

DOI: 10.46299/ISG.2023.MONO.ECON.1.6.1

6.1 Formation of the scientific environment and academic culture in the universities of Ukraine

Successful development of the state is possible if there is an educated nation and a strong scientific potential. "A nation without science is a nation of slaves, a nation that is not a creator of intellectual creative product," Vice-Rector for Scientific, Innovative and International Activities of Cherkasy National University, Professor Serhii Kornovenko, in an interview with Nova Doba [167].

That is why the main strategic goal of universities should be a high level of educational and scientific activity.

Despite the existing results of the ongoing reform of higher education in Ukraine, today the problem of its quality is not just relevant, but extremely important for the transformation of Ukraine into the European higher education and research area, as well as for the economic and humanitarian development of the nation.

Today, unfortunately, the problem of education and science in Ukraine is still a matter of debate rather than practical solutions.

In this context, the factors of science and education play an important role in ensuring post-industrial economic transformation and the formation of a highly competitive intellectual labor market to ensure economic stability at the macro level.

The task of effective use of the potentials of the scientific, technical and educational environment for the state and business has always been relevant and difficult due to a number of incomparable factors that require analysis, consideration and coordination by the subjects of the educational and scientific sphere - the state, higher education institutions, business and society.

Aspectual statements of the problems of management, functioning and development of higher education institutions in general and scientific activities in particular are highlighted in the works of domestic scholars: V. Andriushchenko [156], L. Batchenko [183, 184], L. Honchar [183, 184], S. Honcharenko [161], L. Zhuk [165],

V. Kremenia [168]. The authors have identified the existence of a powerful educational and scientific potential in Ukraine, which is able to accelerate and ensure the innovative development of the state. However, for the rational use of this potential, it is necessary to ensure the management, functioning and development of higher education institutions on the basis of systematic, comprehensive, innovative and flexible.

The importance of research work in improving the scientific and educational process in higher education institutions is devoted to the works of H. Artemchuk [157], T. Holub [160], M. Yevtukh [164]. These works point out the impact of research activities and the formation of creative potential, stimulation of intellectual development of future specialists. The relationship between improving the quality of professional training of applicants in the process of research work has been identified and theoretically confirmed.

L. Batchenko [158], L. Honchar [158], N. Divinska [163], V. Lugovyi [178], V. Maiboroda [170], etc. have been concerned with the formation of research competencies. The main aspects of research competencies, algorithms of their formation and development are considered.

The principles of formation of the scientific environment are highlighted in the works of domestic scientists S. Bendasiuk [159], V. Loktev [169]. The authors focus their scientific interest on the importance of using the following principles in research activities: complexity, permanence, systematic approach, objectivity and transparency, trust and responsibility of performers, perception of different points of view, focus on innovative development, focus on a high world level of science development, creativity, intellectuality, ability to complete the work, etc. Taking these principles into account will help to intensify scientific activity and increase its efficiency.

Accordingly, the purpose of the study is to substantiate the special role of science, education and culture for Ukraine's economic growth; to analyze their status and multiplier effect on the business environment; to confirm the relevance of forming the scientific environment of universities as a factor in increasing their innovation capabilities; to substantiate the effectiveness of using the role model of the integrated program "Science" in the scientific work of universities.

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The current state of development of the world economy, based on the use of new knowledge and technologies, which determines their economic development, is increasingly subject to the laws of the knowledge economy. The knowledge economy traditionally includes three main areas: research and development, education and training, and information and communication technologies.

Countries that have developed an effective national innovation system are becoming leaders. The development of scientific research is one of the key factors in ensuring sustainable development.

A sustainable development economy responds quickly to know-how, technology, and new knowledge, accepts it and implements it rapidly. This is how the economies of the world with high, sustainable development behave. They did not have to create most of this knowledge, but they accepted the scientific results of the world's scientists and quickly implemented them.

The increasing urgency of the problem of developing the educational and scientific sphere has made it necessary to find new, more rational means and ways to bring the educational and scientific activities of higher education institutions in line with the new requirements set forth by the concept of modernization of Ukraine.

