

TARGET SPECIFICATION

IMPROVING THE EFFECTIVENESS OF THE KNOWLEDGE TRIANGLE IN UKRAINE

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Fostering the Knowledge Triangle in Belarus, Ukraine and Moldova

2016

Table 3. A summary review of the barriers to the effective Knowledge Triangle in Ukraine

Barriers to	Legal barriers	Organizational barriers	Financial barriers	Staff barriers	Other barriers
science advancement	Incompleteness of the existing regulations governing the structure and content of academic research works (R&D)	There is no concentration of intellectual and financial resources on strategic directions in both national and regional contexts. The complexity of the organizational structure of science management	The lack of funding	There is no procedure for long-term international research internship. Reduction of academic research works performers	
science and education interaction	A mechanism of the state qualification certification has no provisions for developing the graduate projects with cooperation of research organizations	Insufficient involvement of leading foreign and domestic scientists for overview lectures on the topical issues in specific areas including interdisciplinary ones		Inadequate practice of project development of students for their involvement in R&D and business projects	
cooperation of scientific institutions and business organizations	The lack of a regulatory support for the public-private partnership in academia, for establishment of technology platforms and innovation clusters	The discrepancy between the existing practice of choosing and phrasing research topics and the needs of business organizations and the economy as a whole There are few effective technology platforms, mostly for materials science and food products. The lack of technology exchanges Insufficient involvement of enterprises to the corporate information system "Science in Universities" Insufficient experience in establishing science parks, university business incubators and start-ups There is no innovation clusters enlargement Insufficient involvement of the universities and the research institutions in regional programs Insufficient innovation-oriented culture	The lack of financing the interaction between science and businesses organized as special programs, competitions, etc. The lack of loan programs to stimulate the innovative projects of research and education institutions in collaboration with enterprises The lack of the tax exemptions for commercial transactions of innovations, including the transfer of intellectual property rights Insufficient venture capital funding Insufficient partners' fundraising		

Barriers to	Legal barriers	Organizational barriers	Financial barriers	Staff barriers	Other barriers
cooperation of educational institutions and business organizations	A mechanism of the state qualification certification has no provisions for developing the graduate projects on the basis of the universities and business cooperation	<p>The lack of widespread practice of establishing university innovation centers and laboratories to integrate educational and scientific activities with the needs of third key parties</p> <p>The lack of sufficient dissemination of career centers at national, regional and university levels</p>		<p>Unavailability of dual education</p> <p>The lack of a common practice of studying business through the participation in business activities</p> <p>Insufficient interaction of postgraduate and internship training programs</p>	

TARGET SPECIFICATION

There is a detailed description of the ways the requirements described above can be fulfilled, in particular through:

- institutions,
- interaction,
- results,
- overcoming obstacles.

Featured types of organizations to participate in the Knowledge Triangle and their functions.

Macro-level:

- the Ministry of Education (general coordination and innovation-oriented culture at the country level **are implemented**);
- the Ministry of Economy (funding for establishing the effective “science-education-enterprises” relations **is potential**);
- the National Council of Ukraine on Science and Technology as an advisory body for developing the state policy regarding scientific and technological activities and the practical mechanisms to implement it;
- national technology platforms in priority areas of science and technology (**needed to be established**), Annex C;
- industry-specific innovation funds, the research partnership fund with the participation of business for direct financing of applied research (**needed to be established**).

In order for Hungary to meet the requirements of the Lisbon strategy on a competitive and vibrant knowledge economy (investment in research and development approaches 3% of GDP) the new Research and Technology Innovation Fund was established in 2004. This fund covered the two largest existing funds – the R&D Fund and the National Research and Development Program. It consists of two main components – a business contribution and public funds [12].

- public platforms of business, government and science, established to identify promising areas for the development of economic sectors and priorities. The mechanism for financing innovation development envisages the use of an innovation fund based on priorities defined by public platforms.

Meso-level (a promotion of these establishments is needed):

- regional innovation clusters (Annex D),
- partnership councils on research and innovation,
- partnership venture capital funds,
- regional research alliances,
- thematic innovation networks coordinated by the university,
- regional innovation networks coordinated by the university,
- research foundations,
- "Centre of Excellence" for close alliance between research institutions and industry in research and development.

Centers of excellence serve as institutions for the accumulation of the best practice in each of the defined areas. They invest funds and promote advanced research in partnership with industry, colleges, universities, research clinics and other stakeholders in the public and private sectors. Thus, they stimulate the innovations of particular interest to society [12].

Even a simple analysis indicates that the full structural content of the Knowledge Triangle at the meso-level is obviously insufficient. In most regions some organizations are just not available.

Micro - level:

- universities,
- research establishments,
- science parks,
- university business incubators,
- enterprises,
- transfer organizations,
- business supporting agencies,
- business partnership councils,
- university research and engineering centers,
- innovative university laboratories.

University research and engineering centers are located in major universities and provide good conditions for higher education to cooperate with industry in order to concentrate their knowledge and resources to create new technologies. Sharing of education that integrates knowledge and technology is a common interest that develops not only company property, but also university programs. An additional result is that universities and companies are being encouraged to formulate and reform their research and development strategies. The leading institution of the consortium can only be the one with the right to postgraduate training [12].

An innovation laboratory is a concept that is closely related to open innovation, which creates an experiment environment in which enterprises, government bodies and citizens participate in the development of products/ services/ technologies jointly. Innovation laboratories operate best on the basis of open innovation [13].

The proposed measures to activate the Knowledge Triangle in Ukraine are summarized in the Table 4. They are formed in accordance with the needs of strengthening the ties in the following directions:

- research - innovation,
- education - innovation,
- research - education.

Table 4. Target specification arrangements for optimizing the Knowledge Triangle in Ukraine

Arrangements	Level			Results expected	Якщо потрібні зміни, то до яких саме нормативно-законодавчих актів? Laws and regulations needed to be amended
	Macro	Meso	Micro		
1. Research – Innovation					
1.1 Optimization and implementation of strategic priorities for innovation					
1.1.1 Optimization of quantity and levels of sector-specific strategic priorities of innovation activity	✓	✓		The concentration of financial resources in strategic areas	
1.1.2 Elaboration of regional programs for supporting regional innovation clusters and innovation networks that address strategic business activities		✓			
1.2 Institutional and organizational support					
1.2.1 Empowerment of scientific institutions, state higher education institutions for establishing commercial partnerships in order to promote the application of intellectual properties	✓			An increase in the number of start-ups, research and development parks, technology parks, platforms, exchanges, innovation clusters, innovative products, an improvement to the information sharing	
1.2.2 Establishing of the technology platforms	✓				
1.2.3 Establishing of the technology exchanges	✓	✓			
1.2.4 Optimization of the corporate informational knowledge system "Science in Universities" to improve the quality of research and innovative developments and provide their implementation	✓				
1.2.5 The development of public-private partnership (PPP) in the research and business spheres through joint programs of the Ministry of Economy and the Ministry of Education, including science parks. In particular, the experience of Estonia can be applied, where the competition is held by the Ministry of Economy, the means are received by the enterprise, and the university is an executor. Implementation of priority criteria for selection of projects with a high share of co-financing	✓				
1.2.6 Forming a special state grant program for universities that have developed a strategy and implement the Knowledge Triangle, for establishing appropriate institutions	✓				

and infrastructure - science parks (or R&D parks), technological platforms, for initiating university innovation clusters, innovation laboratories, information and technology business incubator etc. and establishing interaction between them with a certain efficiency criterion					
1.2.7 Establishment of science parks, university incubators and stimulation of students and teaching staff jobs within the park and business incubator (A sample of the Regulation on the procedure for holding the Innovative Ideas Competition "Startup - UzhNU" for students, graduate students and young scientists is given in the Annex E)	✓				
1.3 Financial mechanisms					
1.3.1 Development of the mechanism of the state support for commercial credit easing in order to implement innovative projects with significant social and economic effect	✓				
1.3.2 Establishment of exemptions from incomes taxation for entities that reinvest in inventions and direct depreciation funds to purchase high-tech equipment and technologies	✓				<p><i>-Formation of the incentive system for innovation activities</i></p> <p><i>- Practical support for the endowments and endowment-funds management</i></p> <p><i>- Establishment and management of venture funds to support start-ups</i></p> <p>The Tax Code of Ukraine, No. 2755-VI of December 02, 2010</p> <p>The Law of Ukraine “On Scientific and Technical Activities”, No. 848- VIII of November 26, 2015</p>
1.3.3. Establishment of tax exemptions for commercial transactions of innovations with intellectual property rights transfer, in particular, through complete relief from VAT	✓				<p>The Tax Code of Ukraine, No. 2755-VI of December 02, 2010</p> <p>The Law of Ukraine “On Scientific and Technical Activities”, No. 848- VIII of November 26, 2015</p>
1.3.4 Development of the programs with awards and incentives for innovators will improve person’s perception of the importance of innovation and creativity and will shape the personal context of innovation-oriented culture	✓	✓	✓		
1.3.5 Development of the programs for the projects with commercialization of some researches that have extensive performance and high efficiency	✓	✓	✓		

