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# ЕКОНОМІЧНИЙ АНАЛІЗ НА МАКРО- ТА МЕЗОРІВНЯХ

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## THE DEVELOPMENT OF SCIENCE AND TECHNOLOGICAL COOPERATION BETWEEN UKRAINE AND EU

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### **Abstract**

*Today the innovative policy becomes priority in national strategies of countries world competitiveness ensuring. Its effective implementation provides both maximum mobilization of internal technological and innovative capacity primarily because of R & D expenditure increasing and comprehensive state support of technological progress and the use of international scientific and technological cooperation factor which is based on the joint efforts of various countries in producing innovations in their mass implementation in all spheres of human activity.*

*The research objective is to explore the main forms of science and technical cooperation between Ukraine and EU and to analyze the mechanisms of international innovative cooperation.*

*This article deals with analysis of different ways of science and technological cooperation. The ways of governmental support of innovative cooperation are determined. The EU frame programs of innovation cooperation are highlighted.*

**Keywords:** *science and technological cooperation; innovative development; international cooperation; innovative policy.*

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## РОЗВИТОК НАУКОВО-ТЕХНОЛОГІЧНОГО СПІВРОБІТНИЦТВА МІЖ УКРАЇНОЮ ТА ЄС

### Анотація

*На сьогоднішній день інноваційна політика стає пріоритетом в національних стратегіях країн, які забезпечують світову конкурентоспроможність. Її ефективна реалізація забезпечує як максимальну мобілізацію внутрішнього технологічного та інноваційного потенціалу, перш за все, через зростання витрат на НДДКР і всебічної державної підтримки науково-технічного прогресу і використання міжнародного фактора науково-технічного співробітництва на основі спільних зусиль різних країн у виробництві інновацій та їх масове впровадження у всіх сферах людської діяльності.*

*Мета дослідження полягає у вивченні основних форм науково-технічного співробітництва між Україною і ЄС, а також в аналізі механізмів міжнародного інноваційного співробітництва.*

*В статті визначені шляхи міжнародної співпраці в галузі науки та техніки. Проаналізовано механізми державної підтримки міжнародної інноваційної співпраці. Детально розглянуті рамкові програми інноваційного співробітництва в ЄС.*

**Ключові слова:** науково-технологічне співробітництво; інноваційний розвиток; міжнародна співпраця; інноваційна політика.

### JEL classification: O30, O33

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**Problem setting.** Economic globalization as a main world economic development trend at the beginning of the third millennium gets its multidimensional manifestations especially in deepening of internationalization, transnationalization and integration processes, the gradual formation of universal monetary, financial, information and communication space, and the formation of global economic management institutions. Mainly global processes that in last ten years dynamized the processes of R&D internationalization, specify the modernization of world production innovation and technical basis by including not only world development leaders but also country developing countries.

Today the innovative policy becomes priority in national strategies of countries world competitiveness ensuring. Its effective implementation provides both maximum mobilization of internal technological and innovative capacity primarily because of R&D expenditure increasing and comprehensive state support of technological progress and the use of international scientific and technological cooperation factor based on the joint efforts of various countries in producing innovations in their mass implementation in all spheres of human activity.

**Recent research and analysis of publications.** Many scholars both domestic and foreign dedicate their works to theoretic and empirical research of innovative development of countries and regions, internationalization of science and technical sphere and innovation activity, the formation of global innovative space. The main of them are L. Antoniuk (2007), A. Poruchnyk (2004), R. Solow (1998), C. Freeman (1982), Kleinknecht A. (1987), Mensh (1979) and others.

**The research objective** is to explore the main forms of scientific and technical cooperation between Ukraine and EU and to analyze the mechanisms of international innovative cooperation.

**Key research findings.** From the beginning of the integration processes in Western Europe the main component of European countries integration policy has become the innovative component which relates to the scientific, technical and innovative development of country's region, the formation of common European innovative space, activation of interstate exchange of R & D results.

Describing the current EU innovation capacity, it should be noted that the beginning of its formation belongs to the second half of the twentieth century, which coincided in time with the second scientific and technological revolution. A powerful impulse to development inter-state scientific and technological cooperation in the European Union received in 1973, when after joining the EU the UK, Ireland and of Denmark for the first time at

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European level, put forward the idea of creating a single European Research Area and in 1974 EU Council of Ministers approved the first joint research program for the period of 1974-1977 years.

The final institutional framework intergovernmental scientific and technological cooperation in the EU received only in the early 1980s with the establishment of international centers of research and conducting joint research programs. Their realization involves the removal of country dissection of scientific, technological and innovation potential of the EU, and strengthening the competitive position of Western countries on the most innovative and technological areas of science and technology (medicine and biotechnology, energy and environmental technologies, information and laser technology, materials science, robotics and automation of production, transport and communication technology, etc.). Thus, pioneering technology programs that have been implemented at that time became particularly "EUREKA", "ARIANA", "EVROBIO", "EVROBOT" and a number of framework programs of scientific and technological development.

The steady increase of attention paid to intergovernmental scientific and technological cooperation in the European Union on its highest level had the result of its system diversification. This is primarily manifested in the completion of the formation of mature multi-level scientific and technological cooperation of countries in the regional grouping, which covers today an international scientific and technological cooperation based on strategic alliances. (Chernytska T., 2013).