"It is necessary to change the approach to understanding the role of science in the development of the state" - President of the National Academy of Sciences of Ukraine (NASU), academician Anatolii Zahorodnyi [166].

The success of universities is often based on management approaches and management culture. Mykola Skiba, an expert on education programs at the Ukrainian Institute for the Future, notes that universities that have

- dialog between the rector and activity centers;
- openness to the world of science;
- ability to adapt;
- Increased requirements for the scientific performance of teachers;
- providing opportunities for the growth of young scientists, etc.

Those countries that have strategically decided on the development of their economies are primarily following the innovative path and developing science.

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Economic growth is a multi-factor and multi-level process based on the economy of maximum employment and interaction of all subjects of scientific, scientific and technical, educational and business activities in determining the special role of the state.

Ukraine, which seeks to have a stable economy, must take into account global economic trends and adhere to international standards in all areas of state activity.

Education and science are important components in the development of the economy and civil society. Despite having a significant educational and scientific potential, Ukraine has failed to preserve and realize it and become a country with the most developed educational and scientific spheres.

The negative factors that, unfortunately, significantly affect the development of science in Ukraine through the prism of the determining factors (science and education) are as follows:

- First, the critically low level of its funding. According to Article 48 of the Law of Ukraine "On Scientific and Scientific-Technical Activities", the state provides budgetary funding for scientific and scientific-technical activities in the amount of at least 1.7% of Ukraine's GDP. However, according to statistical observations, actual expenditures from all sources - state budget funds, funds of domestic and foreign institutions, organizations and enterprises, international grants and other sources - for research and development in Ukraine in recent years amounted to no more than 0.76% of GDP. And in 2016, the science intensity of GDP in Ukraine amounted to 0.48%, including 0.16% of GDP at the expense of the state budget [165, p. 25].

As an example, the target capital of Yale University (USA) is \$27 billion, Columbia University (USA) is \$22 billion, and Technion (Israel) receives 4-5% of GDP for science. The budget of one of these universities is many times larger than the total funding for science and scientific and technical activities in Ukraine. In 2019, an average of 4.7% of GDP was spent on education in the European Union, which was about 10% of total public spending.

Roman Yermolychev, Deputy Minister of Finance of Ukraine, in an interview with Ekonomichna Pravda on December 10, 2021, noted that the state budget for 2022

provides UAH 2.1 billion (17.2%) more for science funding than in 2021. In total, the amount of state budget expenditures for scientific and scientific-technical activities in Ukraine amounts to UAH 14.3 billion. After all, funding for science is an investment in the future of our country, an investment in scientists and researchers, in the development of scientific and technical activities.

Among the main priorities for supporting the implementation of scientific and technical activities in 2022 is research in higher education institutions.

Borys Malitskyi, one of the heads of the H.M. Dobrov Institute for Research of Scientific and Technical Potential and History of Science of the National Academy of Sciences of Ukraine, noted that when science is funded by less than 1% of GDP, it cannot be expected to play any function other than socio-cultural. The number of young scientists is decreasing annually [171]. In view of the above, adequate funding of science is undoubtedly one of the most pressing issues.

Secondly, there is the turnover of scientific personnel, which in recent years has been too high due to dissatisfaction with the salaries of scientists, due to excessive workload of scientific and pedagogical activities, due to the falling prestige of the profession of scientist, teacher, etc. This is a "brain drain" that economists compare to the movement of capital, which occurs in one direction - out of the country - due to the lack of prospects for self-realization in Ukraine. In general, the views of young scientists from the National Academy of Sciences on the reasons for leaving can be divided into three categories:

- low salaries and the unsatisfactory financial and economic state of science (about 90%)
- unfavorable working conditions (over 60%);
- difficulties in professional realization (about 20-30%) [182].

It should be noted that the reason "family circumstances" accounts for only 15% [182].

