CONTRIBUTION OF HIGHER EDUCATION IN REGIONAL COMPETITIVENESS AND DEVELOPMENT: CASE STUDY OF KAZAKHSTAN

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Abstract. In this paper, the role of the higher education in the regional development and competitiveness is analysed on the case of Kazakhstan as a country of Central Asian region. The goal of the research is to investigate the influence of higher education on the global and regional competitiveness, basing on the case study of Kazakhstan and as the country of the region of Central Asia. Since there is no unified approach how to measure the impact of higher education on the competitiveness of the country and regional level, the goal of this research is also to contribute in building a theoretical framework for the assessment of the influence of higher education on the competitiveness. The comparative study of the higher education and innovation indicators, using the framework of the Global Competitiveness Index, is performed for Kazakhstan in comparison with other Central Asia countries. In parallel, we discuss the influence of higher education reforms in Kazakhstan after joining the Bologna process on. Basing on our research, we can conclude that the reforms in higher education sector in Kazakhstan including the fast introduction of the Bologna principles, as well as other government policy initiatives positively influenced the competitiveness of the Kazakhstan, giving the highest place in GCI among the Central Asian countries and leading to the entrance of 6 Kazakhstani universities in the first 1000 best universities worldwide according to the QS World University Ranking. In parallel, the recommendations for further development of the higher education sector are given. Key findings are relevant to the policy makers and managers for designing the development strategies for rising the competitiveness. For policy makers, the authors advise to use wider range of indicators. The indicators used in CGI for measuring impact of higher education on the competitiveness should be complemented with other indicators like employability or those indicators applied in university rankings. The influence of the reforms of the Bologna process on the global competitiveness needs further investigation.

Key words: competitiveness, higher education, innovation, Kazakhstan, higher education indicators, benchmarking of higher education, Central Asia.

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Introduction

To be competitive in all levels – individual, national level, regional and world level – is becoming more and more important in our globalised world. However, the competitiveness is difficult to measure (Collignon, 2012). There are several methods how the global and regional competitiveness is measured. The most common indicator is relative unit labour costs (ULC), i.e. the cost of labour compensation, including taxes and social security, per unit of output (CER Rapporto Europa, 2011). Other popular international projects can be mentioned: The World Competitiveness Yearbook, The World Economic Forum's (WEF) Global Competitiveness Report (GCR), OECD's Economic Outlook (OECD, 2017). Concerning regional competitiveness, the concept is more elusive and contested (Borožan, 2008). According to the simplest definition, regional competitiveness may be defined as the ability of some region to compete with one another in some way, both within and between nations, to grow and prosper in economic terms (Borožan, 2008). However, there are not so many works concerning the impact of higher education (HE) on the global competitiveness. Only WEF propose more sophisticated approach for measuring the influence of HE on the global competitiveness. WEF defines competitiveness as the set of institutions, policies, and factors that determine the level of productivity of an economy, which in turn sets the level of prosperity that the economy can achieve. In addition, in the HE sector, the benchmarking of HE is still under the discussion, especially in the light of the fast developing field of "rankology" (Millot, 2015; Spitsin 2016; Gafurov, 2017).

No doubts that educated human capital is crucial for the rising of the countries' and region's economic development and competitiveness (Bauk, 2014). Main actors for preparation of the competitive and skilled workforce for both, public and private sector, are all type of HE institutions. Nowadays, HE institutions are also the main drivers of the science and innovation.

Especially HE and R&D are important because of the Fourth Industrial Revolution (FIR) (Shwab, 2016). FIR, basing on digitalisation, artificial intelligence, biotechnology, robotics, the Internet of Things, 3D printing etc. is characterised by wide spreading of technologies. The dominating role of technologies leads to the situation when the growth of every economy is more than ever dependent on the possibilities to develop educated human capital, to ensure high level of technology development, knowledge transfer and innovation in all fields, not only in production but also in other sectors lies services, health, governance, education, finances etc. Since the role of the technologies is growing, the HE quality is becoming more and more important. In these conditions, HE institutions are facing with high pressure to become more competitive from the both sides, society and government; often the requirement is expressed in the form to reach higher place in some of the university rankings.