1.3.6 Development of the competitive grant programs for individual innovators with priority case studies	✓	✓	✓		
1.3.7 Annual competitions for universities on the best results for the effective Knowledge Triangle with the strengthening of the technological component	✓	✓			
1.3.8 Annual competitions for universities providing synergy with business (which are already in force). Nevertheless, it is important to focus it in the context of tripartite relations.	✓	✓			
<p>1.3.9 Development of partnerships fundraising mechanisms with a help of affiliate councils of universities and business in order to organize innovation financing through the co-contributions, including the establishment of joint venture funds to finance specific research and training programs addressed to the needs of the region</p> <p>Restore sector-specific innovation funds and create public platforms for business, government and science to identify promising areas of economic sectors and priorities.</p> <p>The mechanism for financing innovation development envisages the use of an innovation fund with due regard for the priorities adopted by public platforms.</p>		✓	✓		<p>Modernized Law of Ukraine "On Higher Education" No.1556-VII-2 of July 01, 2014</p> <p>The Law of Ukraine "On Charity and Charitable Organizations" No. 5073-VI of July 05, 2012</p> <p>The Article 170 of The Tax Code of Ukraine, No. 2755-VI of December 02, 2010</p> <p>Draft document "The Strategy for Reforming Higher Education in Ukraine until 2020"</p> <p>Laws of Ukraine "On Innovation Activity", "On Community Associations", "On Public-Private Partnership"</p>

<p>1.3.10 Empowering state educational institutions and scientific institutions to independently use and distribute funds received for the research results, the provision of services, the granting of the right to use intellectual property under licensing agreements and other forms of commercialization of the results of scientific and technological activities</p>	✓				<p>Enactments on National Innovation System: Resolution of the Cabinet of Ministers of Ukraine No.138 of February 23, 2011 The Law of Ukraine “On Scientific and Technical Activities”, No. 848- VIII of November 26, 2015 The Tax Code of Ukraine, The Budget Code of Ukraine The Economic Code of Ukraine</p>
1.4 Innovation-oriented culture and environment					
<p>1.4.1 Forming an innovative culture in communities where universities, research institutions, business and public foundations share a common responsibility for regional and local development in a broader sense The Knowledge Triangle should be supported by local, regional, national and international cooperation.</p>		✓	✓	<p>Raising awareness in the society of the importance of innovation activity</p>	<p>The Strategies for Regional and Local Development Corporate social responsibility strategies</p>
<p>1.4.2 Motivating universities to participate in the elaboration of the regional development strategies, including reasonable specialization strategies, as an example using the experience of Austria with performance agreements It is necessary to be sure, that regional development is a part of the university activities and is reflected in its development plans. Making a map of the current situation and analyzing the needs for covering gaps such as the lack of interaction between academics, researchers and business representatives Motivating individual representatives of universities to participate in such activities Forming a common line for such participation through training, research and services</p>		✓	✓		<p>The Strategies for Regional and Local Development Corporate social responsibility strategies</p>

Motivating universities to be involved in the formation of innovation clusters in the early stages					
1.4.3 Monitoring, evaluation and dissemination of the best practices for regional cooperation of universities, authorities and business. Creating a database of cooperation results. Development of indicators for assessing the results of the involvement of universities in regional governance, e.g. considering a university contribution to regional development in order to evaluate its activities		✓	✓		
2. Education – Research					
2.1 Developing the mechanism of state qualification certification through the introduction of provisions for the development of graduate projects as a part of research and business projects or leading research institutions' projects, in particular the National Academy of Sciences of Ukraine	✓		✓	Easy accessibility and discussion of scientific topics will lead to an exchange of views and knowledge between scientists in different disciplines. This will lead to the development of both sector-specific and interdisciplinary research. Also, the dissemination of scientific knowledge will lead to popularization and help to increase the attractiveness of scientific activity.	- For the Paragraph 4 to the Article 6 of The Law of Ukraine “On Scientific and Technical Activities”, an additional paragraph needs to be inserted to read as follows “6) Academic researcher is obliged to disseminate his knowledge and participate in popularizing scientific activities”; - for the Article 58 of the Law of Ukraine “On Higher Education” an additional paragraph needs to be inserted to read as follows “6) to disseminate knowledge and participate in popularizing scientific activities”.
2.2 Guest overview lecturing by leading foreign and domestic scientists on topical issues of research in certain areas, in particular interdisciplinary ones			✓	Compensation for successful scientific activity will enhance the	For the Article 41 of the Law of Ukraine “On Higher Education” an

				attractiveness for students and stir their interest. It will lead to an increase in the number of students engaged in research work.	additional paragraph needs to be inserted to read as follows “12. Members of the scientific society of students (cadets, students), graduate students, Ph.D. students and young scientists are entitled to receive payment for their research activities, the amount of which is determined by the academic council of the higher educational institution and is allocated from the budget of the higher educational institution”.
2.3 Upleveling the students involvement in research and business projects, including on a reimbursable basis, for example through the formation of student groups			✓		
2.4 Studying beyond the programs of the economic specialties the methodology for the development of scientific projects: the definition of their goals, objectives, methodological component			✓		
2.5 Performing research projects by students of second-cycle academic degree (master students) and third-cycle academic degree (Ph.D. students) within the courses of study as a part of professional training			✓		
2.7 Enhancing the role of the Student Scientific Society to attract students to participate in scientific conferences and competitions of scientific works.			✓		
2.8 Encouraging students to participate in the competitions for obtaining international research grants provided by Erasmus Plus, International Visegrad Fund and others in the framework of bachelor's and master's theses. It includes a share of co-financing.			✓		
2.9 Organization of All-Ukrainian student competitions on fundamental and applied research for budget financing	✓			Getting funds for research and implementation of	For the Paragraph 7.16 to the Article 20 of The Law of Ukraine “On

				<p>scientific developments is the incentive that could inspire students to scientific work. As a result of the All-Ukrainian student competitions on fundamental and applied research, the best work will be evaluated and receive funding, motivating students for further scientific work.</p>	<p>Scientific and Technical Activities” regarding basic functions of National Council of Ukraine on Science and Technology Development.</p> <p>Development of the proposals for the strategy of training and involvement of youth in scientific activities</p> <p>It includes initiating and arranging the competitions with the prizes of the President of Ukraine, Verkhovna Rada and the Cabinet of Ministers for significant scientific achievements as well as All-Ukrainian student competitions in fundamental and applied research for obtaining budget financing.</p>
2.10 Organizing university competitions for student research projects			✓		<p>The Strategies for Regional and Local Development</p> <p>Corporate social responsibility strategies</p> <p>The Strategy of the University Development</p>

					The concept of the innovative university developed by Uzhhorod National University, state higher educational institution
2.11 Involvement of the Student Scientific Society in solving regional problems and challenges		✓			The Strategies for Regional and Local Development Corporate social responsibility strategies The Strategy of the University Development The concept of the innovative university developed by Uzhhorod National University, state higher educational institution
3. Освіта – підприємства					
3.1 Forming a mechanism of the state qualifying certification with provisions for the development of the graduate projects based on the needs of enterprises and organizations in the region	✓		✓		Modernized Law of Ukraine "On Higher Education" No.1556-VII-2 of July 01, 2014
3.2 Establishing career centers at national, regional and university levels	✓	✓	✓		Modernized Law of Ukraine "On Higher Education" No.1556-VII-2 of July 01, 2014 The Strategies for Regional and Local