- Another significant indicator of the impact on the development of science in Ukraine is the number of researchers per 1 million people. This indicator is regularly monitored by UNESCO and is increasingly used as a measure of scientific support for

the country's innovative development and is taken into account when deciding on the feasibility of investments. On average in the EU, this figure is 5-6 times higher than in Ukraine. According to the forecasts of the G.M. Dobrov Institute for Research of Scientific and Technical Potential and History of Science of the National Academy of Sciences of Ukraine. Dobrov Institute for Research of Scientific and Technical Potential and History of Science of the National Academy of Sciences of Ukraine, the forecasts of further evolution of the human resources of national science for the next decades until 2035 showed that if nothing changes in the government's policy towards science and the same trends that we observe today remain in the dynamics of its human resources, then by 2035 the number of researchers in Ukraine will decrease by at least 20 times compared to the early 90s of the twentieth century [172].

Another problem that is currently very absolutized among Ukrainian scientists is the Hirsch index. Today, it is one of the most fashionable means of measuring the scientific productivity of a scientist. It should be noted that this is not a universal measure of personal scientific output, and this indicator has lost its objectivity. It was developed for scientists working in the field of theoretical physics (in 2005). Therefore, nuclear physicists, chemists, and doctors have the highest Hirsch index values (from 32% to 46%). According to analysts (Larivate Analytics in 2017), in the list of 3500 thousand most cited authors in the world, the first place in terms of the number of citations in scientometric journals from the Web of Science database was held by American scientists, Canadian and Chinese scientists. And not a single representative of Ukraine. Although Ukraine ranked 42nd out of 195 countries in the 2018 world ranking of research activity.

By the way, in ancient Greece, it was not the dates of scientists' lives that were noted, but the "acme" (Greek: ακμή - the highest point, the top) - the time of the greatest flowering of their creative powers.

In science, the principle of reality must be observed. Quantitative indicators of a scientist should not displace qualitative ones. Science is not a trade, where many performance indicators are quantified. A working scientist can actually prepare no more than two serious, high-quality publications during the year. When evaluating the

work of a scientist, one should take into account not only the scientific impact (citation rate), but also the whole range of his or her activities - educational, scientific, methodological, organizational and educational, which requires considerable time and is also ranked according to certain indicators of the HEI.

In addition to these factors, the effectiveness of research activities in higher education institutions is influenced by the management system at all administrative levels. During the period of our independence, we have lost a lot of positive things from the scientific system and scientific schools that were formed earlier (in Soviet times), and we have faced catastrophic rates of turnover of scientific personnel due to the "brain drain", aging of scientific personnel and "dilution" of scientific schools, lack of an adequate system of support and motivation for young scientists, etc.

All of these problems have their causes, but the main one is the long-term underfunding of education and science, not only academic but also student education.

To solve the problems in education and science, public policy should be based on:

- awareness of the special and multidimensional mission of science in higher education institutions by the educational and scientific community
- productive employment of scientists;
- integration of Ukrainian science into the world science;
- creation of an ecosystem for the development of innovations with consolidated cooperation of domestic academic and sectoral research institutes, higher education institutions with financial support from the state;
- forming a new paradigm of adequate, flexible scientific management that would be useful and interesting for science and business and that the state needs;
- formation of a new conceptual vision of a scientific and practical problem – development of theoretical, methodological and applied principles of development of the system of scientific work;
- innovative cooperation between science and business.

After all, science is the basis of higher education and its quality. The level of development of national science determines the level of development of the quality of

higher education. And the quality of higher education, in turn, directly affects the formation of a productive, professional competence-based workforce for business. Thus, the integration of higher education, academic, industry, university science and business will allow:

- raise the quality level of education and science;
- shorten the time for scientific knowledge to enter the educational process
- combine scientific developments and educational programs of universities into new scientific technologies;
- create conditions for competitiveness and effective employment of university graduates.

It is now obvious and beyond doubt that new values and products are created in the environment of intellectual property, which is a derivative of the education sector. For this reason, higher education institutions and their teaching staff have become key to the knowledge economy.

In developed countries, knowledge production is the main source of economic growth. And the share of science in the process of producing modern new knowledge is significant and is a strategically important parameter of government policies.