Research goal: to investigate the influence of higher education on the global and regional competitiveness, basing on the case study of Kazakhstan and as the country of the region of Central Asia, and to contribute in building a theoretical framework for the assessment the indicators of the influence of higher education. The goal is also, basing on the analysis of the competitiveness indicators of HE, to outline the main recommendations for future development of the HE sector in Kazakhstan.

Research design and approach

In this paper, the case study method, using analysis of documents, including policy documents and statistical data, is used (Yin, 2003a). For this investigation, a case study design fits well because there is a need to find out more about conditions how HE and its reforms influence the global competitiveness of a country in developing region. For our comparative analysis, we use the competitiveness definition as developed by the WEF (World Economic Forum, 2017), building on Schwab's work of 1979 (Shwab, 2016), the WEF has used the Global Competitiveness Index (GCI) later developed by Xavier Salai-Martin in collaboration with the Forum since 2005.

The study has following tasks: 1) to study comparatively the indicators measuring the higher education and innovation effect on competitiveness for the region of Central Asia (CA) (for countries where data are available - Kazakhstan, Kyrgyz Republic, Tajikistan); 2) to derive more detailed qualitative analysis of the HE policy and reforms in Kazakhstan after entrance in Bologna process in introducing the Bologna process reforms; 3) to develop the conclusions about the framework indicators; 4) to derive the recommendations for the policy makers for future development of the HE sector.

The novelty of the research is connected with the use of indicators adapted from the framework of GCI for the comparative investigation of the HE performance in CA. The novelty is also in analysing the CA region because there are few internationally available data about it.

Results and discussion

1. Higher education and innovation related competitiveness indicators

The regular Global Competitiveness Report (GCR, 2018) presents a set of indicators in three principal categories or also called sub-indexes and twelve policy domains (pillars) for 137

economies. The GCI combines 114 indicators that capture concepts that matter for productivity and long-term prosperity (World Economy report, 2017). These indicators are grouped into 12 pillars: 1st - institutions, 2nd - infrastructure, 3rd - macroeconomic environment, 4th - health and primary education, 5th - higher education and training, 6th - goods market efficiency, 7th - labour market efficiency, 8th - financial market development, 9th - technological readiness, 10th - market size, 11th - business sophistication, and 12th - innovation. These pillars are organized into three sub-indexes: basic requirements, efficiency enhancers, and innovation and sophistication factors. The three sub-indexes are given different weights in the calculation of the overall Index, depending on each economy's stage of development, as determined by its GDP per capita and the share of exports represented by raw materials. According to GCI, economies are divided in factor-driven, efficiency driven, innovation-driven economies (The Global Competitiveness report, 2017).

Higher education and training is included in the 5th pillar of the GCI: 1) secondary education enrolment rate, 2) tertiary education enrolment rate, 3) quality of education system, 4) quality of math and science education, 5) quality of management schools, 6) Internet access in schools, 7) local availability of specialised training services, 8) extent of staff training.

Innovation that is closely related to the science is included in the 12th pillar. Looking into the detail, sub-indicators of this pillar are: 1) capacity for innovation, 2) quality of scientific institutions, 3) company spending on R&D, 4) university – industry collaboration in R&D, 5) government procurement of advanced technology products, 6) availability of scientists and engineers, 7) number of PCT patents application per million population. The role of innovation is widely discussed in the report. Currently, WEF is exploring new ways of assessing innovation, human capital, and competitiveness at different stages of development; however, it is clear that HE, science and innovation are crucial drives for being competitive.

2. Competitiveness characteristics of the HE in Kazakhstan in comparison with Kyrgyz Republic and Tajikistan

Having deeper look on the competitiveness indicators of the CA economies, Kazakhstan has the highest score 4,32 in 2017-2018, giving 57th place out from 137 countries, Kyrgyz Republic - 102th (3.9) place, Tajikistan 70th place (4.31). Uzbekistan and Turkmenistan are not included in WER. The score of Kazakhstan is slightly declining - it was 4.4 in years 2013-2015, 4.5 in the year 2015-2016, again 4.4 in 2016- 2017, and 4.3 in 2017-2018. Kazakhstan has lost places almost exclusively because of the worsened situation of public finance, linked to the loss of oil export revenues (The Global Competitiveness Report, 2017). If we compare these data with the Gross Domestic Product (GDP) per capita, we can see a correlation: for Kazakhstan, it is 7452.8 US\$, for Kyrgyz Republic – 1072.7 US\$, for Tajikistan – 799.8 US\$ (The Global Competitiveness Report, 2017).