					Development Corporate social responsibility strategies Draft document “The Strategy for Reforming Higher Education in Ukraine until 2020”
3.3 Establishing university innovation centers and laboratories to integrate educational and scientific activities with the needs of third key parties; networking and interaction between the university and key parties, including business		✓	✓		
3.4 In the training programs it is necessary to shift the emphasis on the study of entrepreneurship to the training through entrepreneurship. It is important to allow universities to develop programs in accordance with the needs of the region and business, regularly interview business and graduates to ensure that programs meet their requirements and practical needs. The training programs should reflect the interaction of the elements of the Knowledge Triangle, especially in the case of master's and postgraduate training. Using of new forms of learning enables the transformation of the acquired knowledge into practical results.			✓		Modernized Law of Ukraine "On Higher Education" No.1556-VII-2 of July 01, 2014 The Strategies for Regional and Local Development Corporate social responsibility strategies Draft document “The Strategy for Reforming Higher Education in Ukraine until 2020”
3.5 Fostering personal growth of academic leaders, mid- and top-level managers, people who create and develop links between higher education institutions and other key parties, enabling the relationships between the university and business. Providing career and financial incentives for people to support their efforts to participate in local and regional development programs. Interaction with third parties should become a merit in hiring employees or advancing their careers.			✓		Modernized Law of Ukraine "On Higher Education" No.1556-VII-2 of July 01, 2014 The Strategies for

					<p>Regional and Local Development</p> <p>Corporate social responsibility strategies</p> <p>The Strategy of the University Development</p> <p>The concept of the innovative university developed by Uzhhorod National University, state higher educational institution</p> <p>Draft document “The Strategy for Reforming Higher Education in Ukraine until 2020”</p>
<p>3.6 Creating affiliated institutions of specialized departments of the university at the leading enterprises in order to train specialists and implement research results</p>			<p>✓</p>		<p>Modernized Law of Ukraine "On Higher Education" No.1556-VII-2 of July 01, 2014</p> <p>The Strategies for Regional and Local Development</p> <p>Corporate social responsibility strategies</p> <p>The Strategy of the University Development</p> <p>The concept of the</p>

					<p>innovative university developed by Uzhhorod National University, state higher educational institution</p> <p>Draft document “The Strategy for Reforming Higher Education in Ukraine until 2020”</p>
3.7 Establishing dual education system (Annex F)	✓	✓	✓		<p>Modernized Law of Ukraine "On Higher Education" No.1556-VII-2 of July 01, 2014</p> <p>The Strategies for Regional and Local Development</p> <p>Corporate social responsibility strategies</p> <p>Draft document “The Strategy for Reforming Higher Education in Ukraine until 2020”</p>

An important tool for increasing the effectiveness across the Knowledge Triangle is the implementation of an appropriate monitoring system for key indicators.

These may, in particular, include the following key indicators:

- the amount of funds received from the implementation of research results;
- the number of research and development contracts concluded and the amount of their financing;
- the number of registered intellectual property subject matters (patents, production secrets as commercially sensitive information, software, etc.);
- the number of signed license agreements;
- the number of startups created by the university;
- the number of university employees who have improved their skills in the knowledge transfer;
- the number of the students of third-party organizations in the supplementary education programs on small business and technology transfer;
- the number of information events, incl. conferences, forums on integration of education, science and innovation, organized by the university in cooperation with enterprises and scientific institutions;
- the rank in the Webometrics;
- the volume of exports of science-intensive and high technology products;
- the number of publications and citations;
- the number of agreements on cooperation with the organizations of the real sector of the economy;
- the number of scientific and educational laboratories, centers and departments, joint with enterprises and scientific organizations.

Statistical information on scientific and innovative activities in Ukraine

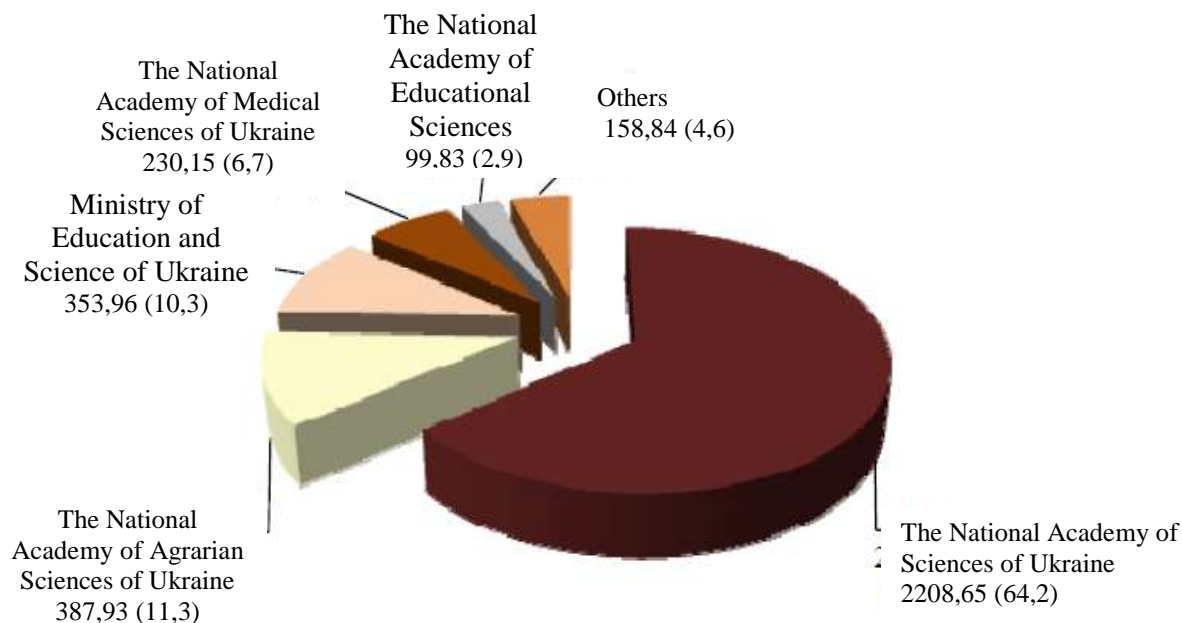
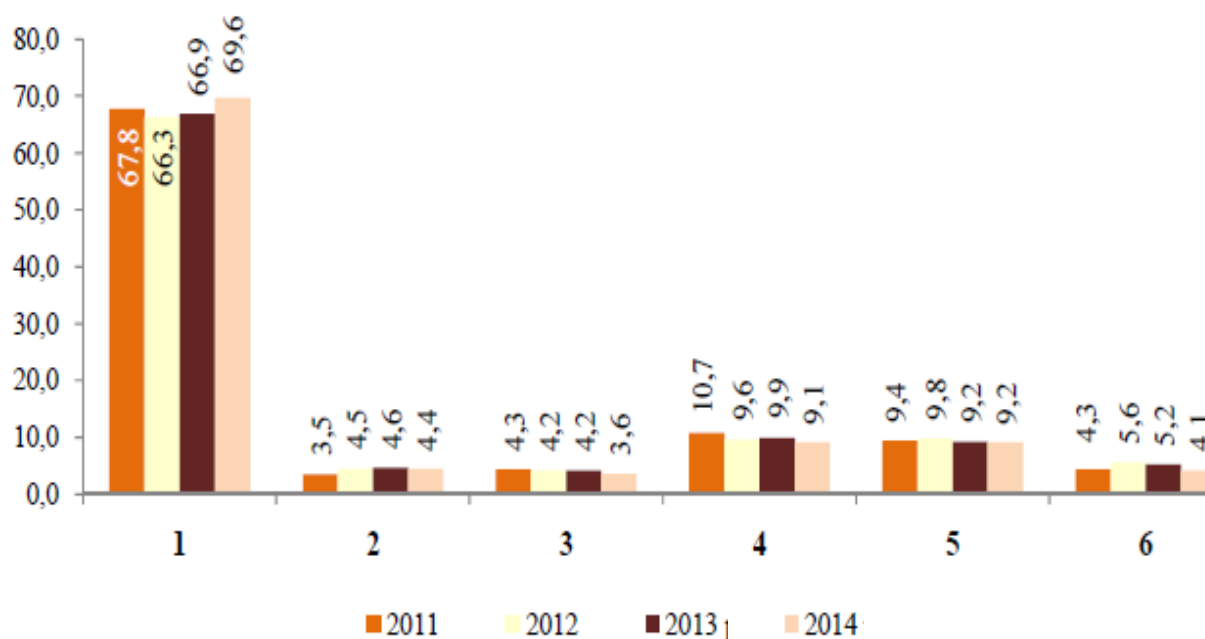


