SPHERE
Support and Promotion for Higher Education Reform Experts

Funded by the Erasmus+ Programme of the European Union

# Harnessing the potential: Research Capacity in the Western Balkans

## APPENDIX

December 2017

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1 This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo Declaration of Independence.

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# Appendix 1 Research productivity per country

The appendix provides the analysis of research productivity in the period 2012-2016 in Albania, Bosnia and Herzegovina, the Former Yugoslav Republic of Macedonia, Kosovo*, Montenegro and Serbia.

## Methodology

The analysis of research productivity in the Western Balkan countries was carried out in February 2017. The main analyses included compiling lists of universities for each country using various sources, such as official lists on government pages, the pages of official national agencies and other sources where available.

The scientific productivity of each university was analysed using the Scopus search engine for the period 2012-2016 and included the number of papers per year, the total number of papers in the five-year period and the number of papers in the five most productive areas during the five-year period. It should be noted that the data compilation was, in some instances, complicated by multiple name variations for institutions. The Scopus search engine provides the data of only the 100 most productive institutions for each search query. In the case of very productive universities such as the University of Belgrade, there is a possibility that name variations with low productivity were not recognised; however, the influence on data interpretation is negligible. In the case of less productive universities, the omission of data due to name variations could influence the interpretation of data; but in these cases the productivity in absolute numbers should be quite low. To provide tools for post-hoc analyses the raw data table includes the exact search queries used for each university.

To calculate the size and relative productivity of papers per scientist per year, the number of academic staff was used. This number was obtained from various sources because not all universities publish this data. In such cases, the data was gathered from the best available source. Some of these include data from older sources (e.g. for 2014), and the data from evaluation reports of other sources that provided the best estimation of academic staff numbers. One other issue is that different institutions have different definitions of who is considered to be part of the academic staff; in some extreme cases it is unclear as to what the real number is of staff. For this reason, this data should be interpreted with caution.

The interpretation of relative productivity as high or low is subjective. A low relative productivity of a university does not mean that there are no excellent research teams in that university. To provide some benchmarks the relative productivity of some other EU universities, calculated using the same methodology, is shown in the table below. It should be noted that the University of Zagreb, part of the wider Western Balkans (WB), performs more strongly than the University of Vienna using these metrics.

*Table 1 The relative productivity of some European universities*

| Name | 5y papers/person | 2016 papers/person |
|---|---|---|
| Trinity college Dublin | 7.25 | 1.54 |
| Humboldt University of Berlin | 5.07 | 1.03 |
| University of Vienna | 2.28 | 0.48 |
| University of Bologna | 7.98 | 2.11 |
| University of Bucharest | 4.51 | 0.96 |
| University of Zagreb | 4.31 | 0.86 |

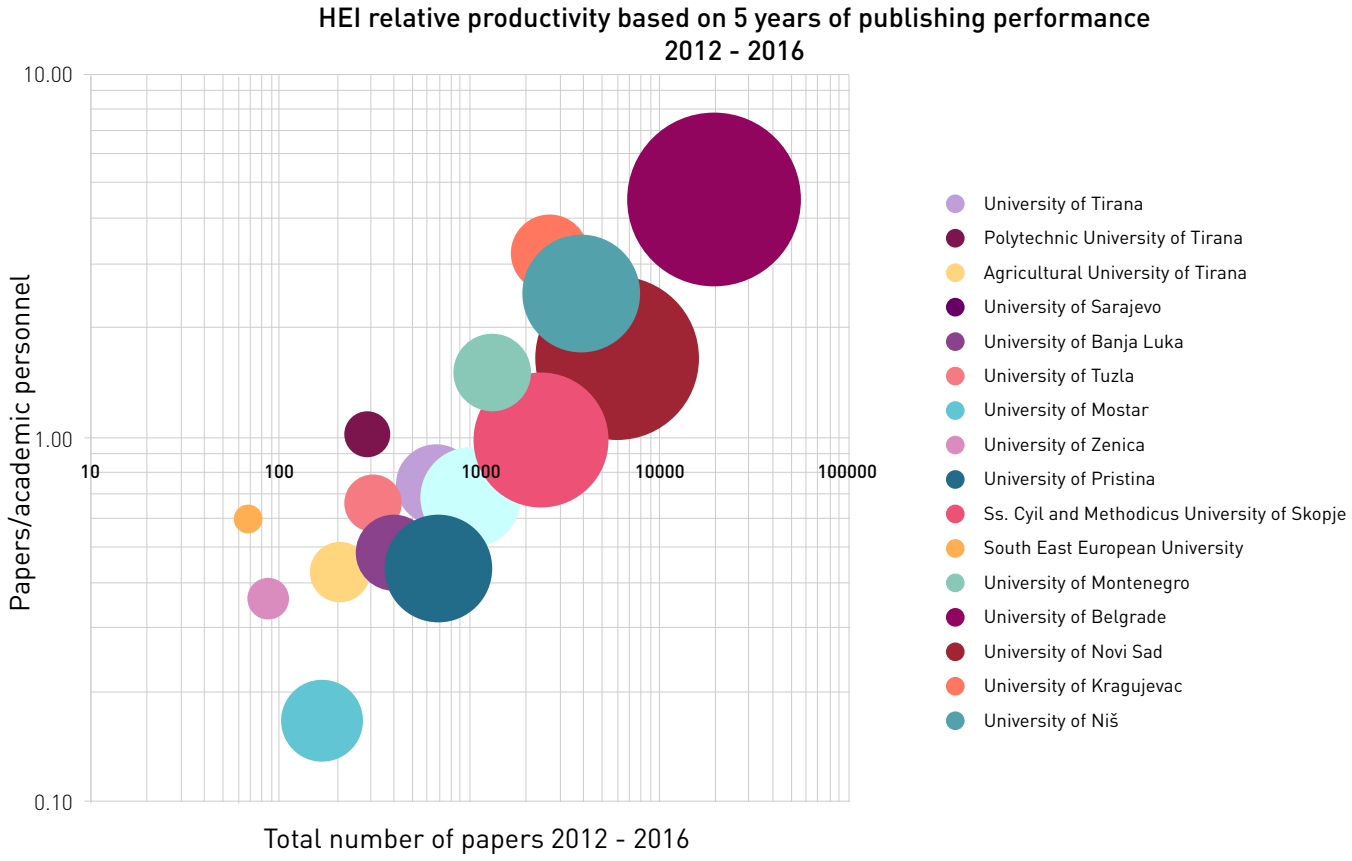
The analysis for other research institutions in the region used the list of institutions that participated in FP7 projects, or other sources where available. Since the number of employees in these institutions is very hard to obtain, only absolute, rather than relative productivity indicators and size were calculated. Absolute data is not included in comparative figures.

