

The Role of Higher Education in a Knowledge Economy

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Abstract Governments all over the world are striving towards high-skilled and high value economies. Traditional factors of production are no longer considered to be the only contributors to economic development and growth. According to recent theories of development, knowledge has become an important factor for achieving economic development. In order to achieve these goals, a well-educated and highly skilled workforce is necessary. A knowledge economy has increased the demand for a highly educated workforce, especially a workforce with university degree. According to the Lisbon 2020 agenda—the EU development strategy—the EU is striving towards developing a knowledge economy, a sustainable economy based on employment, innovation and education. As Bosnia and Hercegovina (B&H) in the process of European integration, the country should reconsider its economic policies. However, a shift in the economic policy in this country is necessary, not only due to reasons mentioned, but also due to the fact that the current economic situation requires new policies and approaches. Endogenous growth models suggest that a country develops along its own growth path including knowledge or human capital in the model. The development of a knowledge economy in B&H might be the solution to its economic and social problems as well. In order to compare countries and knowledge economy development, the World Bank developed a framework and identified key knowledge economy pillars: education and training, research and innovation, economic incentives and institutional regime, ICT and infrastructure. Education, especially higher education, is important for knowledge economy development. Higher education institutions are important for the creation, dissemination, knowledge transfer, and spillover of knowledge to the industry.

Therefore, this chapter is aiming to determine whether higher education in B&H can be a main contributor and driver of knowledge economy development. The results presented in this chapter have been obtained through empirical research, which has been conducted in B&H in 2012 on a sample of 120 medium and large enterprises and all of the state funded higher education institutions in B&H. The results of our research as well as conclusions and recommendations for further action have been elaborated in this chapter.

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1 Education and Higher Education as a Driver of the Knowledge Economy

The relevance of knowledge, innovation and technology for economic growth has significantly increased in the past few decades. The nineteenth century industrial revolution and twentieth century scientific revolution contributed greater importance of knowledge for economic development. Foundations of the knowledge economy can be found in new growth theories during the late 1950s. During this period of time, Drucker (1998a, b) introduced the term ‘knowledge economy’ that emphasised the relevance of knowledge and technology for economic growth and development. New growth theories are based on work by Romer (1989, 1994) or Solow (1956). For example, endogenous growth theory holds that economic growth is primarily generated by endogenous factors such as human capital, innovation and knowledge. The model developed by Romer is considered to be the foundation of the knowledge economy. A knowledge economy is an economy directly based on production, distribution and utilization of knowledge and information as fundamental enablers of growth, wealth creation and employment.

Contemporary economies have been undergoing major structural changes and adaptation to rules of the knowledge economy, for example output and employment in the ‘high tech’ sector has been increasing in developed economies in the past decade or so. But a knowledge economy cannot be developed without an efficient and modern education system. At the 2012 Bologna Process ministerial Conference (EACEA 2012) it was stated in the Ministerial Communiqué that “higher education is an important part of the solution to current difficulties. Strong and accountable higher education systems provide the foundations for thriving knowledge societies. Higher education should be at the heart of our efforts to overcome the crisis-now more than ever.”

Higher education can contribute to an economy’s increased competitiveness. Higher education has become an important factor of the Lisbon Strategy and Europe 2020 strategy, which are aiming to develop Europe as the world’s most competitive knowledge economy. The education system in a knowledge economy plays a key role in generating conditions for investing in creation and utilization of new knowledge and technologies which are crucial for increasing productivity and achieving economic growth. Many economists emphasise the importance of education, particularly tertiary education in a knowledge economy because of the role of higher education institutions in the creation and transfer of new knowledge. Therefore, OECD countries invest approximately 12 % of their budget into education.

A well educated work force with adequate competencies, skills and knowledge is important in a knowledge economy given that changes in work structure have contributed to increased demand for educated workers. Higher education institutions in a knowledge economy are expected to enable the acquisition of knowledge and development of skills needed in the business world. Increased demand for higher educated workers is expected to continue in the future and higher education

institutions must adequately cope with this challenge. In OECD countries the average unemployment rate of individuals with lower levels of education is higher than the unemployment rate of individuals with tertiary education. According to the OECD's "Education at Glance 2013" (p. 80) individuals with upper secondary education were most affected by unemployment during crisis period from 2008 (12.6 % unemployment rate). However, the unemployment rate of individuals with a tertiary education increased during this period but by a much smaller margin (4.6 % unemployment rate). The knowledge economy is characterised by increased demand for individuals with higher levels of education, which has negative effects on the labour force that has lower qualifications. The OECD 'Job study' indicated that there was a polarisation of the labour force on the labor market and a gap has been identified between labourers with lower and higher levels of education and qualifications (OECD Job study, p. 31). Individuals that enrol in education institutions today will be part of the labour force of the future and therefore they are expected to demonstrate skills and competencies which will be needed in the years to come. Scientists believe that knowledge doubles every 7 years, which means that knowledge acquired by individuals during the first year of study will be outdated by the time they finish their education. Therefore, education institutions need to provide students with knowledge and enable them to develop skills that are relevant today and which will enable them to adapt to changes in the real world.