Fig. A1. Financing distribution of priority directions by managers of budgetary funds, mln. UAH. (%) [6]



- 1 - Fundamental research
- 2 - Information and communication technologies
- 3 - Energy and energy efficiency
- 4 - Managing natural resources
- 5 - Life sciences, new technologies for prevention and treatment of the most common diseases
- 6 - New substances and materials

Fig. A2. Financing distribution of priority directions in the years 2011-2014, % [6]

Rating of Ukraine in the Global Innovation Index, 2013-2014

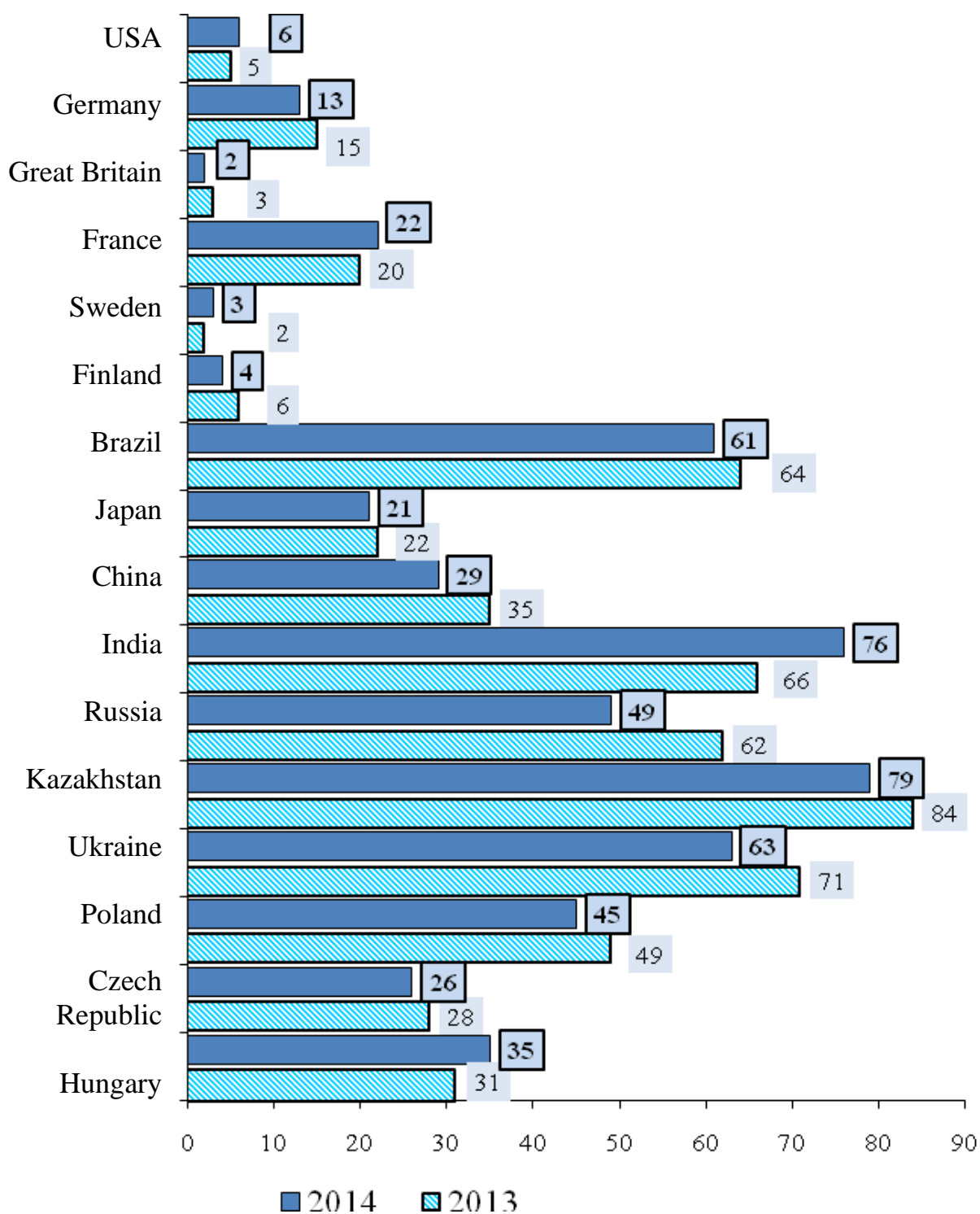


Fig. B1. Dynamics of GII by countries in 2013-2014 [9]

Proposals for legislative changes to establish technological platforms

Article 1. Definition of terms

In this Law the following terms have the following meanings:

Technological platform (TP) is organized by industry communication network of stakeholders (business, science, education, government and civil society), who are joining forces to improve the process of knowledge transfer, creation and promotion of technological innovation and enhance the competitiveness of a particular sector in the country for the purpose of obtaining a synergistic effect in the formation of value added integration of innovative activity of its members in a meaningful market segment.

Technological platforms are independent units with freely chosen legal status. They coordinated their activities, are transparent and open to new members.

The coordinator of the technological platform - an organization that provides organizational, informational interaction between the participants in the TP.

A partnership agreement is a contract between the TP coordinator and the TP partner on the conditions of their involvement in the development process and execution of work under the TP.

Technology platform partners – business entities who have entered into a partnership agreement.

The participants of the technological platform are the TP coordinator and TP partners.

The Executive authorities have the institutional, organizational and consulting support to technological platforms; the results are taken into account in the planning and implementation of government support measures, which aimed at ensuring socio-economic development of the country, the improvement of the scientific-technical and innovative activity.

Priority activities under the TA – economically and socially popular scientific, scientific-technical and innovative activities that meet the goal of creating a TP and are consistent with the activities defined by the laws of Ukraine "About priority directions of development of science and technology", "On priority directions of innovation activity in Ukraine" and other legislative acts of Ukraine in scientific, scientific-technical and innovation spheres.

Article 2. The purpose of establishing a technology platform

TP are created to identify the best innovative practices in technology, develop and promote implementation of the strategic directions of development of leading technologies, combining the institutions of knowledge (education and research), technological know-how industry, regulators, financial institutions and public representatives. Key TP players work together, help to develop solutions to important issues of life and safety of society.

Article 3. The functions of the technology platform

The main functions of the TP are:

- mobilization of stakeholders to work in partnership on the implementation of agreed priorities; the formation of long-term financial and organizational attract industry to the functioning of the platform;

- development of innovation strategies as well as long-, medium - and short-term research and innovation areas of development and action plans for the national and regional levels with the aim of obtaining private and public funding.

- In their design take into account the important policy issues of sector development, the strategic importance of specialization TP and a clear vision of the outcome and potential consequences for the economy, society and environment, as well as the necessary adjustments and non-technological barriers, in particular, the requirements of business structures, qualification of human resources, gaps or niches in the market, etc;

- forming regional strategies for smart specialization in the economy.

- facilitating the formation of public-private partnership in the framework of implementation of the important tasks of the platform;
- dissemination of information and transfer of knowledge to a wide range of stakeholders across the country;
- the implementation of the networking opportunities alone or with other platforms and partners in the chain address sectoral and cross-sectoral issues;
- facilitating the transition to a more open model of innovation through the provision of opportunities to the participants of the TA meetings, sharing knowledge, generating new contacts, develop ideas and implement them in partnership;
- the development of international and domestic cooperation in the field of scientific-technological and innovation activities, contributing to attracting domestic and foreign investment;
- identifying opportunities for international cooperation;
- facilitating the participation of European technology platforms;
- other functions not prohibited by Ukrainian law.

