

# Fostering Knowledge Triangle in Moldova through Education

Rodica CRUDU\*

## Abstract

*In a very short time, economic globalization has changed the world economic order, creating new challenges but also new possibilities. Moldova cannot be competitive in this new context, unless it becomes more innovative and more efficiently responds to consumer needs and preferences. Given that remittances and, therefore, consumption are not able to fuel long-term economic growth of Moldova, we need a new development paradigm that involves smart growth based on investment, innovation and competitiveness. This paradigm of economic growth must be placed in the centre of the knowledge triangle. Only by ensuring conditions for the development of all sides of the knowledge triangle can a reliable economic growth be achieved, visibly reducing the gap between our country and European economies and making Moldova a competitive country in Europe in terms of its ability to reform and innovate. In the present article, the main focus is placed on the analysis of the role of the education in fostering the knowledge triangle in the Republic of Moldova, by analysing its framework conditions, achievements and challenges. A special attention is dedicated to the organisation of PhD studies in Moldova, as one of the main achievements of Education to foster the Europeanisation process and increase the interaction with other angles of the knowledge triangle, research and innovation.*

*Keywords:* knowledge triangle, education, universities, PhD studies, research, innovation

## Consolidarea triunghiului cunoașterii în Moldova prin educație

### Rezumat

*Într-un timp foarte scurt, globalizarea economică a schimbat ordinea economică mondială, generând noi provocări, dar totodată și noi posibilități. Republica Moldova*

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\* Rodica Crudu, PhD, assoc. prof., Academy of Economic Studies of Moldova  
E-mail: rodikacrudu@gmail.com

*nu poate fi competitivă în acest nou context, decât cu condiția să devină mai inovatoare și să răspundă mai eficient necesităților și preferințelor consumatorilor. În condițiile în care remitențele și, drept rezultat, consumul, nu sunt în stare să alimenteze, pe termen lung, creșterea economică a Republicii Moldova, avem nevoie de o nouă paradigmă de dezvoltare care presupune o creștere inteligentă bazată pe investiții, inovații și competitivitate. Această paradigmă de creștere economică trebuie să plaseze în centru Triunghiul Cunoașterii, elementele cărui sunt descrise anterior. Doar asigurând condiții de dezvoltare a tuturor laturilor triunghiului cunoașterii se poate atinge o creștere economică fiabilă, care va reduce vizibil decalajul dintre țara noastră și economiile europene, iar Republica Moldova va deveni o țară competitivă și inovativă în Europa.*

*Acest articol este focusat pe analiza rolului educației în consolidarea triunghiului cunoașterii în Republica Moldova, identificarea condițiilor cadru, principalelor realizări și provocări. O atenție deosebită este dedicată procesului de organizare a studiilor superioare de doctorat în Moldova, drept una dintre cele mai proeminente realizări în domeniul educației, orientată să promoveze procesul de Europeanizare și sporirea interacțiunii cu alte unghiuri ale triunghiului cunoașterii – cercetare și inovare.*

*Cuvinte cheie:* triunghiul cunoașterii, educație, universități, cercetare, inovare

## **Содействие формированию треугольника знаний в Молдове посредством образования**

### **Выдержка**

*В очень короткий период, экономическая глобализация изменила мировой экономический порядок, создавая новые вызовы, а также новые возможности. Молдова не может быть конкурентоспособным в этом новом контексте, если она не станет более инновационным и более эффективно реагировать на потребительские нужды и предпочтения. Учитывая, что денежные переводы и, как следствие, потребления, которые не могут питать долгосрочного экономического роста Молдовы, нам нужна новая парадигма развития, основываясь на инвестициях, инновации и конкурентоспособности. Эту парадигму необходимо поместить в центре элементов треугольника знаний, которые описаны выше. Только обеспечение условий для развития всех сторон треугольника знаний может послужить надежному росту, которые позволят заметно сократить разрыв между нашей страной и европейской экономики, и Молдова станет конкурентоспособной и инновационной страной в Европе. Эта*

