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Historical and Theoretical Framework of the Relation between Higher Education Institutions and the Process of Regional Economic Development

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ABSTRACT

Objective: The objective of the paper is to investigate the evolution in the relationship between higher education institutions (HEIs) and their surrounding environment and the analysis how higher education can increase the economic competitiveness of regional and national economies.

Research Design & Methods: Review of literature that illustrates the evolution of the relation between higher education institutions and its surroundings.

Findings: In the context of a contemporary global "knowledge economy", higher education institutions contribute to the economic competitiveness of regions and nations by performing quality higher education and innovation activities.

Implications & Recommendations: Both theoretical literature and practical evidence show that the relationship between higher education institutions and the surrounding economies have helped each other become more competitive. More than ever, regions and nations must foster and invest in the most important institutions that provide higher education and innovation, which in turn increase the competitiveness level.

Contribution & Value Added: The originality of this work lies in displaying the historical evolution of higher education in relation to its surrounding environment and the comparative analysis of the two competitivity pillars – higher education and innovation – in Eastern Europe.

Article type:	conceptual paper
Keywords:	higher education institutions; regional economic development; socio-economic impact
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INTRODUCTION

The contribution of higher education institutions (HEIs) to economic development in general, and to regional economic development, in particular, has been the subject of a vast international literature over the past decades (De Meulemeester & Rochat, 1995; Shaw & Allison, 1999; Goldstein & Renault, 2004; Brewer & Brewer, 2010). Complementary or separately from subjects like human capital, technological innovation or the transfer of fundamental and applied research results, the contribution of higher education institutions to economic growth and development started to preoccupy the minds of economists, sociologists, historians etc. approximately three decades ago (Elliott, Levin & Meisel, 1988). The constant structural changes experienced by the global society and national economies - the growing influence of total factor productivity within the sources of economic growth in Western countries, the great importance attributed to non-material actives within business organizations and the increasing education level of the labor force - have intensified and extended the interest of specialists studying the role of research and education institutions within this process (Färe et al., 1994). Two or three decades ago the link between higher education institutions and economy was rather tangential or subsequent to already acknowledged fields in applied economic research rather than a self-subsisting preoccupation. Some economists, especially Fritz Machlup (1962) and Peter Drucker (1995), stressed the idea of knowledge as a production factor. Today, independent researchers from university departments all over the world, as well as various groups of specialists at international organizations (World Bank, UNESCO, OECD etc.) invest time and intellectual energy in analyzing - theoretically and empirically - the contribution of the "knowledge" factor to economic growth, and implicitly the role of higher education institutions as the most important institutions that produce "intellectual values"(Wach, 2015).

But of course, the role of universities and other higher education institutions is not limited just to the production of "scientific knowledge", used in the disembodied technical progress (neoclassical theory, exogenous theory, cf. Solow, 1957; Jorgenson & Griliches, 1967) and embodied technical progress (endogenous theory, cf. Romer, 1994; Crafts, 1996). To a great extent, the functions of higher education institutions contribute to the development of the institutional framework, facilitating the efficient redistribution of resources and thus, raising their productivity. This is why the study of connections between higher education institutions and economics cannot be included in just one specialized field such as "economics of education", "economics of knowledge", "economics of technology" or "economics of science" but is rather interdisciplinary. The tendencies of the international academic environment (e.g. the massification of education and research, the growing involvement of business in academic applied research, the acceleration of technological transfer from universities to the business environment etc.), combined with major economic changes that have occurred over the past decades (e.g. globalization process, development and expansion of high-tech industries etc.) generated a much larger and important role for universities and higher education institutions within the competitiveness of nations and regions (Arbo & Benneworth, 2007).

The main objectives of our research are: (1) to illustrate the evolution of HEI and the way in which the process of regional economic development relates to this evolution; (2) to emphasize the role played by the HEIs in shaping the policies and theories of economic

development at regional and national levels; (3) to argue that HEIs have a significant socio-economic contribution to regional development process by analyzing higher education and innovation pillars in four different Eastern European countries.

MATERIAL AND METHODS

The investigation of scientific literature is approached from an interdisciplinary perspective (economics, history, sociology). The research is based on both the theoretical investigation of the existing literature related to higher education and its contribution to sustainable economic development, but also on the empirical investigation in order to capture and understand the way in which higher education institutions in some Eastern European countries contribute to increasing the country's competitiveness level. To illustrate the relationship between higher education and economic development we use documentary analysis technique and specific methods like analogy, comparison, argument selection etc. The sources of documentation are represented by books, jurnals, article, reports and other specific sources. For the empirical part we will rely on the methods and instruments of quantitative analysis, using statistics, data and information collected from public institutions and higher education institutions in the countries belonging to this region, but also from special country or regional reports and bulletins from international organisations.