Article 4. Priority activities of the technology platform

The list of priority directions of activity of TP is formed in accordance with the laws of Ukraine "About priority directions of development of science and technology" and "About priority directions of innovative activity in Ukraine".

Proposals for legislative changes to establish innovation clusters

Article 1. Definition of terms

In this Law the following terms have the following meanings:

Cluster approach - a complex of organizational and economic measures undertaken by public, private or public institutions with the aim of uniting businesses and institutions in the clusters, establishing informal relationships and networking.

Innovation clusters (IC) is a loose grouping of independent companies and innovative start-ups, small, medium and large enterprises and research organizations that operate in a specific sector and geographically defined areas of the region that generate synergetic innovation outcomes through voluntary intensive interactions, common use physical objects, rapid exchange of knowledge and experience, and implementing effective contribution to technology transfer, networks and dissemination of information among cluster participants.

Innovation clusters are functioning primarily in a localized geographical area, but interact with large innovation systems in the region, the country and the world and have a high level of direct or mediated co-operating with authorities.

Cross-border innovation clusters are created with the participation of enterprises from different countries with localization on the territory adjacent to the common border of the participating countries.

Article 2. The purpose an innovation cluster

Innovation cluster aims to create a critical mass of specialization in a particular field of research, development and innovation on the basis of a balance of small and large businesses, research organizations of appropriate activities in a particular area of the region and to align and blend in competency areas of universities, research organizations and industrial specialization of enterprises located in the same territory, with the aim of increasing their competitiveness.

Article 3. Functions of innovation cluster

The main functions of the innovation cluster are:

- form an exquisite culture of innovation, a high level of interaction between members of the cluster, and cumulative-to-date infrastructure for the attraction and development of high-tech enterprises and knowledge institutes;
- create conditions for creative activity, stimulate investment of resources in research and development that contributes to patent activity and their implementation;
- successfully increasing the innovativeness of enterprises and create additional economic benefits, in particular, to increase value added from operations, exchange transactions, export, faster reaction to changes and extensions market share, increasing employment, creating new enterprises and enhance cooperation between them in General;
- increase, as a rule, the share of local resources, markets and consumers;
- generate co adaptation organizations-providers and consumers of services;
- contribute prevalence quality investments in organizations-residents of the cluster;
- interact with public authorities to participate in the development and implementation of the strategy for smart specialization of the economy in the region;
- provide more opportunities for the introduction of open innovation through collaboration, sharing knowledge, generating new contacts, develop ideas and implement them in partnership;
- generate relationships with the companies in the cluster with those in the respective industries in the region and the country and with other clusters;

- contribute to improving the quality of life and individual economic indicators of activity of inhabitants of the territory of the innovation cluster, including improving educational and qualification structure of human resources;
- retention of local authorities to the activities of the innovation cluster through the improvement of the General socio-economic indicators of the territory;
- perform other functions not prohibited by the legislation of Ukraine.

Article 4. Priority activities of innovation cluster

1. The list of priority directions of activity of IR is formed in accordance with the laws of Ukraine "About priority directions of development of science and technology" and "About priority directions of innovative activity in Ukraine".

Sample regulation on the procedure for holding the innovative ideas competition "Startup - UzhNU" for students, postgraduates and young scientists

**REGULATION ON
Procedure for Holding Innovative Ideas Competition "Startup - UzhNU"
for Students, Graduate Students and Young scientists**

1. General Provisions

1.1. This Regulation prescribes the procedure for holding the Innovative Ideas Competition "Startup - UzhNU" for students, post-graduate students and young students under 35 years old (hereinafter referred to as the "Competition").

1.2. The competition is held to support students, graduate students and young scientists, to form research groups for solving urgent problem issues, to raise a creative generation of young scientists of UzhNU.

- *assistance in the implementation of the idea (project) into production.*

1.3. Purpose of the Competition:

• Support of students, graduate students and young scientists under 35 years old in the implementation of innovative ideas;

- Team building for young scientists;
- Training in the basics of business management;
- Implementation of new research methods;
- Experience in public presentation of the idea and the project;
- presentation of the project to sponsor entrepreneurs;
- financial support for the winners of the competition;
- assistance in manufacturing application of the idea (project).

1.4 Students, postgraduates, young scientists and creative scientific groups under the age of 35 years at the time of application are allowed to participate in the Competition.

1.5. The projects submitted for the Competition are reviewed and evaluated by the Competition Committee approved by the order of Rector of UzhNU. Representatives of the University, regional council, city council, businessmen are involved in the Competition Committee.

1.6. The beginning of the project - September 1, 2016, project completion date - May 31, 2017. A working group is created to implement the project.

1.7 Financing of the winning projects is carried out during the academic year on the basis of an agreement between the University and the grant recipients with individual contractual agreements.

1.8. At the end of the academic year, the project executors report on the fulfillment of the project tasks and the use of the funds.

2. Competition Procedure

2.1. The competition of innovative ideas "Startup - UzhNU" for students, graduate students and young scientists under 35 years old is held annually in April-May.

2.2. The decision on the announcement of the Competition is approved by the corresponding order of Rector with the definition of periods and general conditions. This order also prescribes a Competition Committee and its membership.

2.3. The organization and conduct of the Competition is carried out by the research department of UzhNU.

2.4. The innovation competition for "Startup - UzhNU" in 2016 will be held in three stages:

- The first stage (May 16, 2016 - May 27, 2016) - registration of participants' applications on the UzhNU website, filling out the questionnaire by participants (application form - Annex E)
- The second stage (May 28, 2016 - May 31, 2016) - selection, preparation of presentations.

At this stage, the selection of applications submitted for the Competition will take place. The main attention will be paid to the novelty of the idea and the possibility of its realization and implementation.

Based on the evaluation results, the application passes / does not pass to the third stage.

- The third stage (June 3, 2016) - the Competition; Public presentation of the idea and the project; announcements and awards of winners.

At this stage, there will be a 5-minute presentation of the submitted project for public exposure.

3. Requirements for the projects submitted to the Competition

3.1. The Competition presents innovative projects, which are novel in the formulation and methods of research and have a scientific and practical significance.

3.2. In the process of considering projects, the following are assessed:

- urgency of the research ;
- originality of scientific ideas;
- scientific novelty and practical significance of the expected results;
- scientific contributions of authors;
- provision of necessary logistics.
- Availability of the necessary material and technical facilities.

3.3. The beginning of the project is 01st of October 2016, the completion of the project is on May 31, 2017.

3.4. Projects of scientific works, innovative ideas, scientific and technical (experimental) developments of students, post-graduate students and young scientists are accepted.

3.5. Students, graduate students, young scientists must study or work at UzhNU. They are allowed to participate in only one scientific project.

3.6. Projects that do not meet these requirements are not accepted for consideration.

An application form for the innovative ideas competition "Startup - UzhNU"

Full name of participant

Primary place of employment / study (faculty, course) of the participant, contact phone number, e-mail address

Full names of team members, brief information

Project title

Project idea

Novelty and urgency of the reseach

Project mission, ultimate outcome, necessities for implementing the idea

Description of the product (uniqueness, competitive advantages, availability of the prototype)

Target audience, sphere of application

Economic indicators of development costs (materials, wages, production, energy, advertising, etc.)

Anticipated profit

Brief suggestions, questions

Proposals for legislative amendments to implement dual education

A number of objective and subjective reasons, the analysis of which is given below, determines the urgency of implementing the dual system of education in higher education in Ukraine in the context of the concept of the Knowledge Triangle.

The first reason. There is no influence of high innovative potential of scientific universities and scientific institutions on the economy of Ukraine.

It is commonly known that current trends in the acceleration of scientific and technological progress have led to the emergence and intensive development of the industry of science-intensive (innovative) technologies (that is, technologies based on the synthesis of theoretical (fundamental) and technological knowledge) at the end of the twentieth century to the beginning of the twenty first century.

A characteristic manifestation of this acceleration is activation of the processes of reducing the "life cycle" of knowledge, on which technologies are based, that is, the time from their origin, practical use, aging and, therefore, the replacement of one generation of knowledge by another.

