one of the main goals of state policy in the field of scientific and scientific-technical activity is declared the integration of the domestic sector of scientific research and scientific-technical (experimental) developments into the world and European research area. At the same time, the state ensures the integration of the national research space into the ERA by implementing its priorities, in particular: increasing the effectiveness of the national research system; optimizing international cooperation to address the global challenges facing humanity; ensuring participation in the framework and joint international programs of the European Union; aligning the strategy for creating state research infrastructures with the roadmap for European research infrastructures; creating favourable conditions for the mobility of researchers; full exchange, transfer and access to scientific knowledge.

To implement these ambitious goals, formulate and implement a unified state policy in the field of scientific and scientific-technical activities, the Law provides for the creation of the National Council of Ukraine on the Science and Technology Development as a permanent

advisory body under the Cabinet of Ministers of Ukraine (CMU, which should become a single focal point for reforming the system of science and technology in Ukraine. The specified body, which has been founded on April 5, 2017 [19], consists of two committees: a scientific committee, which includes 24 researchers elected by the scientific community on a competitive basis, and an administrative committee, which is represented by deputies of key ministries, presidents of the state academies of sciences and rectors of leading higher educational institutions of Ukraine.

The first result of the work of the newly elected Council is the development of an action plan for reforming the domestic scientific sphere, which includes revising the list of priority areas for the development of science and technology and the mechanisms for their implementation, improving the system of national academies of sciences, stimulating the return of talented scientific youth to Ukraine, improving the regulatory framework for effective participation of Ukrainian researchers in the implementation of international projects, research and innovation programs, creating favourable conditions for the participation of researchers and business representatives in the international cooperation in science, technology and innovation [23].

The next important step, designed to facilitate the open and transparent distribution of public funds for research, development of research infrastructure, scientific mobility, knowledge transfer and dissemination, support for young researchers, is the establishment of the National Research Foundation of Ukraine as the main manager of budget funds, the lion's share which will be distributed according to the results of competitions in the form of individual, collective and institutional grants. This fund has been created on July 4, 2018 [15], and its membership has been approved on December 27 of the same year. It is expected that the National Fund will demonstrate the best international standards for the distribution of funding and the European quality of scientific expertise and selection of bids. To support its activities in 2019, UAH 262 million has been allocated from the state budget of Ukraine.

The third innovative step is related to the introduction of basic funding for the scientific and scientific-technical activities of higher education institutions, which are traditionally considered primarily educational institutions, despite their powerful scientific component and effective indicators comparable to scientific institutions of the Academy of Sciences. Until that time, universities were provided by state funding for the implementation of short-term research projects selected on the basis of the annual competition of the Ministry of Education and Science (MES). For 2019, for the first time in the budget of Ukraine, funds are provided for basic financing of science in higher education institutions in the amount of UAH 100 million, which will be distributed according to the results of the state certification. Such measures will provide science at universities with the same institutional capacity that research institutions have.

A truly revolutionary event for the scientific community was the conclusion in 2015 of the Agreement between the European Union and Ukraine on the participation of Ukraine in the Union programme Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) [26], which provided the country with the right to become an associate member of the ERA. It opens opportunities not only to receive grants for the implementation of research projects, but also to participate in the work of program committees and groups of the ERA, in educational and innovative societies of the European Institute of Innovation and Technologies (EIT), in the activities of the Joint Research Center (JRS), that is, gradually becoming a real player in the European Research Area, which is a powerful system of

programs for integrating scientific resources through which countries exchange experience, gain practical knowledge, develop research and innovation, and collaborate between them [9]. Nowadays, Ukraine takes part in 15 committees of the ERA, for which its representatives have been delegated [13].

In the framework of the «Horizon 2020», in 2016, the European Commission conducted an independent audit of Ukraine's national policy in the field of scientific and scientific-technical activities with the participation of European experts, as a result of which it prepared a large-scale report on the real state of Ukrainian science with the provision of relevant recommendations on a plan for further actions in the direction of increasing its effectiveness [11].

These recommendations were the basis of the action plan for the reform of science in Ukraine and the Roadmap for Ukraine's Integration into the European Research Area (ERA-UA) [4], which was developed by the Ministry of Education and Science to fulfil the requirements of the European Union, which stipulate that each member country or associate member of the ERA should develop a National Action Plan for the implementation of the ERA Roadmap 2015-2020, according to which the European Commission will monitor the progress made in these countries.