LITERATURE REVIEW AND THEORY DEVELOPMENT

Regional Dimension of the Evolution of Higher Education Institutions

The genesis of higher education lies in the centuries V-III B.C, in the ancient Athens and Rome. It is precisely in this period when the notion of *higher education* was born. Indeed, the prototype of the modern university is a philosophy school opened in Constantinopole in 425 (Varvoglis, 2014). Subsequently the role of the proponent education was taken by the Catholic Church. Cathedrals and monastic schools in the late medieval Europe, have been transformed into new study centres, known as *Studium Generale*, and became the craddle for modern universities. In these places, respected researchers also conducted teaching activities, thus attracting people who wanted to study law, medicine or theology (Pedersen, 1997). The word *university* derives from the Latin *Universitas Magistrorum et Scholarum* which describes, as explained by Sir John Henry Newman, "a school of knowledge of every kind, consisting of teachers and learners from every quarter" (Newman, 1917, p. 5) whose main essence was academic debate and the exchange of thoughts and ideas.

The first institutions to be named as universities were the University of Bologna and University of Paris, founded respectively in 1088 and 1150. These two establishments encouraged and inspired other societies and academic circles, thus leading to creation of – among many others – University of Oxford, University of Cambridge, University of Salamanca, University of Heidelberg – which, by the end of 15th century expanded all over Europe. In such form of organization, the European model of University is perceived together with the Roman-Catholic Church, as the oldest and continuous institution in the Western World. As Kerr argues, "they have experienced wars, revolutions, depressions and industrial transformations, and have come out less changed than almost any other

segment of their societies" (Kerr 1980, p. 9). He also indicates that many universities founded at this period "are still in the same locations with some of the same buildings, with professors and students doing much of the same thing and with a governance carried on much in the same way"(Kerr 1982, p. 119).

The fascinating history of higher education institutions reveals values and principles that have survived the great test of evolution (Fotea, 2014). How have these institutions managed to evolve from the medieval universities to the modern "mega-universities" of our time, maintaining at the same time institutional stability, moral principles and cultural diversity? Maybe the secret of this success is the specific relation of these institutions with its surrounding environment? If yes, which have been the changes that both sides of this transforming process have experienced? These are the main questions that drive the analysis of the importance of regional dimension of higher education institutions.

The Birth of Modern University and The Expansion of Higher Education

Early European universities were born in a time of unprecedented expansion of trade and commerce accompanied by a dynamic growth of science. This intellectual revival was associated with the rediscovery of Greek and Roman-Greek cultural heritage, when Western European towns and cities were experiencing an accelerated process of growth and development. As Bender rightly indicates, "this introduced a new order and freedom" (Bender, 1988, p. 3) bringing a fresh breath of air into the medieval society. These activities have led to both positive and negative outcomes. On one hand the universities succeeded in attracting talented people, injected new ideas, enriched the cultural life and strengthened the local economy. On the other, the complexity of the newly-born intellectual life and the intensified interaction of individuals with very different educational and moral backgrounds has led to many conflicts both at regional and national levels (Fotea, 2014).

The end of18th century was a difficult period for universities. They were perceived as institutions unable to adjust to the central or regional administration's new vision of territorial planning dominated by the emergence of new industrialized economies and an accelerated process of urbanization (Gascoigne, 2002). The positive change in this regard occurred only after the French Revolution. From this moment, government efforts to reorganise the administration and curricula of universities have started a process of irreversible change, improving the efficiency of universities and the whole system of higher education. Out of all the reorganization attempts, the Humboldtian reforms adopted by the Humboldt University in Berlin in 1810, were the most successful, serving as model not only for European universities, but also for the ones in United States and Japan (Sauerland, 2007).

This new idea of university involved the promotion of the cultivation of man, and the gradual formation of its character through liberal education which involved the search for knowledge, freedom of learning and teaching, but also an institutional infrastructure that would support these mechanisms. This new organization of knowledge led to the birth of research universities and technical research institutes in the second half of the 19th century, just to name the Massachusetts Institute of Technology (1861) as an example (Layton, 1971). This new higher education institutions aimed at reconciling higher education and scientific research. Thus, the exploration and discovery of the world was not left to "amateurs" in contexts and institutions less academic, but became the duty of "professionals" with an academic background. Universities become prestigious institutions of

higher education and research, promoting modern science, based on rationality, empirical observation and experimental methods (Fotea, 2014). Moreover, they have put much effort in forging long-lasting relations with the surrounding environment. For Bender, the birth of research university becomes a "denial of place" (Bender 1988, p.8). This happens because once the knowledge and science becomes universal, available to all humankind regardless of time and space, the activity of universities transcends the traditional boundaries of its location.

In the very same period – the second part of the 19th century – private companies become interested in cooperation with universities. Big chemical and electric companies, like Bayer or General Electric, inaugurated their own laboratories and research facilities, increasing the demand and expanding the labor market for engineers, technicians and researchers. Initially, the collaboration between universities and the private sector was usually informal, mainly through teachers who received financial and logistic support in their research activities, while the companies secured a constant supply of well-trained graduates and received valuable consultancy services. Subsequently, in the beginning of the 20th century many industrialized countries inaugurated many research institutes with technical and industrial profile, both public and private (Hughes, 1987). In spite of these transformations, the end of the 19th century and the beginning of the 20th century has validated universities as top research institutions. Then, after 1960, an unprecedent boom of higher education was recorded. The number of students, academic and administrative staff alongside the funds allocated to higher education development increased substantially (Kwieck,2006).