In today's world, the driving force of the economy is competition, which is increasingly interpreted as a competition of knowledge. "University science is one of the indicators by which Ukrainian universities lose out to competing universities," said Lilia Hrynevych, former Minister of Education and Science of Ukraine. Competitiveness is increasingly dependent on a product based on new knowledge. Today, the development of productive forces takes place in close interaction of science and new technologies with production. Therefore, the commercialization of scientific research in the educational environment, along with the tracking and development of scientific and technological innovations, is an important basis for the knowledge economy.

The State Targeted Scientific, Technical and Social Program "Science in Universities 2008-2017" [162], which provided for a number of measures to modernize the material and technical base, develop the information and telecommunication

environment, and support the participation of young scientists in international conferences, expired in 2014, resulting in the suspension of all funding. A number of tasks declared by the above program remained unresolved.

Research work in higher education institutions, its connection with scientific institutions and the business environment has recently been one of the biggest problems that hinders the development of university science. To improve research activities, the university research and education environment needs to overcome a number of problems, among which the most pressing are:

- underdevelopment of the modern culture of scientific activity;
- lack of a policy for the administration of research teams;
- unformed scientific environment of higher education institutions;
- low demand for scientific results of university research due to lack of trust in them;
- weak integration of science and business;
- low attractiveness of science for investors;
- devaluation of the social capital of science (decline in the prestige of scientific work in society);
- poor training of scientists in the use of the latest technologies and their capabilities;
- insufficient implementation of scientific results in updating the content and quality of education;
- shortage of specialists with competencies in current scientific trend areas
- predominance of bureaucratic aspects over substantive and scientific ones, etc.

Among the reasons for the rather low level of research at universities are some objective and some purely subjective. The main subjective ones include:

- limited and complicated access to scientific literature due to the lack of proper knowledge of foreign languages among many scientists;
- inability of domestic scientists to support scientific discussion;
- lack of investment from alternative sources;

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- poor preparation of scientists to use the latest technologies;
- academic dishonesty (plagiarism in the works of certain "scientists").

All actors in the knowledge production process (the state, business, educational and research organizations) should join the formation of the knowledge economy market, maintaining the "purity" of the knowledge market, its reputation and trust, stimulating the organization of demand for knowledge and fostering innovation activity.

The peak of innovation activity is at the point where the interests of the state, business and educational and research organizations intersect. The only question is how to combine the interests of these entities. There are no ideal schemes and universal formats for interaction between the state, business and science. But there are international practices that need to be studied and used in Ukraine, adequately assessing the situation and existing trends. Only the state and business itself should initiate the necessary research and focus it on targeted practical applications.

It is worth noting that in leading countries where a new technological order is being successfully formed with the dominance of intellect, knowledge and ideas, the role of the state is growing.

It is the state that, through a number of regulatory levers, should form research orders for science based on key socio-economic priorities. The state should act more consistently and systematically in the development of national science, namely:

- stimulate the demand and participation of the business sector itself in research and development;
- stimulate investment in scientific research by developing measures (tax, grant, etc.) for their implementation;
- to orient research towards the market and the end user of new knowledge;
- to motivate a proactive approach on the part of the scientific community in promoting the results of scientific research (adoption of special state programs and measures);
- to restore the scientific potential and reputation of science and education.

The Law of Ukraine "On Science and Scientific and Technical Activities" [174] introduces one of the innovations - the creation of the National Research Foundation of Ukraine (NRFU), an independent institution that distributes grants for scientific research through a competition. The fund can only finance research and development. However, funding for the development of the material and technical base, scientific cooperation and scientific mobility, scientific conferences, internships for researchers, support for projects of young scientists, and popularization of science among young people were left out of the Law.

Funding for science cannot be reduced to a single source - the state. Given that the infrastructure of the private funding market in Ukraine is not yet properly developed, and there are no multichannel sources of science funding, the problem of an acceptable rate of science funding (globally, 2% of GDP) in Ukraine from alternative sources cannot be solved without business participation.

Science and education are not a source of costs for business, but an investment in the future of the nation - the creation of the country's intellectual capital.