To give a more meaningful picture of the performance of universities, a "bubble" chart was devised where the bubble size represents the size of the university (academic staff). These graphs are shown directly below each group of data.

## Regional overview

Figure 1 shows the relative research performance of the strongest HEIs in the region based on the last years of available data.

*Figure 1 Research productivity based on 5 years of publishing performance 2012-1016*



The University of Belgrade dominates the chart as the largest HEI in the region and also as having the largest number of papers and papers per researcher. Belgrade is followed by the other three large Serbian universities (Novi Sad, Kragujevac and Niš).

HEIs that are performing rather strongly for their size include the University of Montenegro, the Polytechnic University of Tirana in Albania and the South East European University (Former Yugoslav Republic of Macedonia). HEIs which are performing more weakly include the BiH HEIs of Mostar, Zenica and Banja Luka.

## Albania

The analysis for Albania included only eight out of 38 universities because the data on productivity for other universities was unavailable in Scopus. The raw data is presented in the table below. The top three results are underlined.

*Table 2 Scientific productivity and number of academic staff for universities in Albania*

| Type | Name | Number of papers | | | | | | Academic staff | 5y papers/ person | 2016 papers/ person |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2012 | 2013 | 2014 | 2015 | 2016 | 5y total | | | |
| Public | University of Tirana | 106 | 170 | 160 | 121 | 115 | 672 | 900 | 0.75 | 0.13 |
| Public | Polytechnic University of Tirana | 54 | 61 | 43 | 74 | 54 | 286 | 280 | 1.02 | 0.19 |
| Public | Agricultural University of Tirana | 48 | 49 | 44 | 41 | 23 | 205 | 480 | 0.43 | 0.05 |
| Public | University of Medicine | 0 | 0 | 12 | 19 | 16 | 47 | 417 | 0.11 | 0.04 |
| Private | Epoka University | 7 | 8 | 17 | 16 | 8 | 56 | 85 | 0.66 | 0.09 |
| Public | University of Vlorë | 4 | 5 | 9 | 8 | 9 | 35 | 600 | 0.06 | 0.02 |
| Public | Aleksandër Moisiu University | 4 | 10 | 9 | 4 | 2 | 29 | 175 | 0.17 | 0.01 |
| Private | Canadian Institute of Technology | 0 | 13 | 5 | 1 | 0 | 19 | 42 | 0.45 | 0.00 |