The Role of Higher Education Institutions in Technological Development Policies

The rising in importance of both higher education and the research activity has positive and negative aspects. The obvious benefits are the increasing expenditures – both public and private – on universities and research centers. Yet, this expansion and diversification process of higher education and research is followed by increased expectations of the society. The taxpayers and politicians expect to receive even higher returns of investment in this sector (Green & Gilbert, 1995). Even though the first attempts to formulate a coherent research policy dates back to World War I, it was only after the World War II that this project came into being. Both of the World Wars have shown how significant is the impact of carefully designed and supported scientific and engineering policy. Consequently, after 1945, the policy makers elaborated and introduced coherent scientific policies in the Western World. Gibbons et al. describe three stages of the postbelic economic development process to which, as we will point out, higher education has contributed substantially (Gibbons at al., 1994).

The first stage stems from the "Science The Endless Frontier" Report handed to the American President Francklin D. Roosevelt by Vannevar Bush, the Director of the Office of Scientific Research and Development (OSRD) of the US Federal Government. (*Science The Endless Frontier* Report, 1945). This document called for a more consistent financing of scientific research by the US administration. The main idea behind the report was a claim that knowledge is based on a law of nature and thus can be created and discovered through carefully planned scientific research that should be conducted by professional specialists. At the same time, promoting and applying knowledge for practical purposes could bring a set of benefits for the society, contributing to a more vigorous economy,

a more efficient national security and ultimately, to a higher standard of living. In essence, the main objective of the aforementioned document was to increase the capabilities for a more intense research and development process (Fotea, 2014).

According to Gibbons at al. (1994), the second stage of post-war development starts with the introduction of policies that are exploiting research to attain various important national goals. In the first stage, national security, nuclear energy, aeronautics and medicine were the areas that were attracting most of the funding for research. However, in the second stage those sectors were already heavily criticized. Their relevance and gains to civil society was put in question. It was claimed that research funded by public funds should bring major benefits to a larger segment of the national economy and to solve important social problems. The competitively and the rate of growth of national economy, the social issues related living standards and the surrounding environment were considered essential issues that needed to be solved with the help of science (Nelson, 1959). Under these circumstances, the results soon started to appear. Western government's efforts focused more on applied research, and also on the dissemination and implementation of scientific research. These new requirements in research agenda attributed the higher education institutions a central role within the national research systems. Consequently, the universities became the cornerstone in terms of research, expertise, instrumentation and education.

The oil crisis (1973) and subsequent period of economic recession in the West which lasted for almost the entire 1970's had profound implications for research policy and universities in particular. The funds for research have been greatly reduced and have been redirected to save the industries affected by the recession (Carpentier, 2006). It was a period characterized by selective interventions in the industrial sector and new attempts to redefine science and technological policies. The poor economic performance rested on the constant decrease of the technological innovation rate. Consolidating the technological pillars and creating high added value products and services were considered by the United States as top prorities objectives in their attempt to regain their industrial competitiveness, especially in a time when Japan was aiming at the global economic supremacy (Ikenberry, 1986).

The third development stage has been triggered in 1980's by what Roobeeck named "a race for the technological development between the industrialized countries" (Roobeeck, 1990, p. 4). The main characteristic of this epoch was an intense attention devoted to advanced knowledge, high-tech and innovation and to a more efficient and constructive cooperation between science and technology. A new wave of strategic research and technological development programmes focusing on the information technology, biotechnology and other specific fields that could bring national competitive advantage, were launched in this decade. This efforts were visible not only in the US or Japan, but also in Western Europe. For instance, the European Community launched the first, out of eight subsequent programmes for research and technological development, designed to stimulate and support research in the common European space, in 1984. The goal of these programmes was to promote technology transfer, the creation of common research spaces and the intensification of mobilities programmes across the continent. This context attributed higher education institutions a new regional dimension. While national research

institutes were few and mostly centralized, the new implemented educational policy developed a decentralized network of higher education institutions, with stimulating role in regional innovation (Fotea, 2014).

Role of Higher Education Institutions within the Theories and Policies of Regional Development

In the second part of 19th century, the transition from agriculture to industrial society generated significant demographic, economic and social changes. Social protection, territorial planning and development of transport infrastructure were among the new objectives assumed by national governments. First attempts to create a regional development policy go back to the period between the World War I and World War II. One of the most well-known regional policy was the "New Deal" Program initiated by the American president Francklin Roosevelt which was implemented between 1933-1936. The Program launched a new series of economic measures that aimed at reducing unemployment, raising the living standards and stimulating new reforms in various sectors of the economy such as agriculture, industry and banking (Schlesinger, 2003). Between 1929-1933, similar measures were implemented in other countries affected by the Great Depression. Under these circumstances, special attention was given to the territorial planning process, which was designed to stimulate economic development and create new jobs in the areas most affected by the crisis. Even though these plans were postponed by the World War II, the process continued and expanded after the war as part of more larger and complex modernization policies. As a consequence, we can consider institutionalizing the regional development policies is mostly a post-war phenomenon.