Numerous international institutions promote science in the world. One example is the celebration of International Darwin Day (International Day of Science and Humanism). The mission of the International Darwin Day is to inspire people around the world to use the principles of intellectual courage, scientific curiosity, thinking and the pursuit of truth, as embodied by Charles Robert Darwin [189].

This event is actively celebrated annually in scientific and educational institutions by organizing thematic conferences, symposia, competitions, gala parties, etc.

It is a moral obligation for businesses to engage in charity - to give part of their savings to education, science, and culture.

Education and science should be in partnership with business. Smart business should monitor the development of science and invest in creating a scientific base for training its specialists. Entrepreneurs will not be able to get competitive employees without their participation in investing in the development of the scientific and

educational environment. Education and science for business should become the most important investment portfolio.

Education and university research need patrons and donors - only then will universities be able to become effective educational and research centers, producers of innovative knowledge and technologies.

An example is the Dragon Capital company (Tomas Fiala), which invested UAH 30 million in the Endowment Fund of the Kyiv School of Economics in 2021. The Ukrainian Catholic University and the National University of Kyiv-Mohyla Academy have a long tradition of partnership with charitable organizations, foundations, and individuals as part of their donor relations policy.

The Ministry of Education and Science of Ukraine has announced the launch of the Science and Business platform, which will become an online communication platform for effective interaction between business and the scientific community, enabling businesses to engage in generating scientific results and scientists to develop their own research potential and commercialize the results of their research.

In the twenty-first century, countries are not fighting for oil or black soil, but for talent [180].

According to Pavlo Sheremeta, we earn bread with our hands, butter with our heads, and caviar with our ideas [180]. If Ukraine does not have a sufficient number of idea carriers and those who know how to implement them, there will be no state.

The term "war for talent" was first used by the authors Ed Michaels, Helen Handfield-Jones, and Beth Exelrod in their work "War for Talent" [187]. This term refers to the competitive environment that a company creates to attract and retain talented employees, applying a new type of thinking in human resources management to justify the importance of having talent for the company.

In today's environment, knowledge is the most effective competitive advantage of organizations, their scarce asset for generating additional profit (intellectual rent).

In today's economy, educational services have become the most sought-after commodity, as today's labor market "buys not an employee, but his or her qualifications, knowledge and skills" [179].

There is almost no "high science" in Ukrainian higher education institutions, and if there is, its percentage is negligible compared to world-famous universities, where the number of researchers is approximately the same as the number of people involved in the educational process. In addition, teachers themselves do not have enough time for research. In our universities, teachers are overloaded with academic work, science is about "churning out" the required number of scientific publications and reporting on the implementation of the research plan.

The impact of education and science on economic performance has become one of the key issues in economic science in recent years, especially with the emergence of the human capital theory, which has confirmed the positive correlation between human capital, economic growth, GDP per capita, innovation, competitiveness, and sustainable technological development.

The economies of developed countries demonstrate to the world a new quality of economic growth that changes the nature and structure of potential accumulation - 60% of national income growth is determined by the growth of knowledge and education in society [181].

The mechanisms of interaction between business, government and the scientific environment, between the key elements of the innovation system of any country, were described by Professor Henry Itzkowitz in his work "The Triple Helix. University - enterprises - state. Innovation in Action" [185].

"The Triple Helix is a dynamic concept that is regularly updated and supplemented with new knowledge and approaches.

In the information society, higher education institutions not only perform the functions of a teaching structure, but also focus on the capitalization of knowledge.

We believe that competitiveness factors such as science and education are underutilized. Proper conditions for the functioning of national science and education have not been created. The national science continues to function within the framework of the traditional (industrial) model, which does not correspond to modern realities and is characterized by the dominance of independent scientific organizations that operate separately from higher education institutions and real business entities.

State support for university science should be proactive.

Introduction of a progressive system of management of scientific activities of higher education institutions, creation of an appropriate scientific and technical base for research, formation of a high-quality scientific and pedagogical staff are the components that create the scientific environment of higher education institutions.

After all, studying science (even if it is not of the highest world level, but at least just a high-quality professional one) keeps associate professors and professors in an "intellectual tone" and motivates students to learn about the world of science.