*статья посвящена анализу роли образования в укреплении треугольника знаний в Молдове, определение рамочных условий, основные достижения и проблемы. Особое внимание уделяется процессу организации высшего образования и докторантуры в Молдове в качестве одного из наиболее важных достижений в области образования, направленные на содействие процессу европеизации и усиливающегося взаимодействия с другими углами треугольника знаний - исследования и инновации.*

*Ключевые слова:* треугольник знаний, образование, университеты, научные исследования, инновации

## **1. Introduction**

During the 20 years of reform in Moldova, state policies have undergone an essential metamorphosis: priorities have gradually evolved from fundamental science and military needs to key technologies and industry. Currently, a new stage is being shaped, focusing on innovation and societal needs as a whole.

An analysis of the sources of economic growth in Moldova in a classical representation of the Cobb-Douglas production function suggests a very alarming conclusion – without a serious effort to change the development paradigm, the growth potential in the next 10 years is limited to a maximum of 4.5% to 5% per year. As a way to increase the production and capital stock and the knowledge about its use, the economic growth paradigm should imply attracting foreign and local investment, strengthening research and development, as well as development of export industries. On the other hand, the speed, scale and consistent approach to the broad spectrum of proposed reforms are also important. A change in paradigm cannot be achieved through a set of instant reforms alone. Promoted reforms will serve only as a first step in this new method and an approach to the problems of the Government and the entire society.

The current knowledge triangle in Moldova is marked by the legacy of a centralized Soviet-style system of research, development and innovation. [5] The massive exodus of skilled workforce, low capacity of the domestic market, low production capacity, various business constraints, etc. determine the relatively low performance of each element of the knowledge triangle (KT) in Moldova. Its defective functionality is also determined by weak interaction between the sides of the KT. In the following compartments of the study, these issues are treated in detail for each side separately.

In the present article, the major focus is placed on the role of education in fostering the knowledge triangle in the Republic of Moldova. It is not only about the fact that education is the most important aspect of the knowledge triangle in a country (being one of the drivers for research and innovation), but due to some constraints regarding the volume of the paper for submission and the complexity of each KT's

pillar.

The present article is a part of a more complex research performed in the framework of a TEMPUS project “Fostering the Knowledge Triangle in Belarus, Ukraine and Moldova” (FKTBUM), which aims to develop the so-called target specifications or project plan of the knowledge triangle (Pflichtenheft) in partner countries – Belarus, Ukraine and Moldova – in order to contribute to speeding up the development of the three sides/angles/pillars of the knowledge triangle (education, research and innovation) and their integration into knowledge-based economy development policies. The specific objective of the project is: to establish a system of knowledge for the leaders of higher education in Belarus, Moldova and Ukraine concerning modern approaches to the organization and management of the knowledge triangle; to analyse and identify the challenges in the process of efficient integration of higher education, research and innovation in partner countries; to develop measures for long-term use of the project and for support of the knowledge triangle by Belarus, Ukraine and Moldova etc.

## **2. Abstract scheme of the knowledge triangle**

The contribution of higher education to employment and economic growth, as well as its attractiveness at international level, can be increased by means of establishment of close and efficient ties between education, research and innovation – the three sides of the “knowledge triangle”.

The knowledge triangle refers to the interaction between, education, research and innovation, as the key-drivers of a knowledge-based society. In the European Union, it also refers to an attempt to better link together these key concepts, with research and innovation already highlighted by the development of the Lisbon Strategy. The Competitiveness Council within the EU treats the concept of the knowledge triangle as the need to improve the effects of investments in the three sides of the triangle, and namely: education, research and innovation, by assuring juridical, institutional and financial support for continuous and productive interaction between the actors of each field of the triangle. [1] More and more countries are aware of the importance of building viable mechanisms of Knowledge Triangle functioning. More than this, Knowledge Triangle is a priority in the formation of the globally – innovation society on the base of development and integration of the three elements (education, research, innovation) and capital investments in human resources, development of professional skills and supporting scientific research, as well as ensuring the modernization of education systems etc. ., so that they become relevant to the needs of a global economy based on knowledge.