Some authors (North, 1994; Williamson, 2008; Broadberry & Gupta, 2006) consider that these circumstances are not new. Uneven economic development both at country and regional level has been a permanent an undeniable reality over the course of time. Developed regions, with a strong and dynamic economy, low unemployment rates and high standard of living and underdeveloped regions, where the poor economies and failed development attempts had always co-existed throughout history. Still, what were the core elements that urged the creation of new regional development policies? How the higher education institutions contributed to this process?

Higher Education Institution – Source of Knowledge and Innovation

During an unstable economic and political context, higher education institutions made an impact within the regional policies starting with the 1980s. Although they had long played a role in political consultancy, it was then that research was being perceived as a new and valuable source of innovation and realignment. Taking advantage of this fortunate context, many higher education institutions patented their inventions and established technology transfer offices. It was a period characterized by a strong cooperation between knowledge institutions and the commercial and industrial sector.. To consolidate this partnership, some functions were systematically expanded and a series of common research programs were developed. Moreover, massive investments in small and medium companies were made, in order to help them efficiently and use the new knowledge and technology to increase their absorbance capacity and to develop their habit of using the services provided by the higher education institutions.

The new ideas related to innovation influenced the regional policies of the '90's decisively. The policy was defined as an innovation policy, in which innovation was perceived as a system. In the beginning, following the globalization effects, the new concept of innovation system was linked rather to national innovation system than the regional ones. Freeman thinks that the starting point was the attempt to understand the characteristics of the Japanese growth model (Freeman, 1987). In Lundvall's opinion, not before long it was concluded that each country created an innovation system based both on a specific model of industrial specialization and on particular characteristics related to the research and education system, financial system and labour market regulations (Lundvall, 1992). At the time, globalization was seen as a complex process which was minimizing the role and authority of national borders, with companies succeeding in leaving the previous obligations and relations behind and local and regional systems were disintegrating. This process took place at different levels, involving the simultaneous development of various strategies and initiatives. Robertson's concept of "glocalization" launched the idea that globalization will be accompanied by a process of regionalization (Robertson, 1992). Regions will gradually become important spaces of innovation. The creation of a regional economic development policy was based on this interpretation.

Theoretical Framework of The Regional Development Policies

The creation and implementation of regional development policies was based on two main approaches: the classical approach (Solow, 1956) and the endogenous approach (Lucas, 1988).

The classic approach used various theories such as the theory of economic base, new trade theory (Andrews, 1953), theory of growth poles (Krugman, 1992), center-periphery model (Prebish, 1949), theory of production cycles (King, Plosser & Rebelo, 1988), theory of flexible production (Paul & Jonathan, 1991) or the theory of learning regions (Cook & Schienstock, 2000) in order to emphasize the importance of regional innovation, giving birth to many controversies regarding the way in which a relevant regional borderline can be drawn. In practice, the solution to this problem was determined by establishing predefined political and administrative borders. In this context two theories proved to be helpful: theory of industrial clusters and the theory of regional innovation systems. Due to the political recognition that these two theories benefited, gave higher education institutions, as the main research and education institutions, a special status.

Michael Porter's theory defines industrial clusters as being geographical agglomerations which gather firms that are interconnected with related industries, specialized supplier and associated institutions (Porter, 2001, p. 7). The theory emphasizes competitiveness and captures the complexity of the value added generating activities that link together different levels of production in such way that each level produces value added to the whole process. In order to explain the connections between industry and business environment, as well as the rivalry and cooperation between companies to raise the standard of the cluster under the pressure of innovating, collaborating and exchanging knowledge, Porter created his famous diamond. The popularity of the regional innovation system concept is closely related to the creation of regional clusters, but also to regional innovation policies. The region was started to be considered the most appropriate level at which knowledge and innovation based economies can develop. The new concept was born in a time when regional policies were systematically promoting the localization of learning

processes in order to increase the competitive advantage of regions. The reason behind the development of specific political measures within the regional innovation systems was the increase in the capacity and performance of local companies and the improvement of the business environment. Once these coordinates are established, Cooke points out the importance of promoting the interactions between various innovative actors such as companies, universities and research centers (Cooke, 2001). From this point on, the role of knowledge institutions is clearly defined. Knowledge and its carriers together with the communication channels and the mechanisms of learning and disseminating knowledge become essential.