Knowledge and skills that are acquired through education programmes must be recognised as a source of development of competitive advantages in a country. The education system is therefore important for an economy and needs to be supervised, adapted and developed by the government. Recent OECD studies indicate that an educated labour force can be important for attracting foreign direct investments. An educated labour force and application of new technologies lead to increased productivity. According to the International Labour Organisation (ILO), 1 additional year of education above the average level of education in a country can increase labour productivity from 5 to 15 %. Increased productivity can also contribute to country's attractiveness for potential foreign investors. The findings of these studies are particularly important for (small) transition countries, such as B&H, which are struggling to attract new investors.

Regardless of its development level any country can become a knowledge economy, but investing in education, the development of new knowledge, skills and competencies is the foundation of knowledge economy development (Fig. 1).

According to research, knowledge workers or an educated labour force generate approximately 60 % of production. Furthermore, empirical studies have shown that there is a positive correlation between skilled workers, an educated labour force and economic growth. The studies also showed that university graduates find jobs more easily and in a shorter period of time compared to workers with lower education levels, and these benefits reflect on economic growth in general. An effective and productive education system is fundamental for knowledge economy development. Knowledge, the accumulation of knowledge and their effects on productivity cannot be separated from an adequately developed education system. Education

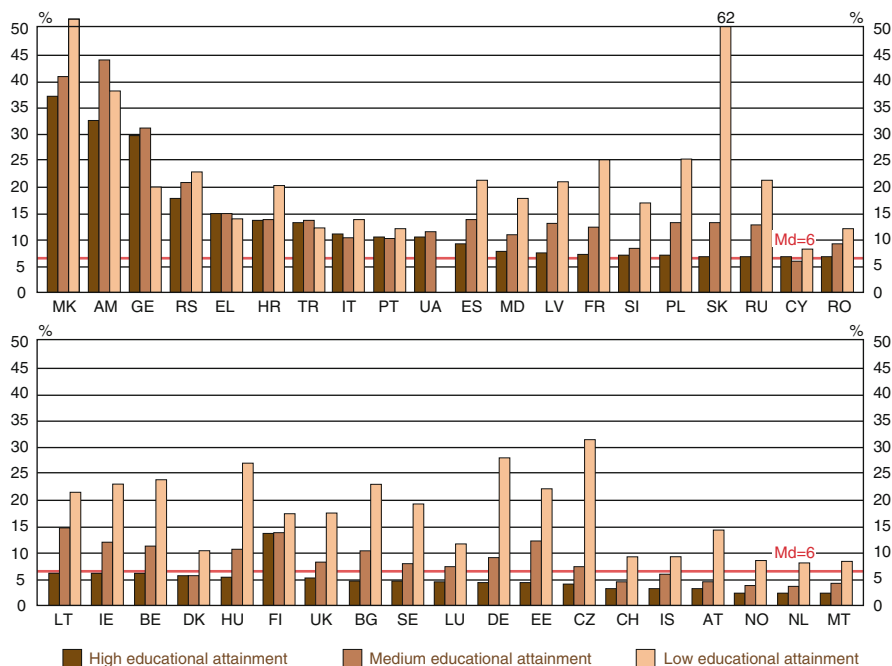


Fig. 1 Unemployment ratio of people age 20–34 by level of education in EHEA (Source: The European Higher Education Area in 2012: Bologna Process, Implementation report, p. 115)

institutions must enable a knowledge flow between individuals, organisations and companies through better academy-business cooperation.

B&H is currently facing socio-economic problems which are mainly high unemployment, unfavourable unemployment structure, unfavorable economic performance and uncompetitive economy. The main question remains as to how does this country achieve economic growth? For B&H, developing a knowledge economy might represent the right path toward economic growth and development, a path many developed countries have already chosen. The country has an unemployment rate of nearly 50 % (over 500,000 unemployed people) while over 350,000 are with no or with low qualifications, and over 12,000 have only secondary education. Over 90 % of all unemployed people are individuals with lower levels of education and skills and with almost no perspective of being employed in the near future. According to the Bologna Process Implementation Report 2012, unemployment ratios provide information on the value of tertiary education degrees.