*Figure 2 Relative productivity of HEIs in Albania (2016)*

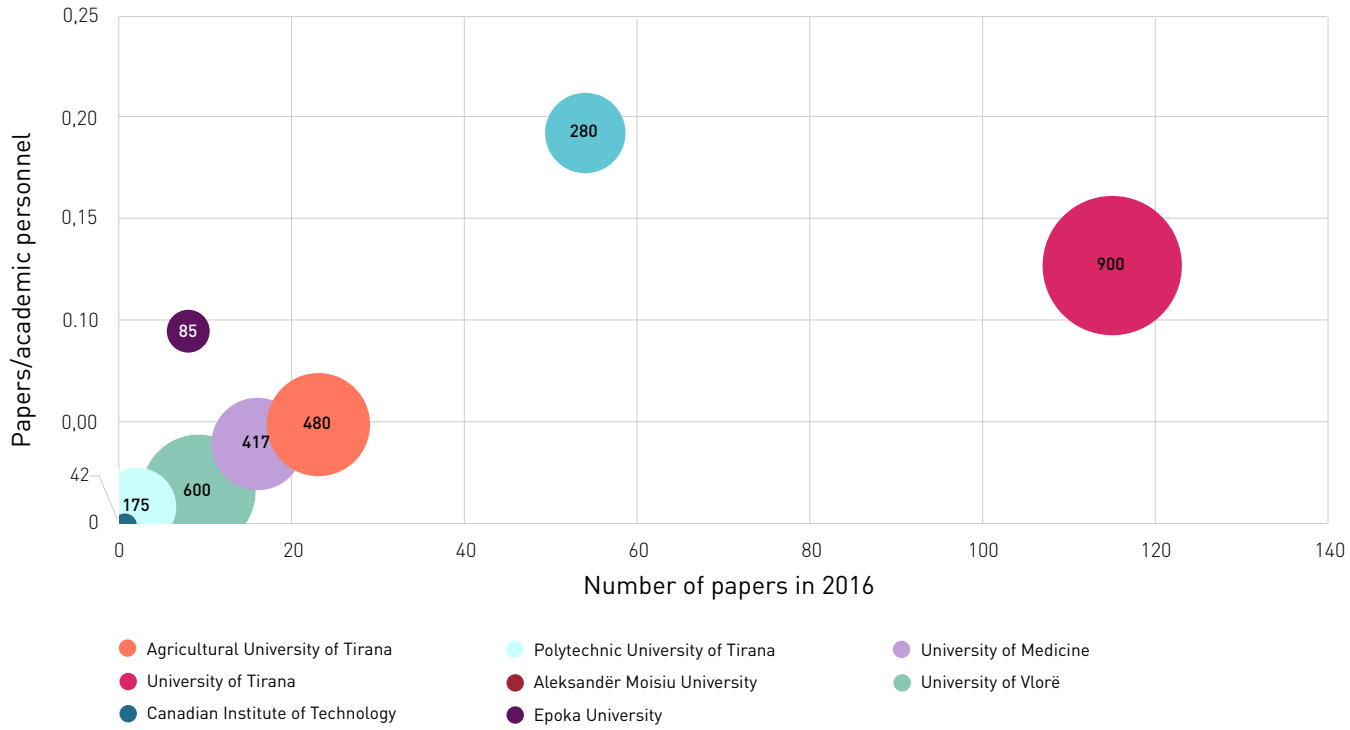
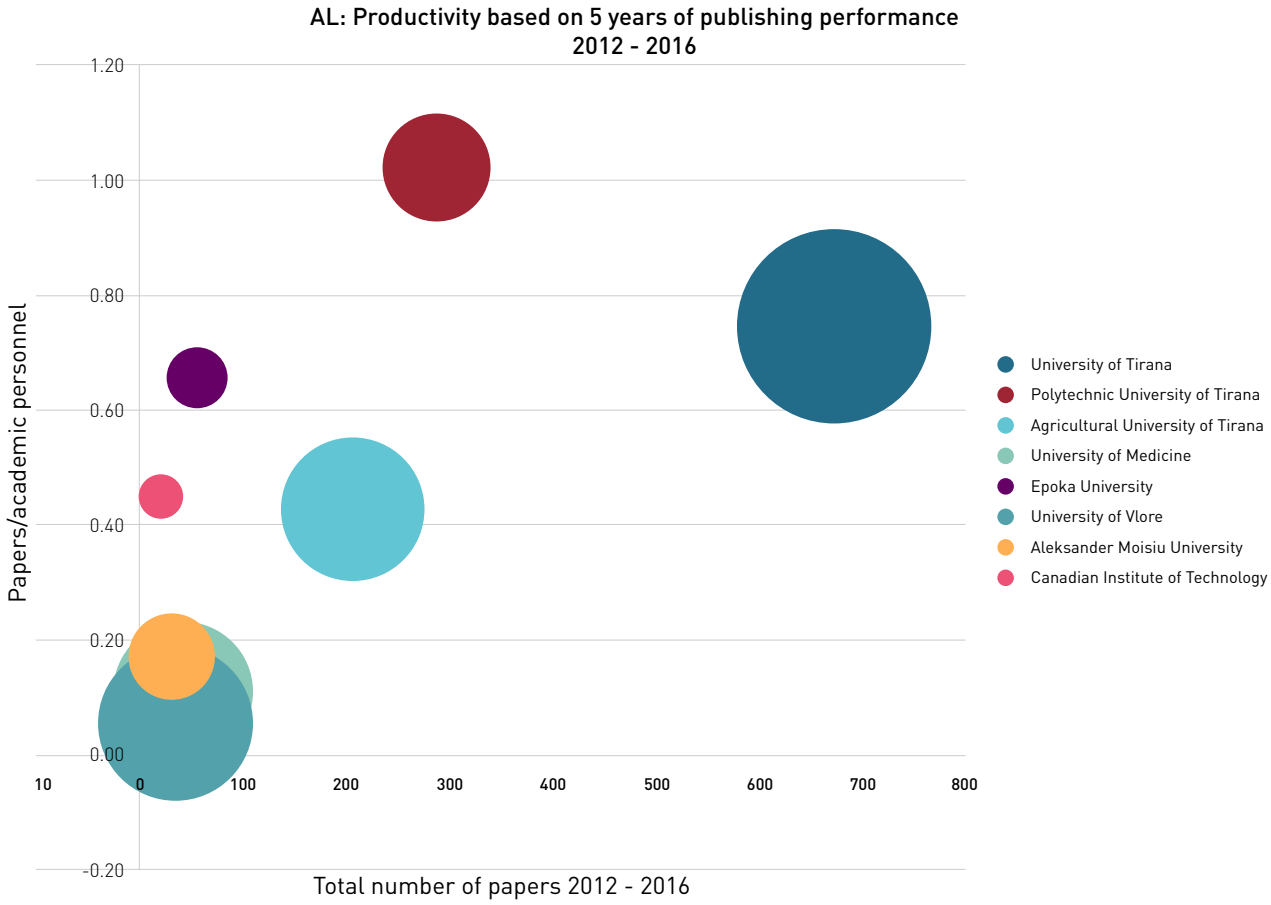



*Figure 3 Relative productivity of HEIs in Albania (2012-2016)*



The largest university by size and absolute productivity is the University of Tirana. Based on relative productivity, the productivity of the Polytechnic University of Tirana is slightly higher, but the numbers for all universities are relatively low with no university having a productivity of over 0.2 papers per year per scientist. The table below shows the number of papers in the period 2012-2016 for the five most productive areas of each university.

*Table 3 Breakdown of number of papers in 2012-2016 for the five most productive areas of each university in Albania*

| Area | University of Tirana | Polytechnic University of Tirana | Agricultural University of Tirana | Epoka University | Aleksandër Moisiu University | University of Medicine | University of Vlorë | Canadian Institute of Technology |
|---|---|---|---|---|---|---|---|---|
| Social Sciences | 214 | | 23 | 17 | 20 | | 10 | 3 |
| Economics, Econometrics and Finance | 202 | | | 13 | 21 | | 7 | 5 |
| Arts and Humanities | 178 | | | 16 | 20 | | 8 | |
| Environmental Science | 92 | 24 | 57 | | | | 16 | |
| Medicine | 120 | | 21 | | | 31 | | |
| Computer Science | | 137 | | 13 | | | | 10 |
| Agricultural and Biological Sciences | | | 125 | | | | | |
| Engineering | | 61 | | 22 | | | | |
| Earth and Planetary Sciences | | 51 | | | | | | |
| Biochemistry, Genetics and Molecular Biology | | | 27 | | | | | |
| Materials Science | | 23 | | | | | | |
| Business, Management and Accounting | | | | | 5 | | | 4 |
| Pharmacology, Toxicology and Pharmaceutics | | | | | | 9 | | |
| Mathematics | | | | | | | 6 | |
| Chemistry | | | | | | 5 | | |
| Chemical Engineering | | | | | | | | 4 |
| Dentistry | | | | | | 4 | | |
| Physics and Astronomy | | | | | | 4 | | |
| Decision Sciences | | | | | 3 | | | |
| **Total** | **806** | **296** | **253** | **81** | **69** | **53** | **47** | **26** |