For estimating the impact of the HE sector to the competitiveness, we investigated the fifth pillar of GCI "Higher education and training". For Kazakhstan, there is the 56th place with the score 4.6 which is quite good. The leader of the fifth Higher education and training pillar with the score 6.3 is Singapore. Second place is taken by Finland (6.2), 3rd place – the United States (6.1) followed by the Netherlands (6.1), Switzerland (6.1). In Fig.1, the comparison of the indicators for the HE and training sector for 3 CA countries – Kazakhstan, Kyrgyz Republic, Tajikistan and pillar leaders – Singapore (1st place) and Finland (2nd place) is given.

Source: author's interpretation based on GCI 2017-2018

Fig. 1. Values of the Higher Education and Training competitiveness indicators for selected countries.

If we look in detail (Figure 1), then the best place for Kazakhstan is for the secondary education enrolment rate (gross, in %) - 18th place with fast growing trend. What concerns the tertiary education enrolment rate it is higher than in other CA countries, however the developed countries the rate is 2 times higher.

In the 2015/16 academic year, 127 higher education institutions were operating in Kazakhstan, of which five were national institutes of HE, 19 institutes, 20 academies and 83 universities. Almost two thirds of institutions of higher education, or 77 institutions, are privately owned, and another 50 higher educational institutions are state-owned. There are also five branches of foreign higher educational institutions in the country (EnergyProm, 2016). In recent years, according to the education reform launched in 2012, the number of higher educational institutions was planned to decrease, and the institutions themselves were optimized. The number of students (to 459.4 thousand people in 2015/16 academic year), as well as the faculty (to 38.1 thousand academic staff) also decreased (EnergyProm, 2016). We can conclude that the reform with the

intention to decrease the number of HE was rather efficiency driven because the high number of HE institutions contributes to the accessibility of education.

According to Figure 1, there is also a good evaluation of the quality of education and quality of the math and science education. All indicators together give the best evaluation of the Kazakhstani HE in comparison with the other two CA countries.

Due to limited space, in this paper, we do not focus on the benchmarking tools, used by the university rankings but it is interesting to mention, that Kazakhstan is the only CA country with universities included in top 1000 universities table, according to the QS World University Ranking 2018 (QS WUR, 2018). The highest place is for Al Farabi Kazakh National university (236th place), next is L.N.Gumilov Eurasian National University (ENU) with 336th place, Kazakh National Research Technical University after K.I.Satpayev 411-420, Abai Kazakh National Pedagogical University 491-500, Auezov South Kazakhstan State University 501-550, Karaganda State university 651-700, Kazakh British Technical university 651-700, Kazakh Ablai Khan University 801-1000 (QS, 2018). To our mind, this can serve as some kind of validation of the approach of the using indicators for HE evaluation from the GCI framework. Both frameworks give similar qualitative results.