The knowledge triangle is a priority in the process of creation of globally innovation society on the basis of development and integration of the three elements of the knowledge triangle (education, research and innovation), as well as capital

investment into human resources, development of professional capacities and support of scientific research, ensuring modernization of education systems, etc., so that they become more relevant for the needs of a knowledge-based global economy. [2]

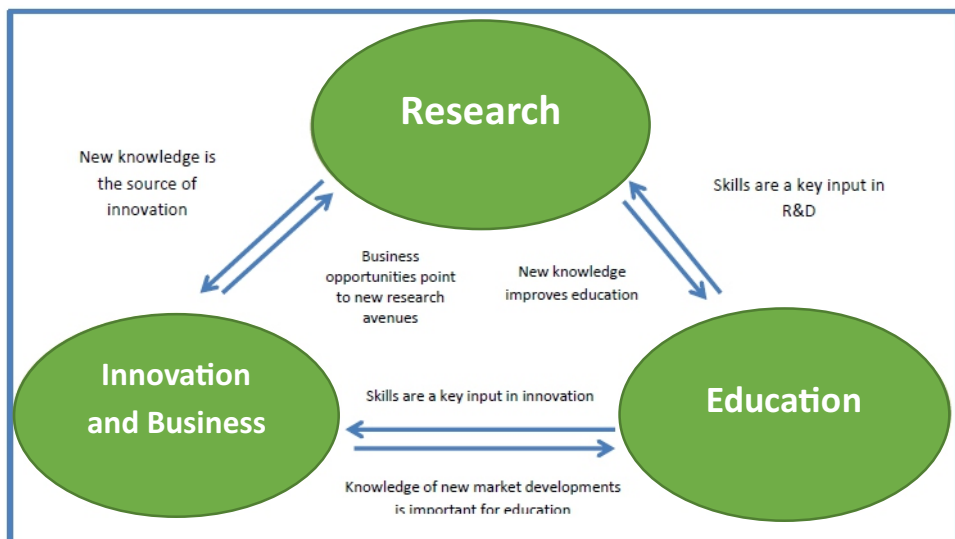
The theoretical model in figure 1 (which is a basic model of the knowledge triangle promoted by FKTBUM coordinators) coincides with the perfect abstract scheme of the knowledge triangle.

The abstract scheme of the knowledge triangle (KT) reveals the indispensable need and vitality of the interdependence between KT stakeholders for the country's competitive development and knowledge transfer to society and economy.

The interaction between KT stakeholders is realized via 3 channels, each of them being double-directional:

**1. Relation/interaction between research and higher education.** In this relation, the functions of the stakeholders involved in research activities consist in transfer of new knowledge and results of the research process to higher education, development and provision of scientific and methodological knowledge and new methods of its application, etc. Meanwhile, the role of the stakeholders involved in education is to define qualifications for researchers, identify research areas for graduates and coordinate their research projects, etc.

**Figure 1. Theoretical model of the knowledge triangle**



*Source:* Adapted according European Institute of Innovation and Technology (EIT). Catalysing Innovation in the knowledge triangle. Practices from the EIT Knowledge and Innovation Communities. Available at: [http://eit.europa.eu/sites/default/files/EIT\\_publication\\_Final.pdf](http://eit.europa.eu/sites/default/files/EIT_publication_Final.pdf)

**2. *Relation/interaction between research and innovation.*** This relation involves several stakeholders, with distinct functions each.

For example, research and its stakeholders should provide to companies the newest inventions, know-how for using them, as well as provide services of expert examination and feasibility in various fields, etc.

In their turn, companies determine and define directions for research, determine the economic parameters for application of research results, and apply the results that promise to be profitable, etc.

On the other hand, the institutions promoting technology transfer perform the function of intermediary between research and real economy.