Generally speaking, the higher the education levels the lower the unemployment rate. In other transition countries, unemployed individuals also mostly have lower levels of education and skills, but their governments have been allocating more funds into education. Having this in mind, it is no wonder that B&H has been dealing with the continuous fall of foreign direct investments in the past years

which can partially be explained by high labor costs and a ‘low productivity labour force’ with almost no knowledge and skills needed by employers or potential (foreign) investors. The World Bank Business Environment and Enterprise performance report also confirmed that one of the main obstacles identified by business owners is the lack of adequate knowledge and skills. According to studies conducted by The European Bank for Reconstruction and Development, in the past 5 years attitudes of enterprises regarding the main obstacle for further development has changed. In 2008 it was the lack of an adequate labour force; today it is the lack of a labour force with adequate knowledge and skills.

The results of World Bank Business Environment and Enterprise performance survey (BEEPS) are presented in Graph 2 and thus it can be concluded that approximately 30 % of enterprises indicated that education and skills are the main obstacles for the further development of enterprises. This obstacle was identified as the most important by enterprises from middle-income community of independent states and South-Eastern Europe, while other obstacles have been identified as most relevant in EU countries. Due to the fact that B&H is striving towards membership in the EU and more significant economic growth, its productivity can only be increased if students are well educated and possess adequate skills, competencies and knowledge. As already mentioned, studies also show that transition countries investing in education and a skilled and well educated labor force can act as a magnet for investors which are needed to enable economic growth.

Universities play a crucial role in creating and transferring knowledge. In developed knowledge economies, universities have had a major role in supporting innovation and knowledge creation. Universities have an important role in the research and innovation process and are considered to be a center of the mentioned processes and therefore an important partner to the business sector. However, in order to be able to fulfill its role as an important factor in the knowledge economy, developing governments must create an adequate framework for higher education institutions.

2 Determining Key Factors for Knowledge Economy Development in Bosnia and Hercegovina

As explained earlier the main goal of our research was to identify the key factors for knowledge economy development in B&H and to establish a model for knowledge economy development based on these results. In this chapter we will only present a part of this research and our findings regarding the identification of key factors which are important for understanding of our research chapter. For this purpose an examination using a questionnaire was conducted on a proportionately stratified sample of 150 middle and large enterprises. The questionnaire was divided into six parts each using the four economic pillars (knowledge economy inputs, independent variables) and the knowledge economy outcomes/results (dependent variable).

Table 1 Criteria and procedures for selection and evaluation of factors

Components of factor analysis	Significant values	Justification
Value of KMO	Higher than 0.5	Acceptable in social sciences
Type of rotation	Varimax	Most commonly used type of rotation
Factor weight	0.5 and higher	The higher the factor weight the more representative is the variable
Eigenvalue	Higher than 1.00	Usual criteria for factor determination
Number of items	3	Min. number of items necessary

The data collected through the questionnaires was summarized and prepared for statistical analysis using adequate software. Factor analysis was used to identify key factors for knowledge economy development in B&H. The criteria and procedures for selection and evaluation were in accordance with the standard criteria for social science research.

Bartlett's test of Sphericity and Kaiser-Meyer-Olkin Measure of Sampling Adequacy were used to evaluate the adequacy of the data for the factor analysis and the strength of the relation between the items. Based on these results, it was concluded that the factor analysis is justified in this research since the value of KMO is higher than 0.5 $KMO = 0.602$. The Bartlett's test of Sphericity is also statistically significant because of its value $\chi^2 = 6298.931$, $p = 0.0001$, $df = 1485$. Based on this criteria we concluded that it was justified to use the factor analysis for this research (Table 1).

Using the factor analysis and taking into consideration the criteria presented in the table (Fig. 2).

Based on the Scree Plot it can be concluded that the solution with six factors is appropriate. These factors, ranked by their significance, are:

1. Higher education and development of educational system
2. State regulative and environment
3. Use of ICT and ICT infrastructure
4. Investment in research and development
5. Training programmes for employees
6. Importance of development and innovation activities

The results of the factor analysis refer to the fact that education is very important for development of a knowledge economy in B&H and that the respondents were extremely unsatisfied with the level of development of the educational system. This is no surprise considering that the structure of work dramatically changes in the knowledge economy and that new and upgraded skills are required. In a knowledge economy, for example, the number of factory jobs or natural resources jobs decreases while the number of office jobs or jobs in health and educational sector increases. These changes will have the most affect on lower skilled workers and factory jobs. Therefore, governments and educational institutions should emphasise the importance of long-life learning programmes. This result is also in accordance