Thus, in the Industrial age the "life cycle" of equipment was 5, sometimes 10 or even 15 years, now, for example, in the key area of economic development – micro- and nanoelectronics – specification of hardware components are annually double upgraded with a thirty percent reduction in costs and prices for the products.

In today's world, the formation and development of countries with a sustainable economy is directly connected with the use of the strategy of innovative development. Countries, that develop and use the latest innovative technologies, are the world leaders in technological progress, where, according to various estimates, a contribution of the results of scientific and technical progress to GDP growth is from 70 to 90%. This is the countries of Western Europe, the United States, Japan, etc.

As for Ukraine, the state of innovation in it by most experts is defined as a crisis and one that does not correspond to the current level of innovation processes in industrialized countries. If we look at our state in international ratings coordinates, we can see a contradictory picture. For example, according to the Global Innovation Ranking compiled by Bloomberg in 2013, Ukraine is ranked sixth in the world in terms of enrolling the population with higher education, patent activity is the seventeenth place, the intensity of scientific research is the thirty-ninth place, while the level of innovation and business experience is seventy-ninth place.

This leads to an important conclusion. In Ukraine, even in the Soviet times, the unevenness and imbalance in the development of various components of innovation and factors of increasing the efficiency of the economy is observed. On the one hand, we have a fairly high level of education, educational and scientific infrastructure, qualifications of scientific personnel, and, on the other hand, a low level of institutional and organizational components of doing business, including involving companies in innovative processes, competition in the domestic market, regulatory environment. That is, high innovative, intellectual and creative potential does not affect the economy. To date, a significant part of the results of research activities has not been implemented in practice, does not generate revenues due to the lack of organizational and economic mechanisms for the commercialization of developments with potential for practical use. All this determines the economic development in Ukraine that follows the inertial scenario within the framework of an inefficient extensive model.

Proceeding from this, it is possible to formulate the following reason, that determines the urgency of introducing the dual system of education. This is inconsistency of traditional forms of teaching in higher education with today's requirements of innovative development of society. Indeed, as noted above, in the present conditions, the life cycles of innovative knowledge in the leading technological sectors of the economy are declining, and now they are up to one to three years. Training at the university, according to the existing standards of higher education, lasts 5 - 6 years. That is, during the training of students at the university there is a repeated change of generations of technological knowledge. And when a graduate comes to an enterprise he needs quite a long time to adapt to the respective production conditions. This means that higher education

within existing traditional standards, objectively is behind the modern level of innovative development of society. On the other hand, an enterprise focused on innovative technologies, have to spend a certain amount of time and money on the acquisition of necessary innovative technologies, their implementation, training of personnel for their use. Often it happens that this time is so long that these technologies become outdated and there is a need to use other technologies that are improved.

The next reason, which, to a certain extent, follows from the previous one, is low efficiency of training of scientific and engineering personnel within the framework of traditional forms of teaching in higher education. Now in Ukrainian higher education there is an urgent problem, which is that daytime students often receive practical knowledge and sustenance outside the university walls, working for firms whose activities do not correspond to the chosen specialty, and only occasionally attending classes. The result of this is good practical skills (provided the work is related to the specialty), but zero knowledge in theory.

In the end, all the above reasons or problems lead to the fact that investors are not ready to come to the regions where there are no professional staff of the required level of training and qualification.

Meanwhile, analysis shows that the formation and development of any country, as a developed innovative state with a stable economy, in the modern world is primarily associated with the formation of the synergy of the educational, research and innovation. Indeed, the strategy of innovation development involves the acquisition and preservation of technological superiority (ie, competitiveness). However, such factors as high-quality higher education, high-level scientific research, professional experience acquired, taken separately, do not automatically lead to such a strategy. Together, in the so-called "the Knowledge Triangle", and being in synergetic relationship with each other, these factors not only create opportunities, but provide technology for innovative development in the relevant time interval. It is the mutual integration of higher education, innovation and research activities, the synergetic interaction of all its components – higher education institutions, research organizations, as well as representatives of business companies focused on the use of innovative technologies, that can effectively implement the concept of the Knowledge Triangle.

Consequently, the formation and development of an innovative society provides, within the framework of the concept of the Knowledge Triangle, the fulfillment of the following necessary conditions:

- the interest of universities in the training of highly qualified professionals with modern innovative technologies;
- the interest of business organizations in the development, implementation and effective use of modern innovative technologies with the help of highly qualified specialists who are graduates of universities.

Realization of these goals on both sides is possible only within the framework of the integration of higher education, research, innovations through the effective use of the results of relevant scientific and innovative research at enterprises with active and direct participation in the so-called online university faculty, students, scientists, enterprise workers.

One of the effective ways of actualizing the concept of the Knowledge Triangle, ensuring qualitative training of modern specialists, can be, in our opinion, the use of the model of a dual system of education in higher education.

Dual education system (DES) is a spatiotemporal, harmonious combination of academic training in an educational institution and internship at enterprises. It provides for the direct participation of enterprises in academic, scientific and vocational education, including the possible monthly payment to the student.

The goal of the DES is to increase the competitiveness of educational services for students at the university, by implementing parallel training at the university and the enterprise, providing opportunities and prospects for the formation and development of an innovative society in the country.

The main principle, on which the DES is built, is the equal responsibility of educational institutions and enterprises for the quality of personnel training.

The main tasks of the DES are:

- ensuring the interconnection, interpenetration and mutual influence of various systems (higher education and science, higher education and innovation (production), science and innovation (production), which should lead to qualitative changes in vocational education, the commercialization of science, the competitiveness of education, science and enterprises, oriented on innovative technologies.

- training that best meets the requirements of employers;
- motivation of students to obtain a specialty and job opportunities;
- providing additional opportunities to improve the efficiency of training highly qualified personnel.

The main stages of implementing the technology of training for the dual system (at the level of the university, business partner) are the preparatory, organizational and final ones.

At the first stage there are:

- preparation of regulatory documents;
- development of educational programs for specialties;
- conclusion of contracts with enterprises;
- determination of the contingent of students.

At the second stage:

- determination of trajectory of training courses for each specialty;
- training agenda;
- determination of control measures based on the results of training.

And at the third, the final, stage students are trained on the trajectory of shift or separate training at the university and enterprise by immersing in the production environment.

It should be noted that the dual system of education is now widely used in a number of countries, especially in Germany, Austria, Switzerland, the United Kingdom, the Netherlands, France, Italy and other countries. However, it is interesting that in the 70-90s this mainly concerned vocational education at the level of our vocational training schools and colleges. Whereas now this form of training has been widely used in the preparation of bachelors and masters.

As the analysis shows, the most active practice is dual education in Germany. Now in this country training is carried out for 350 professions. 500 thousand companies provide the training courses. The total cost of dual education is about 30 billion Euros annually in Germany, 80% of which is business expenses. On average, 18,000 Euros are spent annually on the preparation of one student in the dual system of education.

Fig. 1 shows the results of a comparative analysis of the characteristics of professional and higher education in Ukraine, carried out within the framework of traditional forms, and dual education in Western Europe.