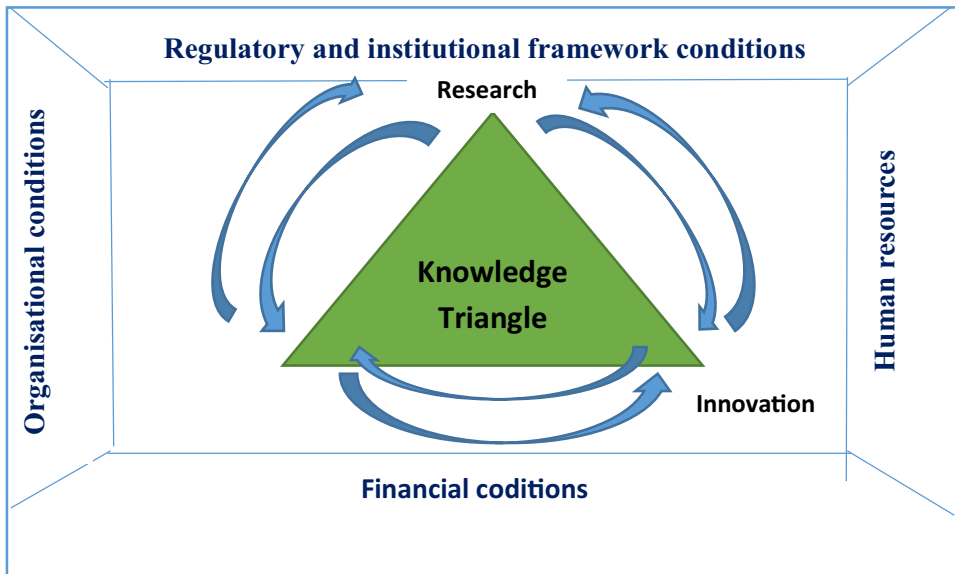
At the same time, organizations that provide support to companies create and ensure the necessary conditions for the development of a healthy business environment and provide legal and economic advice to companies, especially newly created.

**3. *Relation/interaction between innovation and higher education.*** In this relation, the private sector (companies) formulate to the academic environment requests for the professional and social competences of future specialists and managers, while universities integrate them into university curricula and prepare professionals and managers according to the modern requirements of the labour market and of real economy. Also, universities contribute to the development of entrepreneurial culture, collaborate with the institutions that promote technology transfer and participate in the communication platform (cluster) between students, scientists and business representatives.

In this context, it is clear that the separate work of each of the KT elements cannot ensure its functionality or, subsequently, positive effects in the process of establishment of knowledge-based economy at the national level.

### **3. Framework conditions of the knowledge triangle in Moldova**

In order to better assess the knowledge triangle, there were established framework conditions that shape the KT in the Republic of Moldova. Figure 2 presents the framework conditions of the knowledge triangle. Therefore, the current knowledge triangle situation in Moldova cannot be presented accurately without the description of the regulatory, institutional, organizational and financial frameworks and of human resources availability in all KT-related spheres.

**Figure 2. Framework conditions of the Knowledge Triangle**

*Source:* Elaborated by the author

For an efficient operation of the knowledge triangle and qualitative integration of all KT elements, a productive interaction among all four framework conditions is required. Currently, these four components (regulatory, organizational, human resources and financial frameworks) are often determined by systemic, institutional and bureaucratic barriers. The cross-connection of these barriers has a negative effect on the research potential. The outcomes of these barriers could contribute to an inadequate, inefficient and ineffective implementation of policy documents and development strategies in the field of research and innovation. [2]

The knowledge triangle can bring an efficient input into the progressive development of the Moldovan society. It also stands at the basis of ensuring an achievement-based research process, integrated into the international research circuit and oriented towards meeting the growing needs of the national society and economy.

Every element of the knowledge triangle contributes to increasing the level of knowledge, the productive stock of capital, economic development by means of attraction of investment, development of exporting industries, promotion of knowledge-based society, and strengthening of research and development, innovation and technology transfer, oriented towards efficiency and competitiveness.

The knowledge triangle also contributes to creation of the necessary conditions for the implementation of innovation in real economy – key elements for establishment of true knowledge-based society and economy in Moldova.

In this context, we find appropriate to identify the main stakeholders involved in the shape of the KT in Moldova.