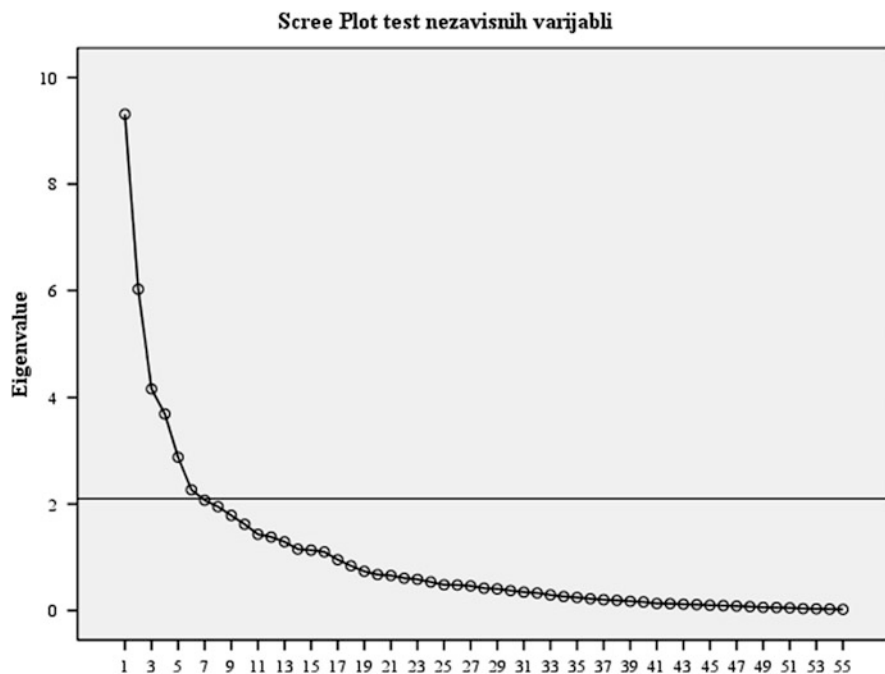


Fig. 2 Scree Plot test of independent variables (knowledge economy inputs)

to the findings of Cohen and Soto (2001) who determined the positive effect of education on economic growth of a country by comparing time series of countries to the average number of years of education.

The second most significant factor is the government and its incentives, which influence the economic activity and therefore the development of the knowledge economy. The third factor ranked by its significance is the use of ICT and ICT infrastructure. As explained earlier, the use and development of ICT can contribute to the improvement of productivity and better efficiency, but the results of the research point out the fact that the respondents were mostly indifferent towards ICT or think that the present state regarding ICT is sufficient.

The fourth factor extracted is investment in R&D where research results show that minor financial resources are invested in research and product development in the selected enterprises. The main reason for this is the economic and financial crisis, which affected the economy in B&H over the past couple of years. The fifth factor is programmes and training of employees. The results show that the selected enterprises insufficiently allocate financial funds into training programmes for employees, which is an obstacle to the adoption of new knowledge and its application. And the last factor is innovation and development activities. The low ranking of this factor indicates the decreased importance of knowledge economy development for the respondents. This result is fully in accordance with their view on research and development activities, which result in new ideas and innovated products, services or processes.

3 Readiness of Higher Education Institutions in Bosnia and Herzegovina to Enable Knowledge Economy Development

Our main goal during this research was to find out whether the tertiary education system in B&H could be a generator of knowledge economy development? In order to provide an answer to this question, we conducted research among state-financed higher education institutions in B&H as a part of wider research aiming to determine the possibilities of knowledge economy development in the country.

According to the World Bank’s Knowledge Assessment Methodology (KAM) which is used to determine readiness of countries to develop a knowledge economy based on four pillars (government and incentives, education and training, ICT, infrastructure, R&D and innovation) B&H is ranked 70th out of 144 countries which are included in the KAM. Indicators for education and training have the highest values compared to indicators for other knowledge economy pillars. We compared these indicators to Denmark (the country with the most developed knowledge economy), Western Europe, Europe and central Asia. The most developed knowledge economy pillar in B&H is the education pillar with an 5.7 average score. As can be seen in Graph 4 B&H has the lowest values for selected indicators compared to others in the benchmark group. For the “Education and training” pillar, the following indicators have been selected: Adult literacy rate 6.16 (Denmark 10, Western Europe 9.2), Secondary education enrollment rate 5.0 (Denmark 9.86, Western Europe 9.2), Tertiary education enrollment rate 5.94 (Denmark 9.49, Western Europe 8.22). Even though B&H achieved the highest values for this pillar, if we compare these indicators in B&H to the benchmark group, it is obvious that its education system is far from being able to contribute to knowledge economy development (Fig. 3).