A student is a future researcher, entrepreneur, and statesman. Formation of a competitive scientific university community by investing in students, the future scientific elite, is an extremely important strategic state social and educational task.

The function of identifying and forming talented young people is entrusted primarily to higher education institutions.

Institutional design of the scientific process of higher education institutions should always focus on the quality of education and an integrated systematic approach to the organization of scientific activities. The mechanism of managing the educational and scientific environment is appropriate to be carried out through the modeled organizational structure of the Integrated Program "Science", which presents the object components of the scientific process and their role interaction, which is organically oriented towards effective research activities of teachers and students of the university (Fig. 1).

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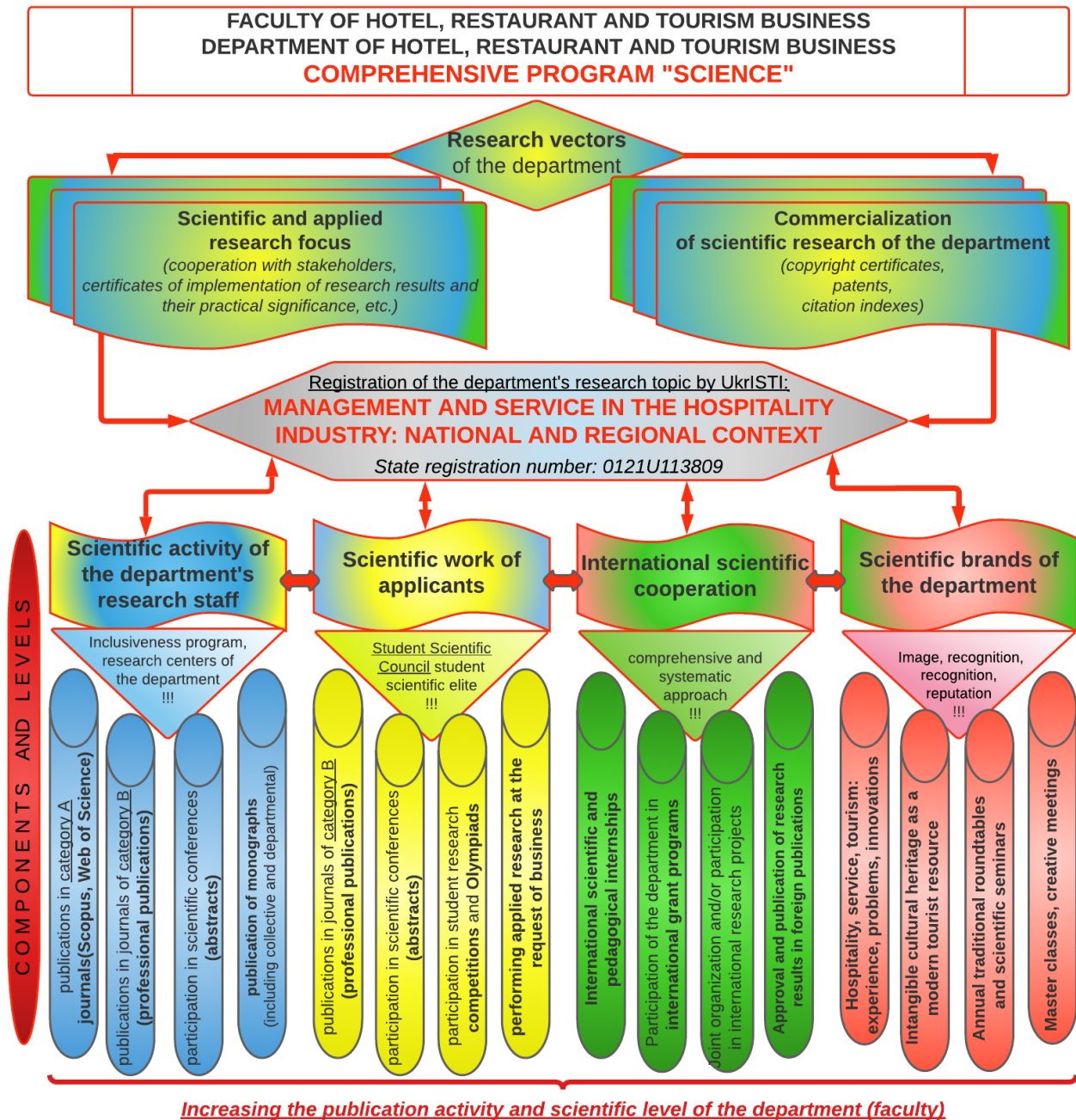