Priorities for research and development in Moldova are established by the Parliament. Research activities in Moldova are almost entirely managed by the Academy of Sciences of Moldova (ASM) and its executive body – the Supreme Council for Science and Technological Development (SCSTD) and other agencies and institutions in its subordination: Center for Fundamental and Applied Research (CFAR); Center of International Projects (CIP); Agency for Innovation and Technology Transfer (AITT); Advisory Council of Expertise (ACE). In addition, research is conducted in 66 institutions, including institutes and research centers (including the 19 research institutes subordinated to the ASM), 15 higher education institutions accredited by the National Council for Accreditation and Attestation and 11 institutions of other types. [5]

The ASM organizes, manages and performs research and development according to the Partnership Agreement between the Government and the Academy of Sciences of Moldova.

The main stakeholders in the education sector are the Ministry of Education and the network of higher education institutions, which in 2014 included 31 institutions (19 public institutions and 12 private institutions).

Innovation activities are performed by local companies and supported by Academy of Sciences of Moldova, Ministry of Economy through its the Organization for Small and Medium Enterprises Sector Development (ODIMM), Agency for Innovation and Technology Transfer (AITT), and the State Agency on Intellectual Property (AGEPI), etc.

For the KT to function in Moldova, all stakeholders should perform their functions according to the theoretical model of the knowledge triangle.

#### **4. Education - the main pillar of the knowledge triangle in Republic of Moldova**

The operation of the Moldovan education system is characterized by the fact that since 2005 it has been largely determined by joining the Bologna Process and by the authorities' efforts to adopt the university system to the European standards established in this process. Legal relations in the field of education are regulated by the Constitution of the Republic of Moldova and by the Education Code [3] (in force since 23 November 2014), as well as by other legislative and regulatory documents. The Education Code is the fundamental regulatory and legislative act for education at all levels, substituting the old Education Law of 1995.

By means of the new Education Code, the Ministry of Education proposes a new approach to the education process, aimed to modernize the education system in the context of Moldova's European integration, in accordance with the Bologna Process. In this respect, the Education Code will contribute to the implementation of the Education



Strategy 2020 by consistently addressing issues of access, relevance and quality of education. [7] The Education Code has several main objectives, namely: promoting lifelong learning; liaising with the labor market; establishing an effective system of insurance, monitoring and evaluation of the quality of education; development, support and motivation of teachers to ensure quality education and rethinking of the education system in terms of quality and cost-effective education services. [4]

The network of higher education institutions in Moldova currently consists of 31 institutions, including 19 public institutions and 12 private institutions (one unit less than in academic year 2013/14). Most of them, mainly 26 units are located in Chisinau municipality, 2 units - in Balti and 1 unit - in Cahul, Taraclia and Comrat. [8]

The universities' participation in the knowledge triangle focuses on training young scientists and researchers in accordance with modern market requirements, introduction of new knowledge and the latest achievements in the field of higher education, etc. Universities are also research units. However, not all higher education institutions are accredited to carry out research and development. Out of 31 institutions of higher education, only 15 are accredited as research and development institutions.

Number of students in higher education decreased by about 8 thousand people compared to the previous year. In this order of ideas, at the beginning of academic year 2015/16 the number was 81,7 thousand students (excluding foreign students), of which 82 percent are enrolled in state institutions. (Table 1)

At the beginning of the study year 2015/16, the number of foreign students constituted 3,5 thousand persons, 41,2 % more in comparison with the previous year. Most of the students were coming from Israel (58,6%), Romania (22,7%), Turkey (4,1%), Ukraine (4%) and Russian Federation (1,9%). [8]

A decrease of the number of students was recorded in both state institutions (5,5 thousand persons compared to the academic year 2014/15) as well as in non-state (2,3 thousand). The distribution by gender predominantly is driven by women - 57,8% of total students.

In 2015/16, on average, there are 230 students in higher education per ten thousand people, compared to 273 students in the 2013/14 academic year. Reduction of the number of people enrolled in undergraduate studies is also felt in distribution per areas of study. Thus, compared to academic year 2013/14, there has been a decrease in the number of students enrolled in the first cycle in all 8 core areas. At the master level, there has been an increase in the number of students enrolled (14 272 in 2015/16 in comparison with 14 802 in 2013/14). On the one hand, the higher increase was registered in the field of services, but, on the other extreme the highest decrease in the number of student was registered in the field of education and social sciences, economics and law. Nevertheless, social sciences, economics, law (3 533 persons enrolled) and education (1 322 students enrolled) remain the most required field of specialisation for master studies.