3. Modernisation of HE in Kazakhstan after joining the Bologna process

Since joining the Bologna process in 2010, Kazakhstan is successful in fast introducing the modernisation agenda of higher education by implementation the principles of the Bologna process and autonomy of the universities. Being the first Central Asian state joining the Bologna process, Kazakhstan was recognized as a full member of the European Higher Education Area (EHEA). The changes in HE system of Kazakhstan were fast and dramatic. For example, more than 60 Kazakhstani universities signed The Great Charter of universities; the universities implemented the three-level system: Bachelor - Master – PhD. Master programmes were opened in 118 universities (approx. 32 527 students, of which 16 220 study by the means of the state order) (Independent Kazakh Agency for quality assurance, 2017). The European credit points - ECTS - has been introduced as a basis for the transfer of credits during academic mobility of students. The Ministry of Education and Science of the Republic of Kazakhstan (MES RK) allocates funding for academic mobility of faculty and students. According to the official data of the Centre of the Bologna process and academic mobility, in 2014, 52 Kazakhstani universities invited 1726 foreign researchers (in 2013 – 1533 researchers, 2012 – 1 349 researchers, 2011 – 1717 researchers, 2010 – 418 researchers, 2009 – 389 researchers). As good example of the fast reforms, it has to be noted that both Kazakh accreditation agencies (the Independent Kazakh Quality Assurance Agency in Education (IQAA) and the Independent agency for accreditation and rating) are members of the ENQA (European Network of Quality Assurance). In the period from 2009 to 2015, IQAA held institutional accreditation of 50 universities and more than 1100 programs. The agency attracted 153 foreign experts from 25 countries, about 1100 national experts, including 190 students and more than 200 employers. Overall, according to the data of the National Report, 66 universities (57 %) out of 115 public universities underwent the national institutional accreditation. To date, 22 Kazakhstani universities (19 %) in 139 specialties of higher and further education underwent international programme accreditation (Independent Kazakh Agency for quality assurance, 2017).

Kazakhstan together with World Bank has developed an agenda for better integration of education, science and industry. Early 2011, in Kazakhstan a new law was passed about Nazarbayevs University, Nazarbayevs Intellectual Schools, and Nazarbayevs fund.

Employability is another important issue in terms of modernisation of HE and reforms of the Bologna process. The participation of HE institutions in the employment of graduates is one of the criteria for an external evaluation of the quality of higher education. Monitoring of the employment of university graduates is conducted in most of the EHEA countries at the national, regional and institutional levels. MES RK jointly with the Ministry of Health and Social Development of the Republic of Kazakhstan (SCPP MHSD RK) (Centre of Bologna process and academic mobility, 2017) hold the annual monitoring of the employment of graduates of higher educational institutions of the Kazakhstan annually. The purpose of this monitoring is to determine the effectiveness of universities in the employment of graduates. In 2016, according to information systems of MES RK and SCPP MHSD RK, the total number of graduates was 71078, 48405 of them were employed. Thus, the overall percentage of the employment of graduates of all universities was 68 % (in 2014, 63 %, in 2015, 70 %). Every university in Kazakhstan is obliged to monitor the employability. For instance, in Table 1 the data of employability for Almaty University of Power Engineering and Telecommunication (AUPET) are given.

Table 1

Employability of the graduates of AUPET

Year	Number of graduates	Total number of employed graduates	Number of graduates employed in profession	Unemployed graduates
2015	1385	1166	1134	16 %
2016	1292	1045	1045	19 %
2017	919	745	590	19 %

Source: author's calculations based on data according to information systems of MES RK and SCPP MHSD RK

Interesting is the fact, that the best result in employment was achieved by graduates of state universities - 72 %, the lowest result of an international university - 30 %. The average result among graduates of national universities is 63 %.

The factor of employability is not directly taken into account in the calculation of the HE competitiveness indicator in the CGI framework. In addition, other important aspects of Bologna process are not taken into account in GCI directly. Maybe they influence the indicators indirectly. The question, how the Bologna reforms influence the global competitiveness needs further investigation.

4. Research and innovation

There are any separate indicators for the research in the GCI framework. However, research is the base for innovation, included in the GCI 12th pillar. In Fig. 2, the values of the indicators of the innovation pillar are shown for CA countries in comparison with Switzerland (top 1 in Innovation pillar) and Finland (4th place).

We can conclude that innovation is one of the weakest sector in Kazakhstan (the 84th place and score 3.2, GCI). Similar situation we have for whole CA. The highest value of innovation indicator is for Tajikistan (3.6). This is a little controversy, taking into account that Tajik universities are not the top 1000 universities in QS WUR. Comparing CA with Switzerland and Finland, the huge difference is in number of patents per million population (Figure 1). The approach of Finland can serve as an example; it includes high levels of investment in human capital and complementary sophisticated innovation environment. It is interesting that the most commonly used indicator to monitor level of R&D worldwide - percentage of state gross domestic product (GDP) devoted to R&D activities - is not included in the CGI 12th pillar. This indicator is included for example in the

ranking tool of the HE systems – Universitas21 (U21, 2017). To our mind, this is an important indicator, which also should be used to monitor competitiveness of innovation system of the countries.