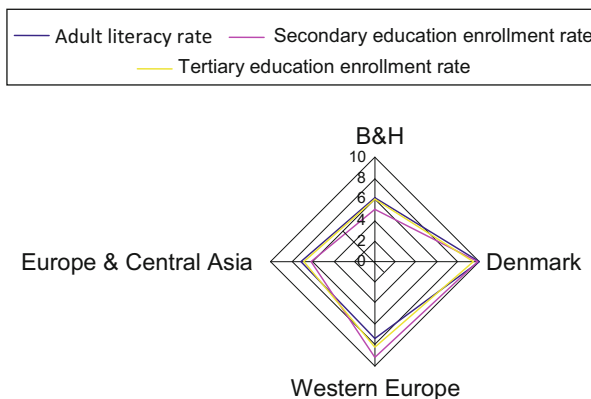


Fig. 3 KAM indicators for education and training (Source: World Bank, Knowledge assessment methodology, <http://web.worldbank.org/WBSITE/EXTERNAL/WBI/WBIPROGRAMS/KFDLP/EXTUNIKAM/0,,menuPK:1414738~pagePK:64168427~piPK:64168435~theSitePK:1414721,00.html>)

Today, the higher education system in B&H is coping with various problems and changes, such as an increased demand in higher education, the internationalization of education and research, decreased funding, the reorganization of knowledge, stakeholder relations and so on. Furthermore, higher education in B&H has been undergoing a reform process initiated by the Bologna reform even though it was not this process alone that pointed at the need for reform in higher education in B&H. The need for the academic community to act as a generator of socio-economic development also indicated the need for reforming tertiary education. Today, over 100,000 students are enrolled in university programmes in eight public and tens of private universities. A deeper analysis was conducted in order to determine the readiness of the tertiary education system for knowledge economy development. For this purpose a questionnaire was developed and structured accordingly. This research involved state-funded public universities due to the fact that over 80 % of all students are enrolled at these higher education institutions. There are eight state universities in B&H, six in the Federation B&H and two in the Republic of Srpska.

The mission and vision of a university are its foundation and encapsulate its goals and purpose. Universities must be aware of their mission and vision, which should not only relate to the educational and teaching process but also to research and its links to the community and economy as well. These statements are important communication channels to internal and external stakeholders of universities. When asked about their mission and vision statement, 87.5 % of universities stated that they have a documented mission and vision statement. However, at only 25 % of the universities were the employees sufficiently familiar with these statements. These results indicate that the relevance of institutions' mission and vision and its relation to institutions' goals, policies and plans is not recognised.

One of the main issues in B&H is the funding of higher education. During the past couple of years government(s) on all levels (state, entity, canton) have been constantly cutting funding for higher education institutions in B&H. This reduction of funds might cause serious and permanent damage to the education system in this country. The average budget of researched universities was 25 million KM (min. 10 million, max. 67 million) wherein 58 % were public funds and grants, approx. 39 % enrollment fees, 5 % revenues from collaboration with the business sector and the rest from other sources (projects, donations, etc). Evidently, universities are not significantly engaged in academy-business collaboration or R&D projects due to the fact that most of the universities' own revenues are generated from enrollment fees. Furthermore, most of the funds are spent on academic and non-academic staff. Insufficient funds are allocated on research and scientific work, which is an important aspect of university missions.

However, this problem prevails in the EU as well. According to Garben (2012) in times of economic crisis, higher education (even though it is a key factor in finding a way out of the crisis and creating a stable and competitive knowledge economy) seems to be the first area where budget cuts are made. While some EU countries such as Germany or France invested in higher education during times of crisis, most other EU countries have cut spending on higher education up to 30 %.