The roadmap for Ukraine's integration into the European Research Area (ERA-UA) was approved by the Board of the MES of Ukraine in coordination with the National Council on the Science and Technology Development on March 22, 2018 and involves the development of a national research field in six priority areas: the effectiveness of the national research system, global challenges, optimal use of public investment in research infrastructures, free labour market for researchers, gender equality and a comprehensive gender approach in the field of science, optimal exchange and transfer of scientific knowledge, international cooperation [4].

On the agenda is the development of a Roadmap implementation plan approved by the MES, and its approval by the Cabinet of Ministers of Ukraine after appropriate examination by the National Council on the of Science and Technology Development.

Implementation of European principles of independent assessment of scientific activity and procedures to ensure its quality. Since the existing system of certification of scientific institutions did not meet the basic principles of European policy, the CMU approved a new Regulation on the Procedure for Certification of Scientific Institutions on July 19, 2017. According to it, the effectiveness of scientific and scientific-technical activities is carried out by expert groups and an expert commission in the following areas: level of provision of scientific and scientific-technical staff; the state of the material and technical base; the quality of activity is determined on the basis of expert assessment using scientometric indicators used in the international examination system and indicators of financial and economic activity [12].

According to the results of the certification, scientific institutions are divided into four classification groups: leading scientific institutions with a high level of results obtained, recognized in Ukraine and the world, integrated into the ERA. Certified for a period of 5 years; stable scientific institutions that are leading in certain areas of research and are active in integrating into the global scientific area and the ERA. Certified for a period of 3 years; scientific institutions that are unique in a particular field carry out scientific research aimed at obtaining and using new knowledge to solve technological, engineering, economic, social and humanitarian problems, fulfil one-time orders, little known in the world and European area. Certified for a period of 2 years; scientific institutions that are not unique in the its

field and have lost development prospects. These institutions are certified for a period of one year without the right to re-certification.

By order of the MES of Ukraine dated September 17, 2018 No. 1008 [2], the Methodology for assessing the effectiveness of scientific, scientific-technical and innovative activities of scientific institutions has been approved and the procedure for their certification for seven scientific areas (socio-humanitarian sciences, social sciences, natural sciences, engineering and technology, agricultural and agricultural sciences, medical sciences, military sciences) has started, which is planned to be completed before the end of 2019.

The second component of the certification campaign that has unfolded in the scientific field of Ukraine is the certification of higher education institutions in terms of their scientific, scientific and technical activities, the corresponding procedure for which has been approved by the CMU on August 22, 2018 [3]. According to this procedure, certification of universities will be carried out in seven areas: agricultural sciences and veterinary medicine, military sciences and national security, humanities and art, social sciences, biology and health protection, mathematics and natural sciences, engineering.

According to the results of the assessment, each scientific direction of the university will be assigned to one of three groups – A, B, C, or recognized as such that did not pass certification. Group A will comprise the directions of universities, the studies of which have important state or world significance, carried out at the global level; group B – those that are important for certain sectors of the economy, national security, other areas, performed at a high professional level; group C – directions that are important for the development of the educational process, performed at a satisfactory professional level.

It is precisely those areas that will be certified in the group A that will receive budgetary funds allocated to ensure basic funding of science at universities, which will allow for proactive research, update the necessary equipment and ensure payment of the wages of technical workers.

By the order of the MES on March 12, 2019 No. 338 [14], the Methodology for assessing the scientific directions of higher education institutions during the state certification has been approved, which is also planned to be completed before the end of 2019.

Identification of priority areas for the development of innovative sectors of the Ukrainian economy in the ERA within the framework of the Strategy of Smart Specialization. The signing by Ukraine of the Agreement on the Establishment of an Deep and Comprehensive Free Trade Area, which is an integral part of the Association Agreement with the EU, forces us to look for our place in the European market, which is already structured by the «smart specializations» of the EU member states.

The development of national and regional strategies of smart specialization is necessary in order to avoid internal competition in the Single EU market through the production of the same type of products and at the same time contribute to increasing the external competitiveness of the European economy through expanding the range of goods and services of own production [5, p. 65].

According to Regulation (EU) No. 1303/2013 [21], a Strategy of Smart Specialization is a national or regional innovation strategy that prioritizes creating competitive advantages by developing and aligning research and innovation with strengths for business needs in order to consistently meet new opportunities and market changes, avoiding duplication and fragmentation of efforts.