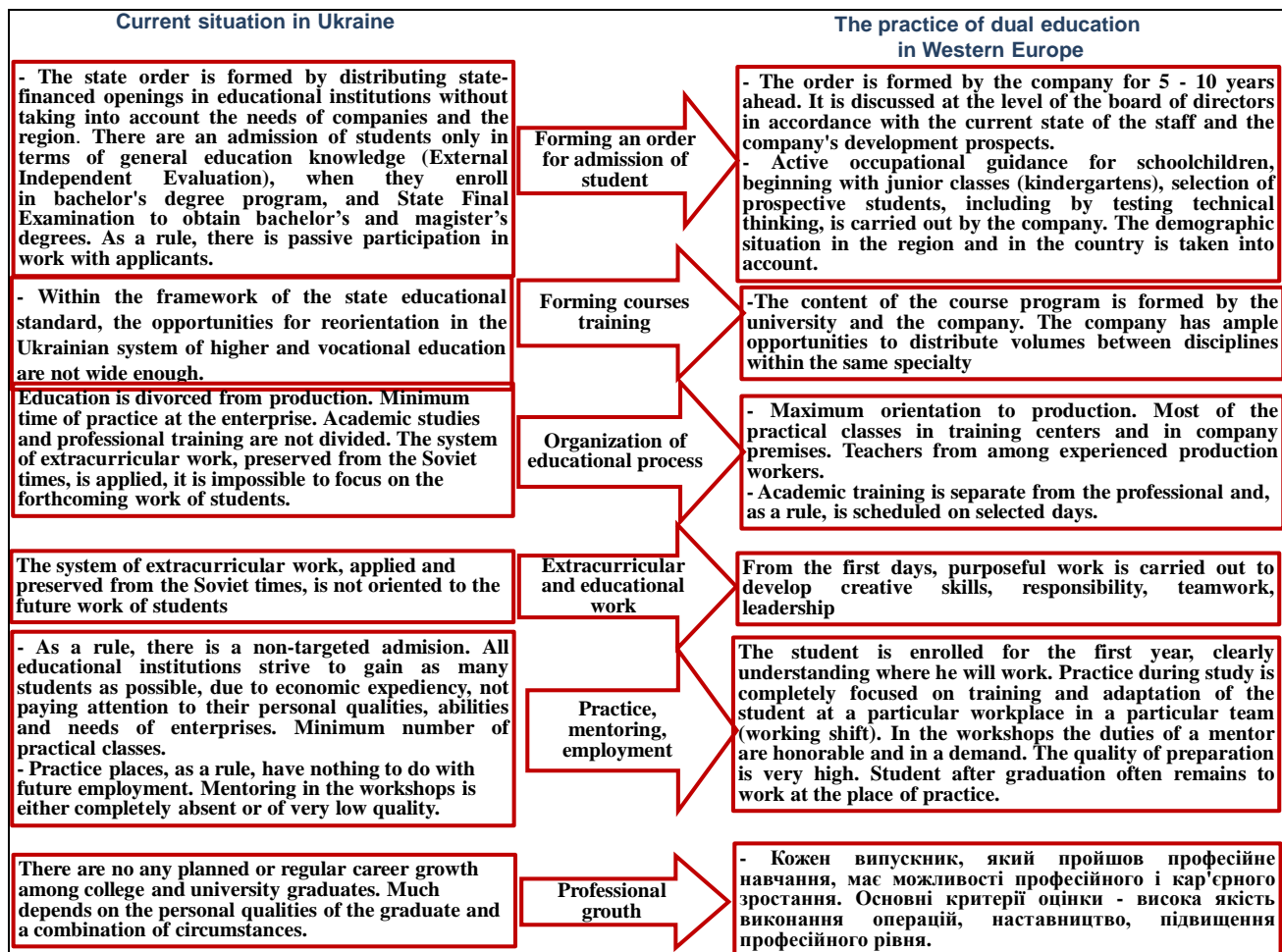


Figure 1.E - Features of vocational and higher education in Ukraine and the dual system of education in the countries of Western Europe.

Since the use of dual technologies for teaching in higher education of our country is at the initial level, a number of conceptual problems arises. These problems, in the context of the concept of the Knowledge Triangle, include the following:

At the state level:

- Development of legislative and regulatory framework for the introduction of the dual education system in Ukraine, including the development of a system of tax incentives for enterprises participating in the training process for this system.
- Development and implementation of effective mechanisms for financial, educational, research autonomy of universities in accordance with the Law of Ukraine on Higher Education, the formation of a full range of research universities.
- Development of science products market.
- Formation of an integrated innovation infrastructure, development and implementation of effective mechanisms for the commercialization of completed scientific developments and technologies.

At the level of ministries, universities and enterprises:

- Identification of the types of dual education programs, their structure, terms of implementation, the extent to which educational, scientific and business units are involved in the implementation of dual programs.
- Justification of the conditions for the introduction of dual programs in universities and the provisions of teaching within these programs;
- Development of forms and mechanisms for effective organization of the educational process using the dual system of education, aimed at individualizing the learning process with a wide use of distance technologies.

- Establishment of a system of internal university and between university cooperation in order to implement dual programs.
- Consideration of the nomenclature of unified degrees and specialties;
- carrying out a set of procedures for final state certification (including examinations and preparation and protection of final qualification works).

Fig. 2 shows the advantages of using dual education for participants in the educational process (for students, potential employers, universities).

The main thing here can be defined as follows: there is no need for professional adaptation, since the graduate can immediately work effectively in the conditions of rapid transformations of production during the transition from one generation of innovative technologies to another, improved one.

<i>Student</i>	<i>Prospective employer</i>	<i>University</i>
<ul style="list-style-type: none"> ❖ Acquisition of professional competencies in the early stages of training; ❖ Motivation to obtain on-fire specialty and job opportunities; ❖ Formation of personal qualities, teamwork skills, responsibility for the assigned task; ❖ Additional income and length of employment. 	<ul style="list-style-type: none"> ❖ Participation in the formation of public policy and decision-making in the field of education; ❖ Participation in the development of educational programs, qualification requirements and professional standards; ❖ Training of personnel that best meets the requirements of employers; ❖ Reduction of financial costs for the search and selection of specialists, their retraining and adaptation; ❖ Getting the benefit from new ideas and impulses coming from students and lecturers. 	<ul style="list-style-type: none"> ❖ Access to operational information about the current state of production processes; ❖ Obtaining current data on the problematic issues of training specialists ❖ Possibility to make adjustments in educational programs and update certain disciplines; ❖ Creation of additional opportunities to improve the efficiency of training highly qualified personnel.

Figure 2. E - Advantages of the DES participants

Between education and partner enterprises, new approaches to the professional orientation of students, the management of their subsequent career growth immerses.

Based on the analysis of the experience gained from the implementation and operation of the dual system of education in Western Europe and post-Soviet Russia and Kazakhstan, our vision of the main components of the implementation of the system project "**Implementation of elements of the dual education system in the training of workers, scientific and engineering personnel in pilot regions of Ukraine**" is proposed.

It should be noted, that the **key systemic problems** that determine the relevance of the current implementation of this project are:

- Labor productivity in Ukraine is much lower than in the most developed countries of the world.
- Despite the relatively high level of education, Ukrainian employees do not have the practical skills necessary for national enterprises to compete in the world market.
- The quality of higher and secondary vocational education continues to deteriorate.
- Investors are not ready to come to the regions, in which there is no professional staff of the required level of training and qualification.

The project should improve the model of personnel training taking into account the real needs of the economy in qualified personnel to increase the investment attractiveness of the regions of Ukraine.

After the implementation of this project, the following effects should be expected:

- Increased investment attractiveness of the regions of Ukraine through the preparation of scientific and engineering personnel and workers that meet the requirements of high-tech (innovative) industries and agriculture, based on dual education.

- The growth of the qualification of scientific and engineering personnel, workers; improvement of the profession status.

As far as the experiment is concerned, the implementation of the project, the most optimal term, in our opinion, can be 3 years. If this is the case, then it is probably advisable in the experiment to carry out training within the dual education of second-cycle academic degree students (master students/magister), and bachelor degree students from the third year, when they begin to study professional disciplines after basic disciplines.

Further, we note **partners** who should directly participate in the experiment. Of course, the main actor should be MES of Ukraine. For example, in Russia, the main executor is the Agency for Strategic Initiatives. In Ukraine until 2014 this could be the State Agency for Science, Innovation and Informatization. However, in 2014, according to the resolution of the Cabinet of Ministers, this agency ceased to exist, and the Ministry of Education and Science became its legal successor. The Ukrainian-German Foreign Trade Chamber (which is still at the stage of establishment) is eligible performer. There are two pros: first, Germany is the world leader in the implementation of the dual system of education; and secondly, Germany is the main partner in Ukraine's trade with the EU countries (about a third of the total turnover of Ukraine with the EU). Germany exports machines and high-tech equipment, electronics and electrical engineering to Ukraine. Therefore, Germany, as a foreign partner, is primarily interested in the presence in Ukraine of highly qualified personnel. Also, in our opinion, the project's executors, by virtue of their respective authorities, should be: the Ministry of Economic Development and Trade of Ukraine; Ministry of Social Policy of Ukraine; The World Bank; Chamber of Commerce and Industry of Ukraine; educational, research, business entities of Ukraine, which will participate in the implementation of pilot projects.