In the last decade of the 20th century the new approach of alternative economic development was born. It emphasized the importance of social development and human capital increase, as well as the role of the local communities in the process of regional development (Lucas, 1988; Romer, 1994). The new vision represented a response to the classic regional development theories and to the hypothesis that only technological progress alone was enough to explain economic growth, as ulterior research were going to prove. Therefore, the endogenous approach represents also an attempt to correct the classic theories by bringing forward models that regard long term effects of growth as endogenous variables of the model. Economic growth has an endogenous feature related either to a competitive accumulation of capital or to a massive investment in human capital and an information exchange between companies. As a consequence, the production of knowledge, innovation and the learning process based on exchange of knowledge between companies, communities and regions became essential components of regional and national governmental policies. Nevertheless, endogenous development is not associated with a precise spatial scale. Therefore it cannot be considered a synonym for local development. One of the main characteristics of endogenous development is economic growth based on the creation, development and use of internal resources at every spatial level: local, regional, national and global. Regions and cities with an intense productive sector are the ones creating fortunate conditions for innovation and knowledge flow between organizations, stimulating the labour force learning process within the same industrial sector. Such a mechanism of knowledge dissemination and innovative ideas circulation inside a city or a region acts like a "shield" that protects local industry from external competitors.

What is the role of higher education institutions within this endogenous approach of regional economic development? The new vision stresses the idea of an intense competition which transcends the regional or national space, encompassing the whole global stage. The markets become more dynamic, generating a larger adaptability and flexibility capacity. The evolution of new economy produces a greater influence of the information technology not only on the technical infrastructure, but also on services. These features are propelled at local and regional level throughout qualified labor force, public administration, research institutes and business organization. Within this process, research and education have a decisive role, which offers higher education institutions a privileged status (Glomm & Ravikumar, 1992).

Contribution of Higher Education Institutions to (Regional) Economic Development: Insights from Central and Eastern European Countries

The concept of "knowledge-based economy" fully acknowledges the crucial role that knowledge plays in the process of economic development. Recent theories, especially the new theory of endogenous growth, place knowledge, incorporated in human capital and technological capital (innovation), at the base of the economic growth process. Huggins et al. define the knowledge base of an economy as "the capacity to create and innovate ideas, thoughts and products and to transform them to economic development, that is to increase the value of regional economies and to generate prosperity" (Huggins et al., 2008, p. 322). Knowledge is considered a key factor in achieving competitiveness not only for production units, but also for territories (regions), which are more and more regarded as economic entities within which knowledge brings competitive advantage. Even though there are various opinions related to the positive effects of knowledge within the process of economic development, one of the consequences that everyone agrees with, both in theory and in practice, is that higher education institutions, due to their teaching and research activities are the most important sources of modern production, dissemination and transfer of knowledge in the surrounding environment.

In an attempt to assess global competitiveness, World Economic Forum has issued over the last years, under the coordination of Professor Schwab, *The Global Competitiveness Report* (Schwab, 2011, 2012, 2013, 2014). Regarded as an important tool by policymakers in many countries, GCR clearly illustrates the important contribution that higher education institutions have to economic sustainability and development. Each year, the GCR measures the 12 pillars that drive competitiveness and growth in a country. Out of these 12 pillars, 2 pillars - higher education and training and innovation – rely on the education and research activities performed by higher education institutions. As the GCR explains, quality higher education and training is crucial for economies that want to move up the value chain beyond simple production processes and products. In particular, today's globalizing economy requires countries to nurture pools of well-educated workers who are able to perform complex tasks and adapt rapidly to their changing environment and the evolving needs of the production system. (Schwab, 2014, p. 7). In the long run, standards of living can be largely enhanced by technological innovation. Technological breakthroughs have been at the basis of many of the productivity gains that our economies have historically experienced. Innovation is particularly important for economies as they approach the frontiers of knowledge, and the possibility of generating more value by merely integrating and adapting exogenous technologies tends to disappear. Although less-advanced countries can still improve their productivity by adopting existing technologies or making incremental improvements in other areas, for those that have reached the innovation stage of development this is no longer sufficient for increasing productivity. Firms in these countries must design and develop cutting-edge products and processes to maintain a competitive edge and move toward even higher value-added activities. This progression requires an environment that is conducive to innovative activity and supported by both the public and the private sectors. In particular, it means sufficient investment in research and development (R&D), especially by the private sector; the presence of high-quality scientific research institutions that can generate the basic knowledge needed to

build the new technologies; extensive collaboration in research and technological developments between higher education institutions and industry. In the light of the recent sluggish recovery and rising fiscal pressures faced by advanced economies, it is important that public and private sectors resist pressures to cut back on the R&D spending that will be so critical for sustainable growth into the future. (Schwab, 2014, p.8).

In order to clearly point out the contribution of higher education institutions to the economic development and sustainability we will take a look at the two pillars -higher education and training and innovation – in four Central and Eastern European countries: Moldova, Romania, Poland and the Czech Republic. Each of the countries selected is placed in different stages of economic development as shown in Table 1.