Most of the universities publish in areas of social sciences, economics, arts and humanities and environmental science. This situation is specific compared to other countries in the analysis where the most prevalent areas are medicine, engineering and computer science. The area of medicine is the most dominant area only for the University of Medicine.

The only Albanian research institute that has data in Scopus is the Institute of Public Health with dominant productivity in medicine and immunology and microbiology. The data on productivity is shown below.

*Table 4 Scientific productivity for research institutes in Albania*

| Name | Number of papers | | | | | |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 5y total |
| Institute of Public Health | 7 | 7 | 8 | 7 | 13 | 42 |

*Table 5 Breakdown of number of papers in 2012-2016 for the five most productive areas of each research institute in Albania*

| Area | Institute of Public Health |
|---|---|
| Medicine | 36 |
| Immunology and Microbiology | 12 |
| Agricultural and Biological Sciences | 5 |
| Biochemistry, Genetics and Molecular Biology | 5 |
| Environmental Science | 3 |
| **Total** | **61** |

## Bosnia and Herzegovina

The analysis for universities in Bosnia and Herzegovina was carried out for 18 universities for which the data on productivity and academic staff was available. The raw data is presented in the table below.

*Table 6 Scientific productivity and number of academic staff for universities in Bosnia and Herzegovina*

| Type | Name | Number of papers | | | | | 5y total | Academic staff | 5y papers/ person | 2016 papers/ person |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2012 | 2013 | 2014 | 2015 | 2016 | | | | |
| Private | International Burch University | 12 | 9 | 16 | 20 | 33 | **90** | 93 | **0.97** | **0.35** |
| Private | University of Herzegovina | 0 | 0 | 2 | 5 | 4 | **11** | 12 | **0.92** | **0.33** |
| Private | International University of Sarajevo | 24 | 26 | 14 | 27 | 35 | **126** | 156 | 0.81 | **0.22** |
| Private | University of Vitez | 1 | 5 | 2 | 2 | 5 | 15 | 30 | 0.50 | 0.17 |
| Public | University of Sarajevo | 176 | 199 | 191 | 233 | 213 | 1012 | 1479 | **0.68** | **0.14** |
| Public | University of Banja Luka | 54 | 70 | 82 | 83 | 100 | 389 | 811 | 0.48 | 0.12 |
| Public | University of Tuzla | 70 | 59 | 68 | 59 | 54 | 310 | 466 | 0.67 | 0.12 |
| Private | Sarajevo School of Science and Technology | 11 | 5 | 5 | 6 | 4 | 31 | 33 | 0.94 | 0.12 |
| Private | Slobomir P University | 0 | 3 | 2 | 1 | 3 | 9 | 34 | 0.26 | 0.09 |
| Public | University of Zenica | 18 | 13 | 19 | 16 | 19 | 85 | 235 | 0.36 | 0.08 |
| Public | University of Bihać | 11 | 9 | 4 | 6 | 10 | 40 | 144 | 0.28 | 0.07 |
| Private | International University of Travnik | 0 | 1 | 0 | 4 | 2 | 7 | 38 | 0.18 | 0.05 |
| Public | University of Mostar | 32 | 24 | 39 | 37 | 34 | 166 | 1000 | 0.17 | 0.03 |
| Private | High college "CEPS-Center for Business Studies" | 0 | 0 | 0 | 0 | 1 | 1 | 42 | 0.02 | 0.02 |
| Private | University Sinergija | 0 | 4 | 0 | 1 | 1 | 6 | 59 | 0.10 | 0.02 |
| Public | University Džemal Bijedić | 6 | 3 | 9 | 2 | 2 | 22 | 250 | 0.09 | 0.01 |
| Public | University of East Sarajevo | 7 | 8 | 18 | 10 | 8 | 51 | 933 | 0.05 | 0.01 |
| Private | University of Travnik | 5 | 6 | 2 | 2 | 1 | 16 | 150 | 0.11 | 0.01 |