Figure 1. Role model of the Integrated Program "Science"

**Source: designed by the authors*

Such a format of professional communication will allow business structures and university scientists to develop innovative economic skills, realize the intellectual potential of the university's scientific environment and commercialize the results of university research.

The university research environment is, first and foremost, a community in which a young person is formed as a scientist.

It takes time to create a productive research environment. After all, its capabilities are determined not only by the personal qualities of individual employees, but also by the rational distribution of role functions, and the harmonious combination of researchers of different generations [172]. Values do not come through the acquisition of knowledge - they come through the possibility of being part of the educational and scientific community. Therefore, the main goals in the formation of the educational and scientific environment of the university should be to unite progressive educators who will become agents of change in university science and education; to create a critical mass of educators who are fruitfully engaged in science within the framework of the implementation of state budget research topics of the departments, within their own research interests, within student science, as leaders of student research clubs, student research papers, etc. Such goals will lead to development results in the direction of synergy of actions and networking.

Despite the state educational standards that improve the scientific quality of education, there is still an insufficient formation of research competencies of specialists. Among the reasons (problems) related to the development of students' research skills are the "wrong" orientation of educational programs to students' independent work, weak interdisciplinary links and inadequate quality of methodological support for disciplines, etc.

There is a need to focus on the indicators of the Global Innovation Index (GII) and take into account the updated version of the key competencies for lifelong learning, which was adopted by the European Parliament and the Council of the EU in 2018. The framework of the updated key competences focuses on eight key competences that citizens need to function successfully in the European community, namely: literacy, multilingual competence, mathematical and scientific and technological competence, digital competence, personal, social and learning competence, civic competence, entrepreneurial competence, cultural awareness and self-expression. Given Ukraine's European integration educational vector, compliance with these European recommendations should be a no-brainer for Ukrainian higher education institutions. There is also a need to increase the requirements for the

growing role of soft skills - flexibility, creativity, critical innovative thinking, mobility, adaptability, academic and research integrity, etc. The acquisition of these skills should be integrated into the educational programs of higher education institutions.

An important condition for the successful development of higher education and its quality is compliance with the principles of academic integrity. After the adoption of the Law of Ukraine "On Education" (2017), academic integrity as a concept was formalized at the legislative level (Article 42 "Academic Integrity"). Unfortunately, its main principles are often neglected.

Article 42 of the Law of Ukraine "On Education" defines academic integrity as "a set of ethical principles and rules defined by the Law that should guide participants in the educational process during learning, teaching and conducting scientific (creative) activities in order to ensure confidence in the results of learning and/or scientific (creative) achievements" [173].

Since then, academic integrity has evolved from a cultural and philosophical concept into a legal provision with clearly defined rules, criteria, and requirements.

The International Center for Academic Integrity identifies 6 postulates of academic integrity: honesty, trust, fairness, respect, responsibility and courage [186].

All these components are the basis for moral and ethical behavior of both students and teachers. Therefore, the integration of the principles of academic integrity into the educational and scientific process is a topical task for Ukrainian higher education institutions.

When formalizing the culture of academic integrity, HEIs should use the Recommendations for HEIs on the Development and Implementation of a University System for Ensuring Academic Integrity developed by the National Agency for Higher Education Quality Assurance [176].

The National Agency for Higher Education Quality Assurance, as a member of the International Center for Academic Integrity, promotes the policy of compliance with the standards and requirements of academic integrity in the educational and scientific environment of higher education institutions. Recommendations for experts

on reviewing internal policies and procedures for ensuring academic integrity and external assessment of their quality were approved [177]. This is very important for the Ukrainian academic community.