**Table 1. Students in higher education per forms of education and forms of ownership, in academic years 2013/14 – 2015/16, persons**

	2013/14			2014/15			2015/16		
	Total students	of which:		Total students	of which:		Total students	of which:	
		female	pay for studies		female	pay for studies		female	pay for studies
<b>Total</b>	<b>97,285</b>	<b>55,067</b>	<b>69 187</b>	<b>89,529</b>	<b>51,496</b>	<b>62,059</b>	<b>81 669</b>	<b>47 217</b>	<b>55 000</b>
full-time	64,352	36,852	38 223	57,940	33,993	32,426	53 536	31 529	28 835
part-time	32,933	18,215	30 964	31,589	17,503	29,633	28133	15 688	26 165
<b>State-owned institutions</b>	<b>78,919</b>	<b>45,586</b>	<b>50 821</b>	<b>72,474</b>	<b>42,345</b>	<b>45,004</b>	<b>66 938</b>	<b>38 966</b>	<b>40 269</b>
full-time	53,656	31,084	27 527	48,417	28,515	22,903	45 233	26 606	20 532
part-time	25,263	14,502	23 294	24,057	13,830	22,101	21 705	12 390	19 737
<b>Private institutions</b>	<b>18,366</b>	<b>9,481</b>	<b>18,366</b>	<b>17,055</b>	<b>9,151</b>	<b>17,055</b>	<b>14 731</b>	<b>8 221</b>	<b>14 731</b>
full-time	10,696	5,768	10,696	9,523	5,478	9,523	8 303	4 923	8 303
part-time	7,670	3,713	7,670	7,532	3,673	7,532	6 402	3 298	6 428

*Source:* Adapted by the author according to the data of National Bureau of Statistics. Higher education institutions in academic year 2014/15, 2015/16. Available at: <http://www.statistica.md/newsview.php?l=ro&idc=168&id=5013>

When referring to graduates' distribution per general areas of study in 2015/16, there is notice for the Bachelor degree a higher percentage of graduates in such fields as economics (28.1% of total graduates), education (17.4%), law (14.9 %) and engineering (8.2%). Among receivers of the Master's degree, 23.2% studied economics, 19.4% – law, and 16.9% – education.

The entire education process was provided by 5 300 people (basic personnel), or 7.6% less than in academic year 2013/14. Teachers with a scientific degree made up 2 700 persons, including 2 300 with PhD and 400 with Doctor Habilitated degree. The share of women among the teaching staff is over 52,9%, and even higher at the didactical level of lecturers / senior lecturers – more than 63,7%. [8]

The downward trend in the number of students is determined by the current quality of the education system, as well as by other shortcomings, including poorly developed education infrastructure, exodus of teachers because of low wages in the education sector, non-compliance of the university curriculum with labour market requirements, etc.

These shortcomings are expected to be overcome by implementing the new Education Code. In this context, it is important to note that the proper application of the Education Code will require additional financial resources, and public spending on education will reach 7-8% of GDP. The extension of the duration of compulsory education alone will cost, according to estimates, around 400 million lei annually, and measures to support young specialists will require about 61 million lei per year.

So, the expected results are determined by a multitude of other factors that

contribute to the gross domestic product (such as a viable business environment, etc.) and by political will.

There is a general consensus that education is a prerequisite for innovation, while research is usually focused on providing a link between higher education and the national innovation system. Equally important is the relationship between formal education and its impact on national innovation systems. In general, to participate in and benefit from the opportunities of the knowledge-based society, one needs to have certain basic skills associated with a high level of innovation, especially ICT and entrepreneurial skills.

The goals of Moldovan universities do not differ from those of European universities: greater visibility of specific outcomes in the public space, a more active and relevant presence in the public space, transparency, accountability and comparability, a better relationship between higher education, research and innovation; promotion of diversity in the university sector; development and implementation of appropriate measures of human resource management; encouragement of life-long learning; strengthening of links with the non-academic sector; improvement of conditions for funding and promotion of competitive and sustainable models.