Thanks to Ukraine's joining the «Horizon 2020» program, the Framework Agreement on Cooperation was signed between the National Academy of Sciences (NAS) of Ukraine and the Joint Research Center to identify areas where the country can be competitive in the European market. Of course, this task is not within the strength of one Academy of Sciences. Therefore, in 2016, the Interdepartmental Coordination Group was created to develop the concept of the Strategy of Smart Specialization for Ukraine, which included representatives of three academies of sciences and six ministries. Based on the results of its work, the following sectoral areas of smart specializations in Ukraine were identified: resource materials, bioeconomics and biotechnologies, energy and power engineering, aerospace technologies, information and communication technologies, healthy society [5, p. 66], and the concept of the Program Initiative «Advanced Durable Materials for Transport, Energy, Medicine and Environmental Protection» – «Resource Materials» was developed as one of the priority areas of Ukraine's specialization in the European market [7, p. 27].

Efforts in this direction should be continued, since the state's passive position can lead to the actual imposition of low-tech specializations, which will make it impossible to build an innovative economy and improve the quality of life of Ukrainians.

Coordination of state targeted scientific and scientific-technical programs with programs of other EU countries. The state-owned targeted scientific and scientific-technical programs existing in Ukraine are not very effective. Most of them were frozen in general in 2014 due to the need to save budget funds, therefore, one of the ways to solve this problem could be cooperation with other countries whose research activities aimed at solving similar problems. Within the framework of the European Research Area, there are 10 multinational Joint Programming Initiatives (JPI) [8], which correspond to the priority areas of development of science and technology in Ukraine, as well as areas of cooperation with the EU in the field of science and technology. However, the country has joined only one of them (JPI Urban Europe), which is being implemented as part of the «Horizon 2020» Expand II [10].

Access to modern EU research and electronic infrastructure. The main instruments for internationalizing research in the ERA are European research and e-infrastructures, which include scientific equipment, knowledge-based resources (collections, archives, etc.), e-infrastructures (data and computer systems and communication networks) and other infrastructure needed for successful research and innovation. Nowadays, there are up to 50 top research infrastructures in the EU. Since 2017, Ukraine has participated in three, although, according to experts, it could have been a participant in at least 10 of them [9], but this is hindered by the lack of legislative recognition of the actions of European research infrastructures Consortiums (ERIC) [6] in Ukraine. In order to solve this problem, on November 20, 2018, by the order of the Ministry of Education and Science of Ukraine, an appropriate working group was created, which should develop proposals on this issue [18].

In recent years, Ukraine has gained access to the modern material and technical base of two international research organizations: the European Organisation for Nuclear Research (CERN) and the Consortium of National Fusion Research institutes in the Field of Synthesis EuroFusion, which are two of the eight institutions that make up the European Association EIROforum.

Ukraine has also shown certain achievements in the development of electronic infrastructure, in particular through cooperation with the pan-European education, science and innovation network GEANT, the Ukrainian scientific and educational telecommunications

network URAN and the Ukrainian academic and research network of the NAS of Ukraine, UARNET, and a memorandum of understanding has been signed between European grid infrastructure (EGI) and the Ukrainian national grid, the purpose of which is the widespread adoption of grid technologies throughout the scope of the scientific and socio-economic activities of the country [6, p. 10]. On January 17, 2019, a draft Concept for the Development of Ukrainian Research Infrastructures was submitted to the Ministry of Education and Science, the implementation of which will ensure the creation of scientific databases and provide access to them, as well as the platform of the all-Ukrainian digital scientific area. Using national research e-infrastructure, Ukrainian researchers will be able to access the scientific data of their colleagues almost anywhere in Europe [24].

Joining a single market for researchers. Personnel problems of Ukrainian science are quite significant: the number of researchers continues to decrease; their average age is constantly growing, since the career of a researcher is not attractive to modern youth. In order to support young researchers, the Ministry of Education and Science of Ukraine holds a separate Competition for research projects and scientific and technical developments of young researchers. Since 2019, the Cabinet of Ministers has established new state scholarships for the best young researchers, and by decree of the President of Ukraine, a Fund has been created to support educational and scientific programs for young people, for which UAH 1 billion has been allocated in 2019.