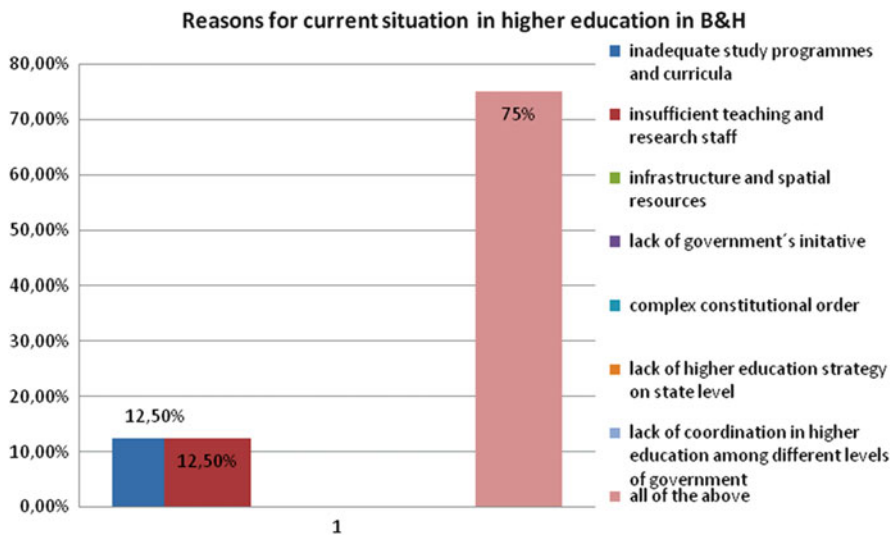


Fig. 4 Obstacles in tertiary education in Bosnia and Herzegovina

The legal framework for higher education is important in any country given that governments need to create preconditions for a functional education system, which will be able to fulfill its role in the economy and society. The legal environment must ensure academic freedom and development of science and research but also create preconditions for strengthening bonds with the economy. According to our research results, 50 % of universities assessed the legal framework and general environment for higher education institutions in B&H bad or very bad. Accordingly, 75 % of universities indicated that governments have not been undertaking the necessary steps for improvement in tertiary education. The constitutional order in B&H and jurisdiction of the higher education system at different levels influences the harmonisation of laws in higher education. The higher education framework law has created a legal framework at the national level for the modernisation of higher education in B&H in accordance with the Bologna process. Higher education laws on lower levels (federation and cantons) are not harmonised in a way in which would ensure a balanced development of higher education in the country. This legal framework is also important for establishing necessary infrastructure and institutions that are important for monitoring and developing higher education such as the national quality assurance agency (Fig. 4).

Even though the reform process in higher education started almost a decade ago, this reform cannot be considered to be successful. Two thirds of the universities have indicated that policy making in B&H in the field of higher education is bad or very bad. Accordingly, 75 % of universities stated that the education system does not meet its goals, does not contribute to the development of a modern society, and does not act as a generator of social, cultural or economic development.

In the survey, we examined the main obstacles to reform and the modernisation process in higher education in B&H. The summarised responses for this question are presented in Graph 5 and as it can be seen that 75 % of all questioned universities stated that all of the optioned answers are applicable (internal and external factors). These factors can be classified into two main groups: internal factors (organisational factors—study programmes, staff, procedures, etc) and external factors (environmental factors—government regulation, legal framework, etc).

In a knowledge economy it is very important that universities create an enabling environment for the creation and transfer of new knowledge to students and young researchers. During our empirical research we examined the key factors for knowledge economy development; we also examined the readiness of the higher education sector to act as a knowledge economy generator. In context of skills, knowledge and collaboration, we compared attitudes of universities and enterprises which were involved in the research. We ran a chi-square (χ^2) test to determine a statistically significant deviation of answers for these two groups of examinees. The reason why this research also included business enterprises is that universities must act socially responsible in the context of teaching students the skills and knowledge that is needed in the business world, they need to collaborate in R&D with the business sector etc. Furthermore, the relevance of higher education is increasingly understood in the context of economy and directed towards business aiming to strengthen the bonds with the real sector. Graph 6 presents answers of universities and enterprises in regards to the ability of universities to transfer adequate skills, competencies and knowledge to students (Fig. 5).

Students are educated in order to be able to compete on the labour market and the employability of graduates is very important for an institution. Higher education