*Figure 4 Relative productivity of HEIs in Bosnia and Herzegovina (2016)*

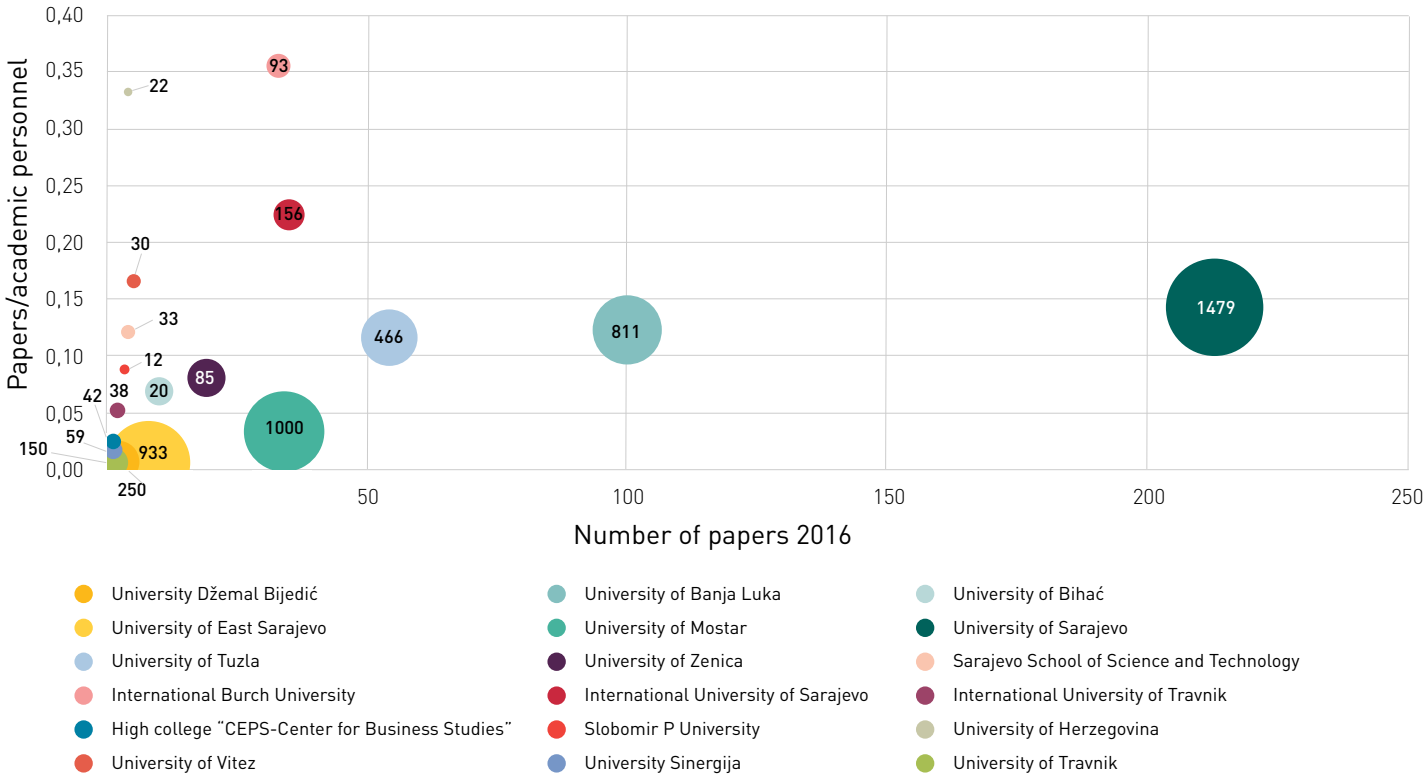
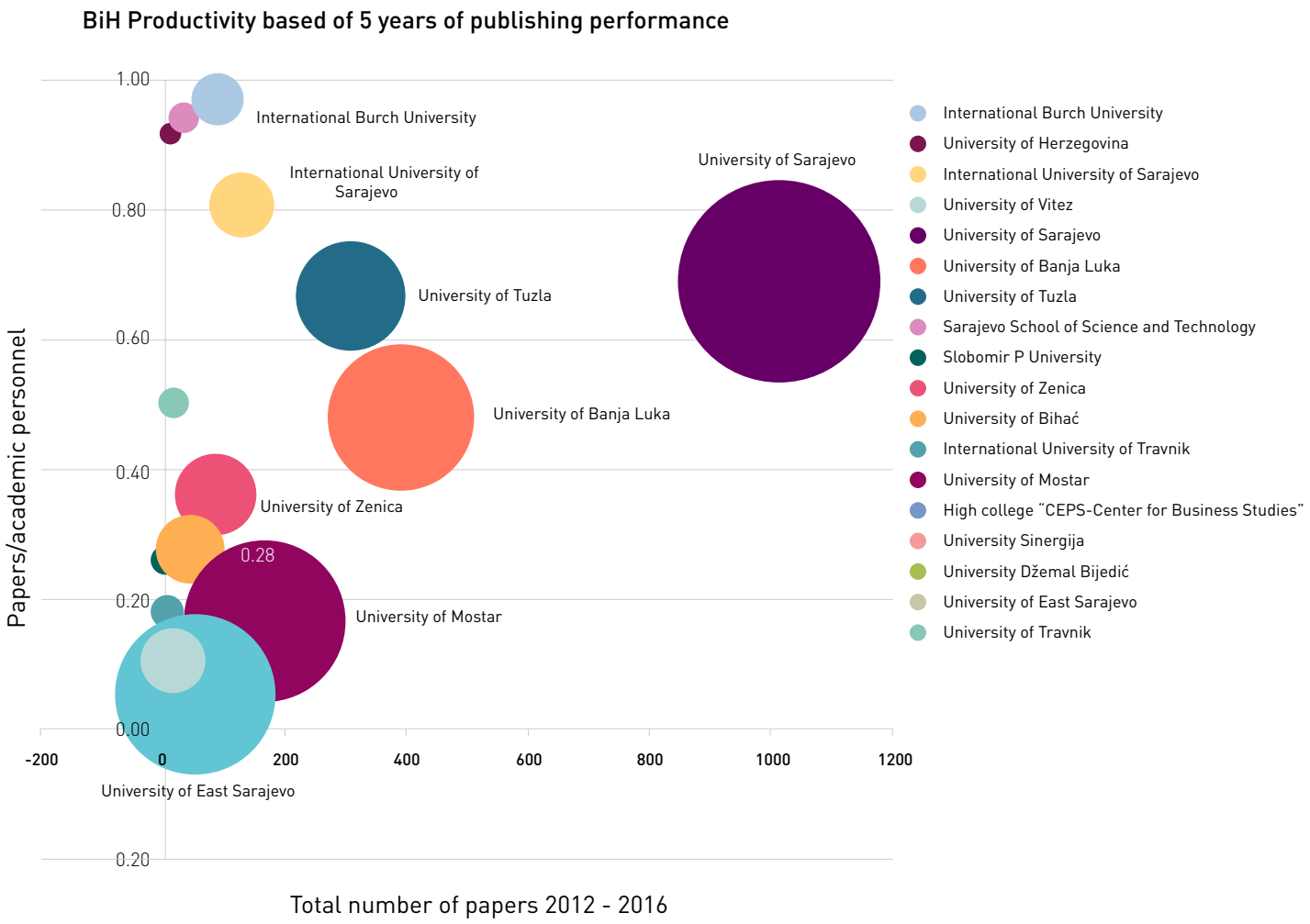


*Figure 5 Relative productivity of HEIs in Bosnia and Herzegovina (2012-2016)*




Both the table and picture show the relatively low productivity of universities. HEI staff are mostly oriented towards teaching, especially in small private universities with the exceptions of the International Burch University and the University of Herzegovina. Based on the absolute number of papers there is a dominance of public universities in Sarajevo, Banja Luka, Tuzla and Mostar. The two tables below show the number of papers in the period 2012-2016 for the five most productive areas of each university.