Some improvements in working conditions for researchers are also provided for in the new Law of Ukraine «On Scientific and Scientific-Technical Activities» [16], in particular, the introduction of flexible working hours and remote working hours, scientific trips for up to 90 days and scientific internships for up to two years with the preservation of the main place of work or study, the creation of conditions for stimulating young researchers by maintaining additional payments for the academic degree and academic rank in determining the scholarship support for doctoral students, etc.

At the same time, despite the competitive principles for appointing the heads of scientific institutions and departments, Ukraine does not use the EU package of procedures for open, transparent and achievement-based, acceptance of the relevant requirements on open sites, for example, EURAXESS. Also, there is no developed Human Development Strategy, which should become the key to the formation of a free labour market for researchers not only at the national but also at the European level [7, p. 32].

Ukraine does not participate in the Standing Working Group of Human Resources and Mobility ERA SGHRM [22] and has not joined the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers [25], which are an effective tool to enhance the development and maintenance of a favourable research environment and culture of science labour. There is no regulatory framework regarding the legal support for the participation of foreign researchers in the «Horizon 2020», in particular, the issue of their remuneration for work in Ukraine has not yet been resolved.

Access to open data and knowledge in the European Digital Single Market. One of the conditions for the successful integration of Ukrainian science into the ERA is the openness of the results obtained by domestic researches to the European and world community, as well as the availability of foreign publications for scientists from Ukraine. In recent years, the Ministry of Education and Science has introduced a number of initiatives in the direction of developing «open science», in particular, starting from 2017, budget funds provide the

connection of scientific organizations and universities to the international scientometric databases Scopus and Web of Science; together with the State Scientific and Technical Library, an open Ukrainian scientific citation index is being developed, which will allow you to search the database, establish the number of documents, citations for authors, institutions, publications and calculate scientometric indicators.

To encourage Ukrainian scientific journals to participate in this project, as well as to increase their compliance with European standards of the Ministry of Education and Science of Ukraine, an order has been issued on a new Procedure for the formation of the List of Scientific Publications of Ukraine [20]. According to it, it is proposed to divide all scientific journals into categories, where scientific publications, which are indexed in the international Scopus and Web of Science databases, will be included in category A and publications that will fulfil a number of requirements for their quality, including ensuring that each published article is assigned international Digital Object Identifier (DOI) will be included in category B. This step is very important, because the presence of such an identifier makes the scientific publication visible to professional bibliometric systems. This makes it easy to be found and to be cited by researchers from around the world. Another step towards «open science» is the decision to create a National Repository of Academic Texts [17], which will ensure free access to such texts and improve their quality by introducing mechanisms aimed at observing the principles of academic integrity.

The further movement of Ukraine in this direction is determined by the need to join the European Open Science Cloud of the European Digital Market by the development of the appropriate National Cloud Initiative strategy for the development of digital infrastructures.

Ensuring the transition from the commercialization of research results to their joint implementation and use in joint innovation ecosystems. A number of technology transfer centres and networks have been created in Ukraine, such as: National Technology Transfer Network (NTTN), Ukrainian Integrated Technology Transfer System, Automated System for Forming Integrated Interstate Information Resources. At the same time, financial and organizational support for the operation of technology transfer and innovation units, the fixation and accounting of intellectual property in universities and research institutions is insufficient. Technology transfer centres and networks are not properly integrated with each other and with other elements of the country's innovation infrastructure. One of the problems that hinders the transfer of research results from the scientific sphere to industry is the lack of financial support mechanisms for these processes.

The main task now facing Ukraine is also the coordination of domestic policy with the European policy of knowledge transfer and open innovation «Open Innovation 2.0», which provides for the development of innovative systems by attracting to the innovation process in open innovation ecosystems of all interested parties: industry, government agencies, academic circles create new markets, products, services by moving from linear innovation to parallel interrelated innovation processes [4, pp. 23-24].

Conclusions

Based on the analysis on the implementation of European standards in Ukrainian science, we can conclude that Ukraine has made some progress towards integration into the ERA, but its further steps in this direction require strong political will and constant attention from

the state, significant changes in legislation, and also powerful financial support. In addition, in order to accelerate integration processes in Ukraine, it is necessary to try to maximize the use of organizational and financial instruments of the European Union through participation in European scientific programs, primarily «Horizon 2020», which will allow to realize the existing scientific potential and ensure sustainable partnership with foreign institutions as the basis further cooperation and participation in new joint projects; it will contribute to the further development of integration and internationalization of educational, research and scientific sphere and will also provide acceleration to the reform processes of these areas.

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