Table 1. GCR ranking and score evolution of Moldova, Romania, Poland and the Czech Republic between 2011-2015

Country/Stage of economic development	GCR 2011-2012 Rank/Score	GCR 2012–2013 Rank/Score	GCR 2013–2014 Rank/Score	GCR 2014–2015 Rank/Score
Moldova (1-2)	93 (3.9)	87 (3.9)	89 (3.9)	82 (4.0)
Romania (2)	77 (4.1)	78 (4.1)	76 (4.1)	59 (4.3)
Poland (2-3)	41 (4.5)	41 (4.5)	41 (4.5)	43 (4.5)
Czech Republic (3)	38 (4.5)	39 (4.5)	46 (4.4)	37 (4.5)

Source: Schwab 2011, 2012, 2013, 2014.

As shown in Table 1, Moldova, in transition from the factor driven to efficiency driven economy (1-2) is the lowest ranked European country and, implicitly Eastern European country in the GCR, improving its overall score with just a 0.1 over the last four years. Among the four countries, Romania, an efficiency driven economy (2) had the best improvement score of 0.2 over the last years, which enabled it to climb 18 positions from 77th place in 2011-2012 to 59th in 2014-2015. Poland, a country in transition from

Table 2. Higher education and training pillar between 2011-2015 in Moldova

5th pillar: Higher education and training	GCR 2011-2012	GCR 2012-2013	GCR 2013-2014	GCR 2014-2015
Secondary education enrolment, gross (%)	69 (88.1)	74 (88.0)	77 (87.7)	75 (88.2)
Tertiary education enrolment, gross (%)	62 (38.3)	66 (38.1)	66 (39.4)	69 (40.1)
Quality of the education system	102 (3.2)	103 (3.2)	115 (3.0)	103 (3.2)
Quality of math and science education	69 (4.0)	64 (4.1)	74 (4.1)	80 (4.0)
Quality of management schools	124 (3.3)	121 (3.3)	133 (3.2)	125 (3.2)
Internet access in schools	63 (4.3)	61 (4.4)	56 (4.6)	49 (4.9)
Availability of research and training services	101 (3.5)	114 (3.4)	128 (3.3)	119 (3.3)
Extent of staff training	118 (3.3)	122 (3.2)	126 (3.2)	120 (3.4)

Source: Schwab (2011, 2012, 2013,2014).

efficiency driven to innovation driven economy (2-3) and the Czech Republic, an innovation driven economy (3) have had a relative constant score over this period.

If we analyze the *higher education and training* pillar in the four countries we will notice Moldova (40.1%) and Romania (51.6%) have the lowest tertiary education enrolment compared to Poland (73.2%) and to the Czech Republic (64.2%).

Moldova has by far the lowest score in terms of quality of the education system, math and science education, management schools, availability of research training services and extent of staff training (see Table 2).

Table 3. Higher education and training pillar between 2011-2015 in Romania

5th pillar: Higher education and training	GCR 2011-2012	GCR 2012-2013	GCR 2013-2014	GCR 2014-2015
Secondary education enrolment, gross (%)	56 (91.6)	42 (97.2)	46 (97.2)	57 (95.0)
Tertiary education enrolment, gross (%)	23 (65.6)	39 (58.8)	39 (58.8)	53 (51.6)
Quality of the education system	90 (3.3)	108 (3.1)	99 (3.3)	61 (3.8)
Quality of math and science education	45 (4.5)	55 (4.2)	57 (4.3)	31 (4.7)
Quality of management schools	92 (3.8)	112 (3.5)	104 (3.7)	74 (4.2)
Internet access in schools	58 (4.4)	64 (4.3)	60 (4.5)	53 (4.8)
Availability of research and training services	112 (3.3)	112 (3.5)	91 (3.9)	68 (4.2)
Extent of staff training	79 (3.8)	111 (3.4)	134 (3.1)	111 (3.6)

Source: Schwab (2011, 2012, 2013, 2014).

Table 4. Higher education and training pillar between 2011-2015 in Poland

5th pillar: Higher education and training	GCR 2011-2012	GCR 2012-2013	GCR 2013-2014	GCR 2014-2015
Secondary education enrolment, gross (%)	28 (99.6)	45 (97.0)	48 (97.0)	45 (97.7)
Tertiary education enrolment, gross (%)	19 (69.4)	21 (70.5)	19 (72.4)	23 (73.2)
Quality of the education system	71 (3.7)	68 (3.7)	87 (3.4)	79 (3.6)
Quality of math and science education	52 (4.3)	59 (4.1)	69 (4.1)	50 (4.4)
Quality of management schools	78 (4.0)	85 (4.0)	89 (4.0)	84 (4.0)
Internet access in schools	48 (4.7)	53 (4.5)	55 (4.6)	50 (4.9)
Availability of research and training services	27 (5.0)	30 (4.8)	33 (4.8)	31 (4.8)
Extent of staff training	55 (4.1)	59 (4.0)	75 (4.0)	72 (4.0)

Source: Schwab (2011, 2012, 2013, 2014).

The Czech Republic has the highest score in terms of availability of research and training services, extent of staff training and quality of management schools (see Table 5), while Romania has made significant progress in the quality of the education system and quality of math and science education over the last four years (see Table 3).