During the experiment, it is necessary to specify the priority sectors that determine the innovative direction of development of Ukraine, and which primarily require the availability of skilled workers, scientific and engineering personnel. In accordance with the priority sectors, "pilot" regions are defined (that is, territories where pilot projects for the implementation of dual-education elements will be introduced). Within these regions, it is necessary to identify educational, research and entrepreneurial partners that will participate in the experiment to train workers, scientific and engineering personnel for the enterprises, focused on the use of innovative technologies.

As a form of structural and functional organization of performers of educational, research and entrepreneurial activities involved in the experiment on training workers and scientific and engineering personnel from the priority sectors of the country's innovative economy, it is proposed to use an innovative scientific and educational cluster.

It should be noted that the establishment of innovative scientific and educational clusters with the performers of the pilot projects within the framework of certain priority sectors of innovative development of the respective regions is the most distinctive part of the proposed project.

The following definition of innovative scientific and educational cluster is proposed. An innovative scientific and educational cluster is a free group operating on the basis of multilateral agreements, universities, colleges, vocational schools, enterprises, research institutions in a certain sector of the economy and on the geographically specified territory of the region. In the short term, the group provides workers, scientific and engineering personnel needs of employers (business organizations) and has a significant impact on the country's innovative development. This is achieved by combining the educational, research and innovation component of the activities of universities of different levels of accreditation with the real needs of potential enterprises.

Here we should emphasize the fact that within the framework of an innovative scientific and educational cluster, comprehensive educational activities are carried out not only to train workers,

but also scientific and engineering personnel for certain priority sectors of the economy that support the country's innovative development.

In accordance with the objectives and stages of the introduction of dual education in Ukraine, which were discussed above, an indicative action plan (road map) for the implementation of this system project, which is shown in the Table 1.E, is proposed. It consists of three stages: the preparatory stage will last approximately 1 year; the implementation stage - about a year and a half; and the final stage is approximately half a year. The road map includes the following main positions: measures, key results, timelines, responsible executors, implementation tools.

Table 1. E - Indicative action plan (road map) for the implementation of this system project "Introduction of elements of the dual education system in training of workers, scientific and engineering personnel in pilot regions of Ukraine".

Sub-project/ activities	Key result	Implementation period	Responsible executor
1. The preparatory stage (approx. 1 year)			
1.1.1. Creation of a working group of representatives of the Ministry of Education and Science of Ukraine; Ministry of Economic Development and Trade of Ukraine; Ministry of Social Policy of Ukraine; The World Bank ; Chamber of Commerce and Industry of Ukraine; Ukrainian-German Foreign Trade Chamber (at the stage of establishment) and other stakeholders	A workgroup formed		Main: Ministry of Education and Science of Ukraine; Ministry of Economic Development and Trade of Ukraine; Ministry of Social Policy of Ukraine
1.1.2. Preparation of the analytical report and methodical recommendations on the description of the main elements of dual education on the example of the best international practices	Press conference dedicated to the presentation of the report		Main: Ministry of Education and Science of Ukraine Co-executors: Ministry of Education and Science of Ukraine; Ministry of Economic Development and Trade of Ukraine; Ministry of Social Policy of Ukraine
1.1.3. Identification of priority industries and development of criteria for "pilot" regions, in the territory of which pilot projects will be implemented to introduce elements of the dual education system.	Package of tender documentation		Main: Project Workgroup

<p>1.1.4. Adding amendments to the agreement on advisory services in reforming the investment environment between the Ministry of Economic Development and Trade of Ukraine and the World Bank on the dual education.</p>	<p><i>Amendments</i></p>		<p><i>Main:</i> <i>Ministry of Economic Development and Trade of Ukraine</i></p>
<p>1.1.5. A competition to select a certain number of pilot regions in the territory of which pilot projects will be implemented, with the formation of innovative educational and scientific clusters in them, and a list of business entities (enterprises implementing investment projects) for which specialists are planned to be trained.</p>	<p>A list of the "pilot" regions; formation of the innovative educational and scientific clusters</p>		<p>Main: Working group of the Ministry of Education and Science of Ukraine Co-executors: Ministry of Education and Science of Ukraine; Ministry of Economic Development and Trade of Ukraine; Ministry of Social Policy of Ukraine With the involvement of: Entities of Ukraine</p>
<p>1.1.6. Inclusion in the guidelines for the elaboration of regional comprehensive programs for the development of higher education proposals on the implementation of elements of the dual education system for the Ministry of Education and Science of Ukraine competition for subsidies from the state budget.</p>	<p>Changes to guidelines</p>		<p>Main: Ministry of Education and Science of Ukraine With the involvement of : the Entities of Ukraine</p>

1.1.7. Signing of multilateral agreements with pilot regions on provision of expert and methodological support for implementation of elements of the dual education system	<i>The signing of multilateral agreements with the regions winners</i>		Main: Ministry of Education and Science of Ukraine; Ministry of Economic Development and Trade of Ukraine; Ministry of Social Policy of Ukraine
2. Implementation stage (approx. 1.5 years)			
2.1.1. Organization of the development of professional standards, if necessary, and (or) their actualization for business entities of pilot regions and taking into account international requirements	Development and updating of the required professional standards		Main: Ministry of Social Policy of Ukraine Co-executors: Ministry of Education and Science of Ukraine; Ministry of Economic Development and Trade of Ukraine With the involvement of: the entities of Ukraine
2.1.2. Development and (or) modernization of existing educational programs for requirements are necessary for the implementation of pilot projects.	Development of appropriate programs		Main: the entities of Ukraine
2.1.3. Preparation of material and technical facilities for the implementation of pilot projects.	Facilities for the implementation of pilot projects		Main: the entities of Ukraine
2.1.4. The implementation of activities to improve the skills of relevant personnel (in educational organizations and enterprises) involved in the implementation of the pilot project.	Certification training		Main: the entities of Ukraine

<p>2.1.5. Organization of recruitment and training of specialists in educational programs prepared in the framework of pilot projects and monitoring of training.</p>	<p>Completion of training in the "pilot" regions of a certain number of persons</p>		<p>Main: the entities of Ukraine</p>
<p>3. The final stage (approx. half a year)</p>			
<p>3.1.1. An analysis of the implementation of pilot projects and prepare recommendations on legislative and procedural changes based on it. These changes are aimed to expand the practice of training specialists in educational institutions and industrial enterprises on the basis of the dual system of education, taking into account the real need of the economy for qualified personnel and stimulating private business investment in higher and vocational education.</p>	<p>Report to the Supervisory Board of the Ministry of Education and Science of Ukraine</p>		<p>Main: Ministry of Education and Science of Ukraine; Ministry of Economic Development and Trade of Ukraine; Ministry of Social Policy of Ukraine</p>
<p>3.1.2. Preparation of recommendations for improving the management system of higher and professional education in the part of:</p> <ul style="list-style-type: none"> • formation and development of sectoral systems of continuing education and professional development of specialists; • encouraging educational organizations to constantly update the education programs for the 	<p>Report to the Supervisory Board of the Ministry of Education and Science of Ukraine</p> <p>Instruction for</p>		<p>Main: Ministry of Education and Science of Ukraine</p> <p>Co-executors: Ministry of Education and Science of Ukraine; Ministry of</p>

<p>needs of the economy;</p> <ul style="list-style-type: none"> • formation of mechanisms for determining actual and long-term needs of enterprises in the real sector of the economy in terms of competencies and qualifications, and taking into account these needs when forming a government order, establishing admission quotas; • creation of information support tools for the integration of educational organizations and enterprises interested in qualified personnel and stimulating mechanisms for attracting business to the training of specialists; • development of cooperation between educational institutions and business. 	<p>making system changes based on the results of the implementation of the system project «Introduction of elements of the dual education system in training of workers, scientific and engineering personnel in pilot regions of Ukraine».</p>		<p>Economic Development and Trade of Ukraine; Ministry of Social Policy of Ukraine</p> <p>With the involvement of:</p> <p>entities of Ukraine</p>
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