*Table 7 Breakdown of number of papers in 2012-2016 for the five most productive areas of each university in Bosnia and Herzegovina*

| Area | University of Sarajevo | University of Banja Luka | University of Tuzla | University of Mostar | International University of Sarajevo | International Burch University | University of Zenica | University of East Sarajevo | University of Bihać |
|---|---|---|---|---|---|---|---|---|---|
| Medicine | 332 | 76 | 102 | 67 | | 24 | 22 | | |
| Engineering | 212 | 91 | 77 | 19 | 38 | 16 | 24 | 20 | 18 |
| Computer Science | 195 | 66 | 53 | | 24 | 41 | | 14 | 8 |
| Agricultural and Biological Sciences | 124 | 81 | | 25 | | | | | 9 |
| Biochemistry, Genetics and Molecular Biology | 87 | | | 22 | | 7 | | | 4 |
| Social Sciences | | | 48 | 22 | | 14 | | 7 | |
| Mathematics | | 31 | | | 20 | | 9 | 8 | |
| Materials Science | | | | | 15 | | 20 | | |
| Physics and Astronomy | | | | | 16 | | 14 | | |
| Arts and Humanities | | | 24 | | | | | | |
| Health Professions | | | | | | | | | |
| Energy | | | | | | | | 7 | |
| Economics, Econometrics and Finance | | | | | | | | | |
| Business, Management and Accounting | | | | | | | | | |
| Environmental Science | | | | | | | | | 4 |
| Psychology | | | | | | | | | |
| Neuroscience | | | | | | | | | |
| Immunology and Microbiology | | | | | | | | | |
| Multidisciplinary | | | | | | | | | |
| Pharmacology, Toxicology and Pharmaceutics | | | | | | | | | |
| **Total** | **950** | **345** | **304** | **155** | **113** | **102** | **89** | **56** | **43** |

| Area | Sarajevo School of Science and Technology | University of Travnik | University Džemal Bijedić | University of Herzegovina | University of Vitez | Slobomir P University | University Sinergija | International University of Travnik |
|---|---|---|---|---|---|---|---|---|
| Medicine | | 14 | 5 | 9 | 9 | | | 1 |
| Engineering | 5 | 1 | 4 | | | 8 | 5 | 1 |
| Computer Science | 11 | | 7 | | | 2 | | |
| Agricultural and Biological Sciences | | | 3 | | | | | 1 |
| Biochemistry, Genetics and Molecular Biology | | | | | | | | |
| Social Sciences | 6 | 1 | | 2 | | | | 3 |
| Mathematics | 4 | | | | | | | |
| Materials Science | | | | | | | 3 | |
| Physics and Astronomy | | | | | | | 1 | |
| Arts and Humanities | | 1 | | | | | | |
| Health Professions | | 9 | | 6 | | | | |
| Energy | 4 | | | | | 3 | | |
| Economics, Econometrics and Finance | | | 3 | | 5 | | | 3 |
| Business, Management and Accounting | | | | | 6 | | | |
| Environmental Science | | | | | | | | |
| Psychology | | | | 3 | | | | |
| Neuroscience | | | | 2 | | | | |
| Immunology and Microbiology | | | | | 1 | | | |
| Multidisciplinary | | | | | | | 1 | |
| Pharmacology, Toxicology and Pharmaceutics | | | | | 1 | | | |
| **Total** | **30** | **26** | **22** | **22** | **22** | **13** | **10** | **9** |

The dominant area for scientific production is medicine, which is one of top five areas for 11 out of 17 universities. Engineering and computer science are also very prevalent research areas, whilst other areas are dominant in smaller universities.

The analysis of institutes in Bosnia and Herzegovina produced no results in Scopus search and therefore their data is not shown.

## Former Yugoslav Republic of Macedonia

The analysis for the Former Yugoslav Republic of Macedonia included eight universities for which the data on productivity and academic staff was available. The raw data is presented in the table below.

*Table 8 Scientific productivity and number of academic staff for universities in the Former Yugoslav Republic of Macedonia*

| Type | Name | Number of papers | | | | | 5y total | Academic staff | 5y papers/ person | 2016 papers/ person |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2012 | 2013 | 2014 | 2015 | 2016 | | | | |
| Public | University of Information Science and Technology "St. Paul The Apostle" | 12 | 18 | 23 | 13 | 16 | 82 | 39 | 2.10 | 0.41 |
| Public | Goce Delčev University of Štip | 46 | 71 | 60 | 78 | 73 | 328 | 200 | 1.64 | 0.37 |
| Public | Ss. Cyril and Methodius University of Skopje | 423 | 428 | 467 | 531 | 484 | 2333 | 2390 | 0.98 | 0.20 |
| Private | South East European University | 3 | 14 | 6 | 23 | 20 | 66 | 110 | 0.60 | 0.18 |
| Public | State University of Tetova | 9 | 11 | 22 | 11 | 17 | 70 | 273 | 0.26 | 0.06 |
| Private | University American College Skopje | 5 | 11 | 14 | 9 | 4 | 43 | 101 | 0.43 | 0.04 |
| Public | St. Clement of Ohrid University of Bitola | 0 | 10 | 6 | 10 | 5 | 31 | 375 | 0.08 | 0.01 |
| Private | FON University | 9 | 11 | 7 | 7 | 0 | 34 | 170 | 0.20 | 0.00 |