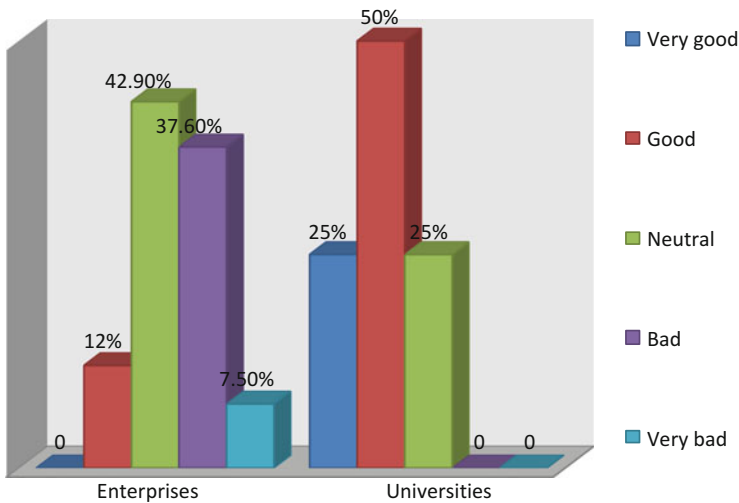


Fig. 5 Attitudes towards skills and knowledge of students at universities in B&H

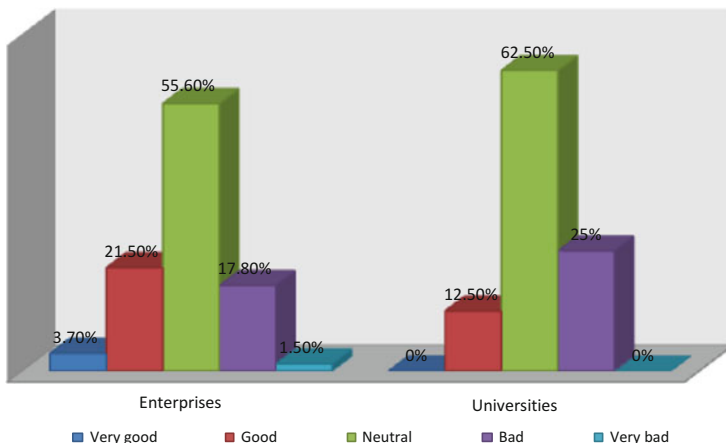


Fig. 6 Perceived quality of higher education institutions in B&H

institutions must enable students to acquire competitive knowledge and skills needed in the business world. However, as can be seen in Graph 5, answers provided by enterprises deviate significantly from those of universities. Employers indicate that the skills and knowledge of university graduates are not adequate.

However, results indicate that those universities are not able to involve all stakeholders when creating new study programmes and curricula, especially employers who are important external stakeholders. Furthermore, we investigated the perceived quality of universities and we were not surprised to get contrary answers from enterprises and universities in regards to the perceived quality of higher education institutions (see Fig. 6).

The transfer of knowledge and new technologies has also been investigated during our research. Academy-enterprise collaboration is indicated to be bad by 47.1 % of enterprises and 46.2 % of universities. Thus, cooperation and collaboration between academy and business sector must be improved in order to develop a knowledge economy. Research activities are very important in creating new knowledge. Universities play an important role in the national innovation system. But, the overall score for university R&D engagement efforts, research projects and generators of new knowledge is considered to be good by 62.5 % of universities even though only 25 % of universities indicated that they are currently satisfied with the level of scientific research at their institutions. However, in terms of results we analysed regarding research and R&D being a mid-term goal for universities, only one third of questioned universities indicated that strengthening scientific research would be a development goal in the next 5 years.

As already mentioned, during our research aiming to assess the readiness of B&H to develop a knowledge economy, various stakeholders needed to be included in this research. Some 150 middle and large companies in the real sector from all over B&H have been included in the stratified random sample for purpose of this research along with all state (government funded) universities in B&H. During our

Table 2 Chi-square test for two groups of examinees (business companies and universities)

Question	χ^2	Df	P
Fulfillment of goals of higher education system	2.884	1	0.089
Education policy is clearly and adequately implemented	0.206	1	0.650
Current development level of higher education in B&H	2.986	3	0.394
Investment in higher education and meeting of EU standards	7.315	3	0.063
Providing knowledge, skills and competencies	45.104	4	0.001
Ability to adopt to changes in environment	22.969	4	0.001
Quality of state HEIs	0.987	4	0.912
Quality of private HEIs	3.312	4	0.507
Transfer of new knowledge and technologies	1.568	3	0.667
Adequate study programmes and curricula	3.193	1	0.071
Graduates from state HEIs are competitive on the labor market	0.860	1	0.354
Graduates from private HEIs are more competitive on the labor market	0.019	1	0.892
Technology parks and incubators	0.201	1	0.654
Awareness of necessity to be involved in R&D activities	2.701	4	0.609
Efforts to innovate processes	0.870	4	0.929
Academy-business cooperation	3.480	3	0.323
Research capacities of universities	6.160	3	0.104
Importance and relevance of R&D for the organization i the next 5 years	12.246	4	0.016
Investment in R&D	18.875	5	0.002

research we assumed that *there is no deviation of answers received from business companies and higher education institutions*. We conducted a Chi-square (χ^2) Test to determine a statistically significant deviation of answers for these two groups of examinees and to confirm or reject our research hypothesis. Since the value of Chi-square depends on the level of freedom, the higher the value of degrees of freedom, the higher the value of the Chi-square.

Based on the results presented in Table 2, it can be concluded that there are statistically significant differences in proportions between business companies and universities regarding several questions. Our hypothesis that there are no statistically significant differences between answers provided by business companies and universities can be rejected in the following cases:

1. Ability of universities to provide students with knowledge, skills and competencies needed in the business world
2. Ability of universities to adequately respond to changes in their environment
3. Importance of R&D activities during the next 5 years
4. Sufficient investment in R&D by higher education institutions

Education is the essence in a knowledge economy. Based on these results we can conclude that the business sector is not satisfied with knowledge university graduates have, business companies consider research and development activities more important than universities, companies also indicated that universities are not flexible enough and do not adapt adequately to changes in their environment.