However, higher education institutions are facing many problems in the realization of their goals: lack of transparency in high-level decision making, lack of quality standards and strong political commitment in this area, lack of sufficient funds to ensure an exchange of good practices in higher education institutions abroad, lack of medium - and long-term common goals with the private sector in certain directions that produce positive structural effects, such as economic growth, improved quality of life, etc. All of the above, and not only, create serious barriers to the organization, operation and development of the education system in Moldova.

Nevertheless, things are changing. These changes are determined by a range of factors that determine higher education institutions (HEIs) should respond to the challenges imposed by the knowledge based society, and namely to cooperate with business, administrative, political environment and non-profit organizations. Starting with this premise, Ministry of Education of Moldova launched a series of actions oriented to increase the degree of interaction between universities and entrepreneurial environment.

According to the Code of Education, higher education should continue with PhD studies (IIIrd Cycle). [7] Admission to the PhD studies is realized in compliance with:

- Code of Education nr. 152 from 17th July 2014;
- Regulation on the organization of PhD higher education studies, approved by Government Decision no. 1007 of December 10, 2014;
- External evaluation methodology for authorization of temporary functioning of Doctoral Schools and doctoral programs, approved by Government Decision no. 586 of 24 August 2015 (Official Gazette of the Republic of Moldova, 2015, no. 241-246, art. 681);

- Government Decision no. 816 of 11 November 2015 on the right to organize doctoral higher education institutions, consortia, national and international partnerships (Official Monitor of the Republic of Moldova, 2015, no. 306-310, art. 909);
- Admission plan to the higher education PhD studies, IIIrd Cycle, with funding from the state budget for the academic year 2015 - 2016, approved by Government Decision no. 453 of 24 July 2015;
- Methodology of organization the scientific projects Contest (competition) for distribution, between doctoral schools, the grants from the state budget for the academic year 2015-2016, approved by Minister of Education no. 936 of 29 September 2015;
- The plan of distribution, between doctoral schools, the grants from the state budget for the academic year 2015-2016, approved by Minister of Education no. 1100 of 19 November 2015, with further amendments.

For the period 2014-2015, the Government has approved a total of 320 multi-annual PhD grants (of which 307 grants for scientific PhDs and 13 grants for professional PhDs) for a period of minimum 3 years for scientific and professional PhD studies in arts and sport. The admission plan to the higher education of PhD studies, IIIrd Cycle, in higher education institutions was elaborated in accordance with HEIs proposals; analysis of the admission plan for the academic year 2014-2015, approved by Government Decision no.731 of 8 September 2014, reports and surveys doctorate monitored by the National Council for Accreditation and Attestation. [6]

Doctoral higher education could foster the development of knowledge triangle in the Republic of Moldova, being at the same time a tool to assure the interaction between higher education and research (two angles or pillars of the KT).

Therefore, table 2 comprises the main challenges, arguments and potential solutions of the organisation of Doctoral studies in Moldova (Table 2).

The process of Moldova's Europeanization also contributes to the KT's strengthening, by intensifying the relations with European doctoral schools (especially from Romania); providing assistance to Doctoral schools' administration (seminars organized); inviting foreign speakers to Doctoral schools; developing academic mobility programmes for PhD students etc. [6]

**Table 2. Problems and potential solutions in the organisation of Doctoral studies, IIIrd Cycle in the Republic of Moldova**

N/o	Problem	Argument	Potential solution
1	Number of projects submitted for the 6 areas are not reported to the needs of the labour market	Doctoral higher education should, first of all, prepare specialists able to strengthen areas of national importance.	Advantaging, through the Admission Plan, the agricultural and technical sectors, as two of the areas of importance for the country's development, but also that of art

2.	Research does not always have a practical purpose relevant for Moldova	Doctoral theses must not only follow to obtain the scientific title of doctor, but also create solutions to the problems Moldova is facing	<ul style="list-style-type: none"> <li>- To award financing from the state budget for those scientific projects that come to research the most sensible changeless of the country and that are of national importance;</li> <li>- To involve employers in the establishment and determination of the doctoral themes.</li> </ul>
3.	Too numerous doctoral schools	Focusing the specialists on a specific domain in a single Doctoral school would help resolve the problems, which would boost confidence, quality and encourage potential applicants and research services institution.	It was concluded a memorandum with French Agencies of Universities that motivated 6 institutions to apply for a grant that follows to organize doctoral schools in several PhD centres.