Source: author's interpretation based on GCI 2017-2018

Fig. 2. Innovation indicators for 3 CA countries and leaders Switzerland and Finland.

If we look of the spending to R&D from GDP worldwide, the 2014 regional averages for the share of GDP are: 1.7 % for World, 0.3 % for Arab States; 1.1 % for Central and Eastern Europe; 0.2 % for Central Asia; 2.1 % for East Asia and the Pacific; 0.7 % for Latin America and the Caribbean; 2.4 % for North America and Western Europe; 0.7 % for South and West Asia; 0.4 % for Sub-Saharan Africa (UNESCO, 2017). Research intensity overall is quite low in Kazakhstan; however, it is larger than in other CA countries. Moreover, few industrial enterprises conduct research in Kazakhstan. Only one in eight (12.5 %) of the country's manufacturing firms were active in innovation in 2012, according to a survey by the UNESCO Institute for Statistics (UNESCO, 2017). The role of national state funding in R&D is one of the most important factors for the creating basis for excellence of science; it has to be combined with reforms of research sector, ensuring the effective use of the funds.

Findings, using comparative analyse of the indicators from the framework of GCI, agrees with the conclusions from other sources. For example, also in the OECD report, "OECD Development Pathways Multidimensional Review of Kazakhstan" states that education attainment has progressed continuously in Kazakhstan, but modernisation in terms of competitiveness and internationalisation and research-based education is still an issue (OECD, 2016). Thus, the GCI approach could be used to evaluate the HE influence on competitiveness but in combination with other important indicators, like expenditure for R&D, employability etc.

Conclusions

- 1) In this paper, the influence of the indicators, connected with the HE, was analysed using the framework of GCI for the case of Kazakhstan in comparison with the other CA countries (Kyrgyz Republic and Tajikistan). The indicators, used for the assessment of the HE and training are: 1) secondary education enrolment rate, 2) tertiary education enrolment rate, 3) quality of education system, 4) quality of math and science education, 5) quality of management schools, 6) Internet access in schools, 7) local availability of specialised training services, 8) extent of staff training.
- 2) Kazakhstan is good in attainment and accessibility of HE; enjoyable are good results in math and science education. In general, there are many reforms going on in Kazakhstan in the HE sector that gives confidence that this sector will have fast development and will ensure the rise of competitiveness of the country and region. The system of monitoring the employment of the graduates is well organised in Kazakhstan and it is very important for assessment of quality of higher education.
- 3) Kazakhstan as the first CA country in EHEA introduced the reforms of the Bologna process very fast. The case study of the reforms of HE in Kazakhstan showed great progress in the modernisation of higher education and training sector. Kazakhstan has the highest competitiveness score between the countries of Central Asia, and six Kazakh universities are in the list of 1000 best world universities according to QS WUR 2018.
- 4) The analysis showed also the weakest points the CA region. The modernisation of the higher education sector has to be continued in terms of rising research based education, quality of management and business schools, digitalisation and new educational technologies, autonomy, responsibility, internationalisation.
- 5) Analysing the innovation and research indicators, it can be concluded that to reach the competitiveness of the country and region, as well as to introduce research-based education, the quality and the level of R&D has to be increased. The funding of the R&D sector has to be smart in terms of the way how the funds are distributed to increase the number of competitive scientists and the outputs of the scientific work. In addition, for the effectively working innovation system, cooperation between all its elements is required, especially cooperation between industry and universities and research centres, as well as clever innovation funding schemes.
- 6) Concerning the applicability of the HE and Innovation indicators from GCI framework, it can be concluded, that they do not give full picture of the influence of HE to the competitiveness of the country and region. The framework can be used in addition to other approaches like ranking systems and data used by governments to monitor the quality of HE like data about the employability.

- 7) The influence of the reforms of the Bologna process on the global competitiveness needs further investigation.

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