*Figure 6 Relative productivity of HEIs in the Former Yugoslav Republic of Macedonia (2016)*


*Figure 7 Relative productivity of HEIs in the Former Yugoslav Republic of Macedonia (2012-2016)*

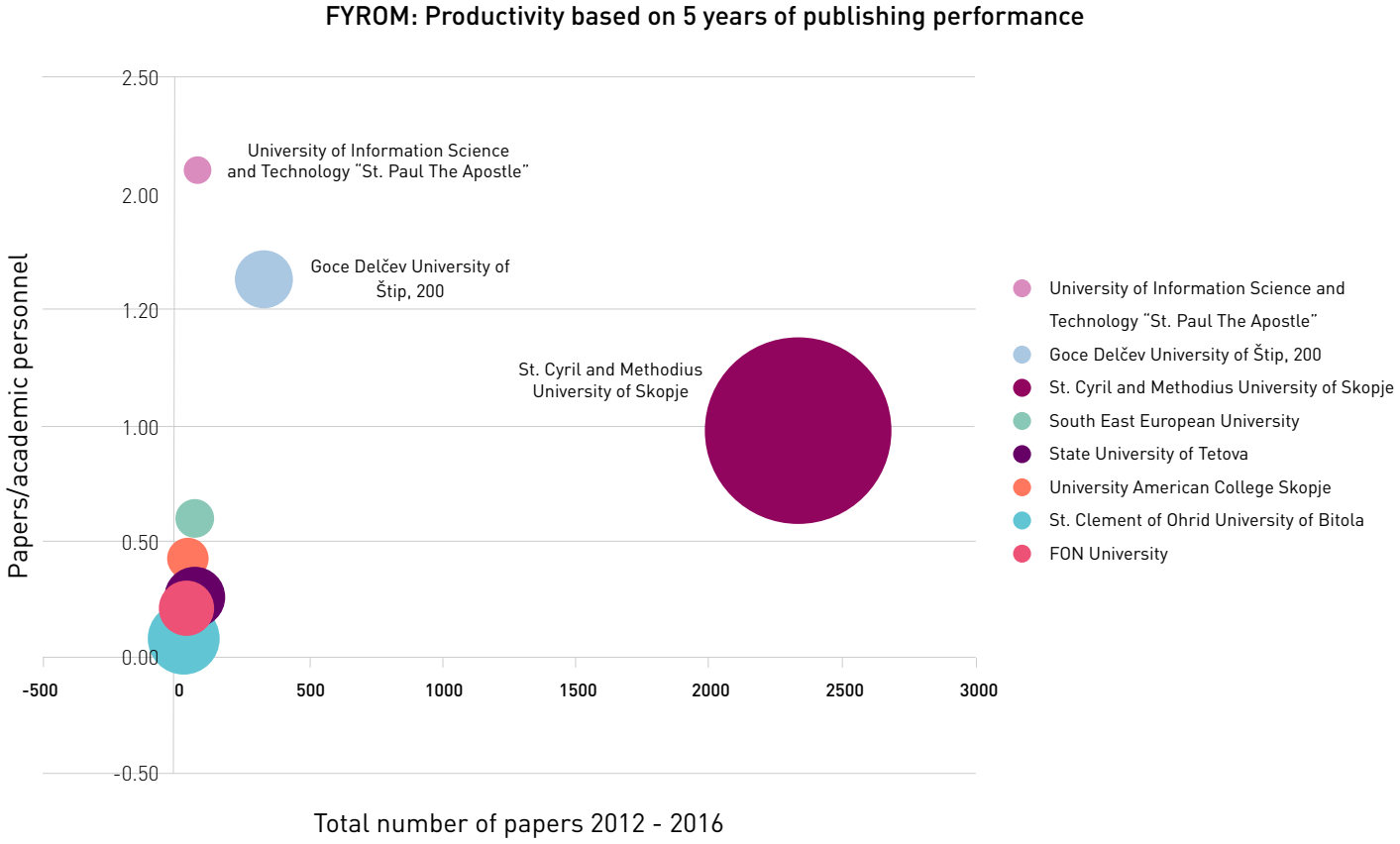


*Table 9 Breakdown of number of papers in 2012-2016 for the five most productive areas of each university in MK*

| Area | Ss. Cyril and Methodius University of Skopje | Goce Delčev University of Štip | University of Information Science and Technology "St. Paul The Apostle" | South East European University | State University of Tetova | FON University | University American College Skopje | International Balkan University | St. Clement of Ohrid University of Bitola |
|---|---|---|---|---|---|---|---|---|---|
| Computer Science | 555 | 48 | 52 | 23 | 13 | 19 | | 5 | 4 |
| Engineering | 546 | 54 | 31 | 13 | 11 | 11 | 4 | 6 | 4 |
| Medicine | 572 | | | | 11 | | | | 6 |
| Agricultural and Biological Sciences | 230 | 57 | | | 9 | | | | 7 |
| Chemistry | 224 | 56 | | | | | | 8 | |
| Earth and Planetary Sciences | | 59 | | | | | | | |
| Economics, Econometrics and Finance | | | | 27 | | | 24 | | |
| Business, Management and Accounting | | | | 30 | | | 8 | | |
| Mathematics | | | 16 | | | 8 | | 4 | |
| Social Sciences | | | | 4 | | 7 | 8 | | 6 |
| Physics and Astronomy | | | 7 | | 10 | | | | |
| Arts and Humanities | | | | | | 5 | 4 | | |
| Biochemistry, Genetics and Molecular Biology | | | 5 | | | | | | |
| Chemical Engineering | | | | | | | | 4 | |
| **Total** | **2127** | **274** | **111** | **97** | **54** | **50** | **48** | **27** | **27** |

The Ss. Cyril and Methodius University is the largest university and has the largest absolute number of papers produced in 2016. However, based on relative productivity, the University of Information Science and Technology "St. Paul the Apostle" is the most productive university, although the absolute number of papers is relatively small. The only two private universities with productivity in 2016 are South East European University and University American College.