Table 5. Higher education and training pillar between 2011-2015 in the Czech Republic

5th pillar: Higher education and training	GCR 2011-2012	GCR 2012-2013	GCR 2013-2014	GCR 2014-2015
Secondary education enrolment, gross (%)	46 (94.9)	63 (90.4)	66 (90,8)	49 (96.6)
Tertiary education enrolment, gross (%)	34 (58.3)	32 (60.7)	29 (64.9)	32 (64.2)
Quality of the education system	49 (4.1)	59 (3.9)	67 (3.7)	77 (3.6)
Quality of math and science education	66 (4.1)	78 (3.8)	83 (4.0)	74 (.4.1)
Quality of management schools	82 (4.0)	95 (3.8)	90 (4.0)	68 (4.3)
Internet access in schools	21 (5.8)	21 (5.8)	24 (5.8)	27 (5.8)
Availability of research and training services	20 (5.2)	23 (5.1)	26 (5.0)	27 (4.9)
Extent of staff training	39 (4.3)	48 (4.2)	68 (4.0)	55 (4.1)

Source: Schwab 2011, 2012, 2013, 2014.

Countries like the Czech Republic and Poland, with a greater score in higher education and training benefit from higher levels of human capital. This is because on one hand, higher education institutions not only increase the level of human capital following the education process, but they also have a positive impact on the degree of using the human capital available. Higher educated and trained graduates have a higher activity and occupation rate, but also a lower unemployment rate compared to individuals with inferior levels of education, which proves that human capital generated in higher

Table 6. Innovation pillar between 2011-2015 in Moldova

12th pillar: Innovation	GCR 2011-2012	GCR 2012-2013	GCR 2013-2014	GCR 2014-2015
Capacity for innovation	107 (2.6)	122 (2.5)	134 (2.7)	128 (3.0)
Quality of scientific research institutions	122 (2.7)	131 (2.4)	132 (2.6)	121 (2.7)
Company spending on R&D	137 (2.1)	140 (2.1)	142 (2.1)	135 (2.3)
University-industry collaboration in R&D	124 (2.7)	124 (2.8)	129 (2.7)	124 (2.7)
Gov't procurement of advanced tech products	132 (2.6)	136 (2.6)	139 (2.5)	127 (2.7)
Availability of scientists and engineers	122 (3.3)	131 (3.2)	131(3.1)	128 (3.1)
PCT patents, applications/million population	90 (0.0)	69 (0.7)	81 (0.4)	73 (0.8)

Source: Schwab (2011, 2012, 2013, 2014).

education institutions has a greater probability of being available on the labor market and a higher chance of being used in productive ways. So, higher education and training not only increases the individual cognitive and intellectual level, but has a greater impact on the regional or national labour market. The human capital generated in higher education institutions raises the occupation rate and the activity rate of its graduates, providing them with a higher sectorial and geographical mobility due to the skills and competences acquired during the academic years. The contribution of higher education institutions to the increase of human capital has a double value. First, because it develops it and secondly, because it increases the probability of its productive use, with positive effects on the economic development of its surrounding environment.

If we take a look at the Innovation pillar (see Table 9), we can see that the Czech Republic has the biggest innovation capacity with score of 4.6, followed by Poland (3.8) and Romania (3.7). Even though it has improved its score in the last four years, Moldova still has one of the lowest innovation capacity in the ranking (128th position) with a score of 3.0 (see Table 6).

In terms of the quality of its scientific research institutions Romania has made a significant improvement over the last four years, from a score of 3.2 to 4.0, advancing 36 places in the GCR (see Table 7). The Czech Republic has the best scientific research institutions with a score of 4.5 (see Table 9), while Moldova has not improved the quality of its scientific research institutions over the last four years (see Table 6).

Table 7. Innovation pillar between 2011-2015 in Romania

12th pillar: Innovation	GCI 2011-2012	GCI 2012-2013	GCI 2013-2014	GCR 2014-2015
Capacity for innovation	78 (2.9)	77 (3.1)	90 (3.4)	68 (3.7)
Quality of scientific research institutions	91 (3.2)	84 (3.4)	64 (3.7)	55 (4.0)
Company spending on R&D	87 (2.9)	87 (2.9)	104 (2.8)	65 (3.1)
University-industry collaboration in R&D	115 (3.0)	113 (3.1)	88 (3.3)	71 (3.6)
Gov't procurement of advanced tech products	111 (3.1)	114 (3.1)	99 (3.2)	75 (3.4)
Availability of scientists and engineers	59 (4.2)	82 (3.8)	99 (3.6)	72 (4.0)
PCT patents, applications/million population	62 (0.8)	56 (1.9)	55 (2.0)	56 (2.2)

Source: Schwab (2011, 2012, 2013, 2014).

As an innovation driven economy, the Czech Republic has the best score in terms of company spending on R&D, university-industry collaboration, availability of scientists and engineers and in PCT patents and applications (see Table 9). Moldova has the lowest stores and over the last years in Moldova, the collaboration between universities and industry in R&D sector has not made any improvements (see Table 6).