One of the main goals of higher education reform in B&H was to educate students, which will possess knowledge and skills needed by future employers. Often universities do not include any relevant stakeholders in curricula development nor do these study programmes include practical knowledge or short-term internships in the real sector. This might explain the fact that companies in B&H stated that they are not satisfied with the knowledge and skills that graduate students have.

There are significant differences between these two relevant stakeholders in a knowledge economy. Obvious differences in attitudes between the real sector and higher education institutions in all the important aspects of knowledge economy leads us to conclude that there is no systematic approach in higher education development and there is a lack of collaboration in resolving all the important issues influencing knowledge economy development.

4 Discussion

We have shown that B&H is not yet ready to develop a knowledge economy. Its knowledge economy pillars are underdeveloped as research results indicate. This empirical support now leads us to conclude that a systematic approach must be applied in developing all of the knowledge economy pillars in order to make economic progress. In this context, empirical results have shown that governments must improve regulatory legislation. Unfortunately, the laws and regulations are not adequate for enabling entrepreneurship, research or education development. Adequate laws and particularly laws on intellectual property protection are crucial in order for investments, innovation and research to happen. The results of our research provide a potential for the B&H government to make improvements in this area.

According to benchmark analysis which we conducted using World Bank's Knowledge Assessment Methodology, the indicators for B&H in the field of education were the highest compared to other knowledge economy pillars. However, these indicators were way lower compared to the benchmark group. Results from our study indicated that education (particularly tertiary education) is the most relevant factor for knowledge economy development. After a deeper analysis of the higher education sector in B&H we were able to conclude that higher education institutions do not act as knowledge creators and therefore graduate students often do not have necessary knowledge, skills or competencies. Furthermore not all stakeholders are involved in development of study programmes, there is no collaboration with enterprises, investments in research and equipment are low, funding is also an issue and so on. However, we must also emphasise that private higher education institutions have not been covered by our research. This might represent a limitation to our study and we suggest that future research include all higher education institutions in B&H regardless of their status.

The role of higher education institutions in developing a knowledge economy has been elaborated in the theoretical background of our research. Our aim was to investigate whether higher education institutions in B&H can act as crucial knowledge institutions in order to enable knowledge economy development in the country. Our study has shown that they are not ready to act as such. Results of our study have shown that the lack of a strategic approach to higher education development and strategic management of higher education institutions has a negative impact on R&D activities, innovation, industry-university collaboration and all other important aspects of a knowledge economy. Furthermore, according to endogenous growth theories, commercially oriented innovation is a major driver of technological progress and productivity growth and universities play an important role in this Triple-Helix interaction between the state-university-industry. According to our research results there is a wide gap in the application of new information-communication technologies between B&H and others in the benchmark group. However, a country's ability to absorb new technology is crucial for knowledge economy development.

5 Conclusion

Due to growing complexity of the contemporary business environment, knowledge has become a significant factor of economic development. Knowledge has become the main driver of modern economies. Building a dynamic economy that is based on the development and application of knowledge is currently an aspiration of all countries (developing countries, transition countries etc.). In such an environment where knowledge is a dominant driver of economic and social development, universities are important centers of knowledge production. Knowledge creation, research and innovation are fundamental for increasing competitiveness and productivity. The mission of universities today is to provide students with the knowledge and skills needed in the business world. Research results have indicated that tertiary education in B&H is currently not on a level that would ensure its contribution to knowledge economy development. Most importantly, the current higher education legal framework and policies are inadequate to enable development of a modern higher education system. Even though obtaining higher levels of education improves employability (in developed countries as well as in B&H), research results indicate that employers in B&H are not satisfied with knowledge and skills of university graduates. Furthermore, universities themselves indicated a lack of interest in research even though scientific research is crucial for the creation of new knowledge. Generally speaking, the number of university graduates in B&H is below European average. Simply producing more graduates is not the right option, as the country needs a higher educated work force with the right knowledge and skills. Universities must adapt to these changes more rapidly and improve institutional processes. Most importantly, universities have a public purpose and a public obligation and the opinion that individuals enrolled in university programmes is

enough to benefit them cannot prevail any longer. Universities must overcome the obstacles that prevent them from responding to these new changes and expectations in a modern changing economy. So what should be done? Generally speaking, we need to enhance competitiveness and productivity. B&H has to invest in the development of higher education in a way that it ensures education for adequate human capacity building. Knowledge is in the core of a knowledge economy and therefore education, especially higher education, has an important role. Secondly, research and development activities, which can lead to innovation and commercialization of these results through a strong collaboration with the industry, is also a very important aspect of creating a sustainable knowledge economy. The development of a diverse and competitive economy is the only way that B&H can benefit economically on the long run and ensure economic development that it so desperately needs.

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