In this context, it should also be noted that since the early 1990s it was observed an established trend of substantial separation of the European Union from the United States in terms of productivity growth. Thus, the average growth of labor productivity in the EU by 1995 was about 2,5-2,8%, while in the US – only 1.6%. Such dynamics seemed at the time quite promising in terms of future separation prospects of the EU in terms of macroeconomic growth. However, since 1996 the situation has changed in the period up to 2012 productivity growth in the EU has fallen to the level of 0.8%, while in the US became 1.2%. (Miller B., 2014)

Despite the intensification and government support of interstate scientific, technological and innovation cooperation development in the European Union, at present countries of this regional group lagging behind its global competitors in terms of innovation. With regard to funding research and development, in 2014 the total volume of global innovation spending in Europe (34 countries) accounted for only 21.7%, while in the US – 31.1%, China – 17.5%, Japan – 10.2%. European average share of GDP that goes to R & D funding is currently only 1.8%, while in the US – 2.5%, in Asia – 1.9%, in Japan – 3%. Annual expenses of the European Union for innovative developments in medical technology, aviation, pharmaceutical and other high technology industries is only 170 billion dollars, while the United States – about 290 billion dollars, which is almost half of total global spending in this area. (2014 Global R&D Funding Forecast).

A powerful impetus to the regional scientific and technological cooperation development in the EU received in 2012 after the adoption of the EU Strategy "A strategic approach to increase international cooperation of EU to research and innovation". Implementation of this strategy deals with an advisory body of the European Union and the European Commission – Strategic Forum for International Cooperation on Science and Technology (SFIC).

Today, the EU implemented the Eighth Framework Program called "Horizon – 2020", which came into force on 1 January 2014, replacing the Seventh Framework Program (FP7). It will combine funding scientific research of the European Union member countries with innovative technologies developing for the period 2014-2020 years. The main objectives of the program "Horizon 2020" stemming from the Lisbon Strategy the European Commission that involves complex measures on further development of scientific, technological and innovation cooperation in the EU, empowerment of regional structures in the realization of innovation policy, the achievement of the EU industrial leadership in innovation of social problems solution and improvement of Europe scientific base, etc. The "Horizon 2020" with a total budget of over 87 billion euro is on to unite the three programs (the Seventh Framework Program for Research, the Competitiveness and Innovation Program (CIP), the European Institute of Innovation and Technology (EIT)) and provides funding for such areas of the innovation process, such as:

- information and communication technology (new generation of components and computer systems; development of Internet network; technology information management; the latest interfaces and work; micro- and nanoelectronics, photonics);
- nanotechnology (the new generation of nanomaterials, nano devices and nanosystems; development and use of nanotechnologies; development of technology, measurement methods and equipment that increases productivity; the market launch of complex nanomaterials and nanosystems);
- new materials (inter-technology based on advanced materials; development and transformation of materials; use of materials and components; materials for sustainable and low-carbon industries; Materials for creative industries; metrology, standardization and quality control; optimization of materials);
- biotechnology (industrial processes based on biotechnology, innovation and competitive technology platforms);
- space industry (the development of a competitive and innovative space industry and research community that will develop and use space infrastructure to support future policy and social needs of the EU)

(Horizon 2020).

Table 1 shows the approximate distribution of funding areas of intergovernmental scientific and technological cooperation under the program "Horizon – 2020" grouped in the following categories: "advanced science" (total financial 27.8 billion euros), "Leadership in Industry" (20.3 billion), "Social Challenges" (35.9 billion respectively).

**Table 1. Distribution of funding by the program "Horizon-2020" (Miller B., 2014)**

Direction of cooperation	Funding, million euro
1. Advanced science, including:	27818
- European Council for Scientific Research	15008
- Upcoming and latest technology	3505
- Shares of Marie Curie Training and Career Development fund	6503
- European research infrastructures (including e-infrastructure)	2802
2. Leadership in the industry, including:	20280
- leadership in the highly efficient and industrial technologies	15580
- access to risk finance	4000
- Innovation SMEs	700
3. Social challenges, including	35888
- Health, demographic change and wellbeing	9077
- Food security, sustainable agriculture, marine research and economics	4694
- safe, clean and sustainable use of energy	6537
- rational "green" and integrated transport	7690
- preventing climate changes, efficient use of resources and raw materials	3573
- self-contained, innovative and secure societies	4317
- European Institute of Innovation and Technology	3194
- Non-nuclear direct actions of the Joint Research Centre	2212
Total	87740

In the implementation of these strategic directions is difficult to overestimate the importance of cooperation with partner countries, and therefore – special attention is paid to the development of international cooperation especially in basic research and promote international mobility of researchers and innovators, including from third countries. However, the "Horizon 2020" – is not the only European source of funding for international scientific and technological cooperation. It should be also mentioned about the program of the European satellite navigation system "Galileo". The total funding of euro program is 6.3 million euro in order to develop an experimental reactor ITER (2,7 million euro), a program to create a satellites observer system Earth "Copernicus" (3,8 million euro). In addition, there are also important coordination and financing of European research, implemented through intergovernmental program of national research coordination "European cooperation in science and technology» (COST) and the organization of "Eureka" as the leading platform of financing for entrepreneurs engaged in research in Europe and beyond.

**Conclusions.** Summing up, it should be noted that the logics of modern scientific and technological cooperation with the European Union follows the global trends of science and innovative technologies, informatization of global manufacturing processes and the development of post-industrial model of economic development. EC prevailing forms of international cooperation in the innovation sphere characterized by the flexibility and modification approaches, providing mobile and effective response to the challenges and to mobilize all available resources in the areas of advanced science and technology to consolidate joint efforts on solving the problems of innovation development of the integration grouping.

Despite the currently lag of the European Union from its global competitors in terms of innovation development, all innovative projects currently being implemented in this regional grouping, subject to its overall strategic goal: strengthening the global competitive leadership in world markets and its conversion into a competitive economic zone.

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