Romania has made an important progress by improving company spending on R&D, university-industry collaboration in R&D, government procurement of advanced tech

products and PCT patents and applications. (see Table 7), while the only real improvement that Poland has made from 2011 to 2015 is to raise its innovation capacity and the number of PCT patents and applications (see Table 8).

Table 8. Innovation pillar between 2011-2015 in Poland

12th pillar: Innovation	GCI 2011-2012	GCI 2012-2013	GCI 2013-2014	GCI 2014-2015
Capacity for innovation	49 (3.3)	54 (3.3)	62 (3.6)	67 (3.8)
Quality of scientific research institutions	44 (4.1)	45 (4.1)	55 (4.0)	63 (3.9)
Company spending on R&D	80 (2.9)	88 (2.9)	103 (2.8)	98 (2.8)
University-industry collaboration in R&D	65 (3.6)	67 (3.6)	72 (3.5)	73 (3.5)
Gov't procurement of advanced tech products	100 (3.3)	101 (3.2)	103 (3.1)	89 (3.2)
Availability of scientists and engineers	67 (4.1)	58 (4.2)	66 (4.2)	62 (4.2)
PCT patents, applications/million population	56 (1.0)	43 (5.8)	40 (6.9)	40 (7.1)

Source: Schwab (2011, 2012, 2013, 2014).

Table 9. Innovation pillar between 2011-2015 in the Czech Republic

12th pillar: Innovation	GCR 2011-2012	GCR 2012-2013	GCR 2013-2014	GCR 2014-2015
Capacity for innovation	25 (4.0)	22 (4.1)	26 (4.3)	28 (4.6)
Quality of scientific research institutions	26 (4.8)	26 (4.9)	26 (4.9)	36 (4.5)
Company spending on R&D	28 (3.9)	28 (3.9)	32 (3.8)	31 (3.7)
University-industry collaboration in R&D	30 (4.5)	28 (4.5)	32 (4.4)	42 (4.0)
Gov't procurement of advanced tech products	81 (3.5)	122(2.9)	124 (2.8)	107 (3.0)
Availability of scientists and engineers	42 (4.5)	43 (4.5)	64 (4.2)	55 (4.2)
PCT patents, applications/million population	33 (7.1)	28 (18.4)	29 (15.3)	30 (15.8)

Source: Schwab (2011, 2012, 2013, 2014).

The current context of the "knowledge society", in which higher education institutions transfer knowledge to the surrounding environment, contributing to the technological development and providing practical solutions for the economic agents and for society reflects their role of entrepreneurial institutions. As shown above, higher education institutions have the capacity to stimulate entrepreneurial activities both directly, following their own initiatives and actions as well as indirectly, by supporting and facilitating an innovative environment for socio-economic entrepreneurs. Moreover, following its academic education, its graduates can develop entrepreneurial activities.

CONCLUSIONS

History holds evidence that HEIs and their surrounding environment have been interacting and influencing each other for more than nine centuries with great mutual benefits. Due to their inexhaustible resources, large scale influence and their social, cultural and economic involvement, higher education institutions have played a decisive role in the development of our societies. Accelerated socio-economic transformations, especially in the last decades, often encompassed in concepts like “knowledge society” or “knowledge-based economy” point out the great importance of knowledge in the process of economic growth and development. As the most important institutions involved in the production, dissemination and transfer of knowledge, higher education institutions play a vital role within this process. The economic mechanisms that they develop regionally, following their interaction with the surrounding environment can represent “engines” of economic development.

Even though HEIs are one of key elements that can drive the economic competitiveness of a territory, we must not forget there are numerous other factors to which they relate and, in a larger or smaller proportion, depend on. Institutions, infrastructure, macroeconomic environment, health and education level of the population, market size, efficiency of the goods, labour and financial markets, technological readiness and business sophistication are all major pillars on which the economic competitiveness of a country or region also relies (Schwab, 2011, 2012, 2013, 2014). In order to fully assess and understand the contribution of HEIs to economic competitiveness and development, future research should also determine and understand the way in which HEIs interact with each of this factors. The different political and socio-economic context of Moldova, the lowest ranked country and the Czech Republic, the best ranked country in our analysis prove the strong interdependency between the above mentioned factors. Moldova has been experiencing tremendous political and socio-economic unrest over the last year. Unstable macroeconomic environment, highly corrupt institutions, poor infrastructure, low percentage of foreign investments, high unemployment rate and not always assured property rights have all had a negative impact on the civil society, forcing the young population to leave the country. These circumstances have also influenced the trajectory of higher education institutions, blocking their development over the past years and jeopardizing its future evolution. At the opposite side, a stable political and socio-economic environment where private property is guaranteed, along with highly developed infrastructure, functional labour and financial markets and low unemployment rate have enabled the Czech Republic to build a strong political and socio-economic basis on which higher education institutions can perform steady and healthy long term progress.

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