*Source:* Elaborated by the author in accordance with the information provided by the Ministry of Education of Moldova. Report on the implementation of higher education PhD studies, IIIrd Cycle, in the university year 2015-2016

However, it is discouraging the small number of partnerships, international consortia and joint programs, interdisciplinary research themes, international PhD students coordinated by two mentors (one local and one foreign), lack of experience and legal provisions on how to organize the PhD studies in the framework of consortia and partnerships (procedures for defending the thesis and issuing the diploma); financing problems in terms of financial autonomy etc.

Additionally, in order to increase the quality of cooperation relations of the universities, business and labour market increase, were initiated a series of reforms:

- a. Development of National Qualifications Framework for higher education and extension of this activity towards other levels of education, in accordance with the new provisions of the European Qualifications Framework and with the latest changes in the structure of the national economy.
- b. Updating the nomenclature of professional education, occupational standards at all levels of education, which will cover the necessary skills required by the labour market.
- c. Development of the occupational standards for the professions included in the Classification of Occupations.
- d. Modernization of the university curriculum, focused on competences, on the needs of the learner and on the economic environment.
- e. The launch and development of the system career guidance and counselling for youth professional orientation of, in accordance with the actual structure of the

national economy and the current situation on the labour market.

f. The creation of student organizations, which, alongside with other responsibilities, would contribute to the establishment of an effective dialogue between the universities and business environment.

g. Encourage partnerships and consortia between universities, doctoral schools and national and international business sector, which, according to the provisions of cooperation agreements, could contribute to:

- an increased access for students or young researchers to modern equipment and technology, through internships;
- a higher insertion of specialists on the labour market;
- a greater academic mobility, which would increase considerably the visibility and promote institutions at regional, European and global level;
- stimulated research partnerships;
- an increased involvement of economic environment in the process of curriculum and the National Qualifications Framework development;
- an increased number of requests from entrepreneurs for advice provided by academics;
- a higher involvement of private sector in establishing the topics for annual projects, bachelor, master and PhD thesis, which could be based on finding solutions to real problems of the regional economy;
- an increased participation of representatives of both environments (academic and entrepreneurial) in joint activities such as conferences, roundtables, scientific symposiums etc.

Finally, it can be stated that education is to create optimal conditions for the foundation of a knowledge society able to contribute to a better socio-economic development of Moldova.

## **Conclusions**

The framework conditions of the knowledge triangle in Moldova (regulatory, organizational, human resources and financial frameworks) are often determined by systemic, institutional and bureaucratic barriers. The cross-connection of these barriers has a negative effect on the research potential. The outcomes of these barriers could contribute to an inadequate, inefficient and ineffective implementation of policy documents and development strategies in the field of research and innovation.

The analysis of the regulatory, organizational, financial frameworks and availability of human resources specific for the Knowledge Triangle in Moldova allows us to sum up several structural constraints in the field of education as: decreasing number of students, professionals involved in the higher education, quality of curriculum, non-compliance of higher education created competences with labor market requirements, uncertainty and relative low quality of research and organization

of PhD studies etc.

For Moldova, education is one of the most significant factors for human resource development. Education has an essential role in ensuring economic growth, modernization of technological and intellectual components and increase of population's welfare. Only by acknowledging the fact that the quality of education is vital for the formation of the research potential a tighter relation between education and research can be achieved.

The new Code of Education and the Education Development Strategy for 2014-2020, "Education 2020" represent the first steps in implementation of reforms in education in the Republic of Moldova. Moreover, establishing the legal framework for the organization of PhD studies, represent a further step in promoting deeper Europeanisation of Moldova and several advantages in the process of fostering the knowledge triangle in Moldova.

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