Academic integrity is a fundamental value - a set of behavioral patterns in the scientific environment in terms of the basic principles and fundamental values of academic relationships, including [176]:

- honesty and integrity;
- legitimacy, transparency, legality;
- respect, trust, responsibility;
- self-improvement and professionalism;
- respect for the scientific achievements of colleagues, scientific schools, and student science.

This set of behavioral patterns creates the right academic culture.

Academic culture is the culture of knowledge accumulation, development, organization and transmission from generation to generation through the education system of practitioners-researchers and teachers of research institutions and higher education institutions [155].

The academic culture of a researcher in the educational and scientific environment is considered as the culture of the university as a whole, its system of values, traditions, norms, rules, behavioral patterns, principles of professional and scientific communication.

The academic culture of the Kyiv National University of Culture and Arts is a unique and inimitable construct, a hallmark of the university's cultural and educational space, where the values and principles of humanization of the educational process and personal orientation of higher education students are implemented in the process of pedagogical, scientific, and educational activities. It is a cultural and educational space where teachers and students care about the reputation of the university.

The importance of involving students in academic integrity activities in higher education institutions remains unchanged. The formation of a model of the scientific environment of a higher education institution should be based on the use of a set of

certain principles of academic integrity, taking into account the prerequisites and prospects for the development of innovation and technology transfer in Ukraine, studying international experience and modern models of technology transfer by universities.

The established scientific and educational environment of the university should become a factor in the development of interests and needs of university students.

State support for university science should be proactive and focused on the implementation of strategic plans.

The Strategy for the Development of Education and Science for 2022-2032 (hereinafter - the Strategy), presented at the state level and approved by the Order of the Cabinet of Ministers of Ukraine No. 286-r of February 23, 2022, focuses on the implementation of five strategic goals [175]:

- efficiency of management in the higher education system;
- trust of citizens, the state and business in the educational, scientific and innovative activities of higher education institutions;
- ensuring quality educational and research activities, competitive higher education;
- internationalization of higher education in Ukraine;
- attractiveness of higher education institutions for study and academic career.

The expected result of the Strategy implementation is the creation of a modern and efficient higher education system that is competitive in the domestic and global market of educational services.

The concept of increasing returns with the development of the education system should be taken into account. The higher education system should be a generator of new ideas, and on the basis of new educational services and new knowledge it will be able to realize its ever-growing returns.

Knowledge provides increasing returns as it is used. The more you spend it, the more its value grows, which ensures a multiplier effect.

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If a higher education institution is not able to generate and develop new ideas, courses and specialties, its market position will be weakened, it will not be able to provide a high level of training, and the most qualified scientists will leave it.

The controversial issues of scientific activity of higher education institutions are, in one way or another, challenges to modern society today. These problems are relevant not only for science and education, but also for culture, which is acutely responsive to scientific discoveries and technological breakthroughs.

The conducted scientific research of the problem is not final and exhaustive, but focuses on the formation of a scientific environment and academic culture in universities, which should unite scientific and pedagogical centers for the development of university science.

Increased competition between HEIs against the background of globalization, force majeure crisis and insufficient funding for education and science necessitate the formation of a research and education environment in HEIs that will provide innovation and competitiveness to a particular institution and the national education system as a whole.

The internal university research environment and commercialization of scientific research will provide an opportunity to apply for and attract funding for further research from European funds and institutions.

The solution to these problems is possible provided that the educational and research work of higher education institutions is constructively organized, the choice of scientific and educational methodological tools is thoughtfully considered, and the interaction of all actors in the educational and scientific process is coordinated.

In terms of values, Ukraine is moving in the right direction, and the task of the subjects of the educational and scientific process is to capitalize on the results of this movement.

Further scientific research should focus on the results of organizational and economic synergy of the subjects of the educational and scientific sphere, the state, higher education institutions, and business as a factor in the successful development of the country. Another promising area for further research will be the development and

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substantiation of effective models for managing the research and educational environments of higher education institutions from the perspective of the process approach in science and education.