The most dominant areas for almost all universities are engineering and computer science. It should also be noted that the dominant area for Ss. Cyril and Methodius University is medicine.

The only institute that is independent from a university and has data in Scopus is the Institute of Public Health. Their data on productivity is shown below.

*Table 10 Scientific productivity for research institutes in the Former Yugoslav Republic of Macedonia*

| Name | Number of papers | | | | | |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 5y total |
| Institute of Public Health | 8 | 7 | 3 | 4 | 3 | 25 |

*Table 11 Breakdown of number of papers in 2012-2016 for the five most productive areas of each research institute in the Former Yugoslav Republic of Macedonia*

| Area | Institute of Public Health |
|---|---|
| Medicine | 10 |
| Agricultural and Biological Sciences | 5 |
| Environmental Science | 5 |
| Pharmacology, Toxicology and Pharmaceutics | 4 |
| Physics and Astronomy | 3 |
| **Total** | **27** |

## Kosovo

The analysis for Kosovo included six universities for which the data on productivity and academic staff was available. The raw data is presented in the table below.

*Table 12 Scientific productivity and number of academic staff for universities in Kosovo*

| Type | Name | Number of papers | | | | | 5y total | Academic staff | 5y papers/ person | 2016 papers/ person |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2012 | 2013 | 2014 | 2015 | 2016 | | | | |
| Public | University of Pristina | 115 | 110 | 108 | 147 | 175 | 655 | 1500 | 0.44 | 0.12 |
| Private | Iliria Royal University | 0 | 0 | 4 | 2 | 0 | 6 | 91 | 0.07 | 0.00 |
| Public | University of Prizren | 0 | 1 | 0 | 3 | 7 | 11 | 180 | 0.06 | 0.04 |
| Private | AAB College | 0 | 0 | 0 | 1 | 1 | 2 | 37 | 0.05 | 0.03 |
| Private | American University in Kosovo | 1 | 1 | 0 | 0 | 0 | 2 | 37 | 0.05 | 0.00 |
| Public | HaxhiZeka University of Peja | 1 | 1 | 0 | 1 | 4 | 7 | 159 | 0.04 | 0.03 |
| Private | University for Business and Technology | 1 | 13 | 1 | 5 | 11 | 31 | NA | NA | NA |

*Figure 8 Relative productivity of HEIs in Kosovo (2016)*

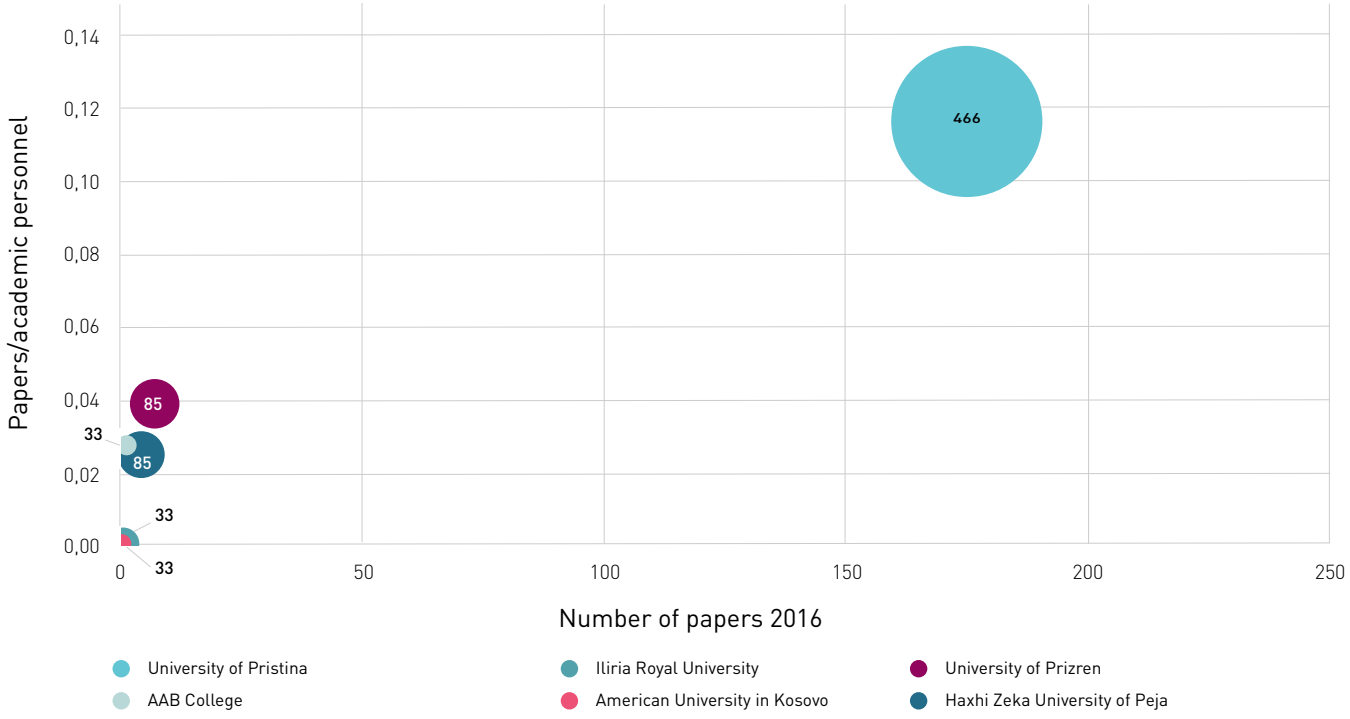
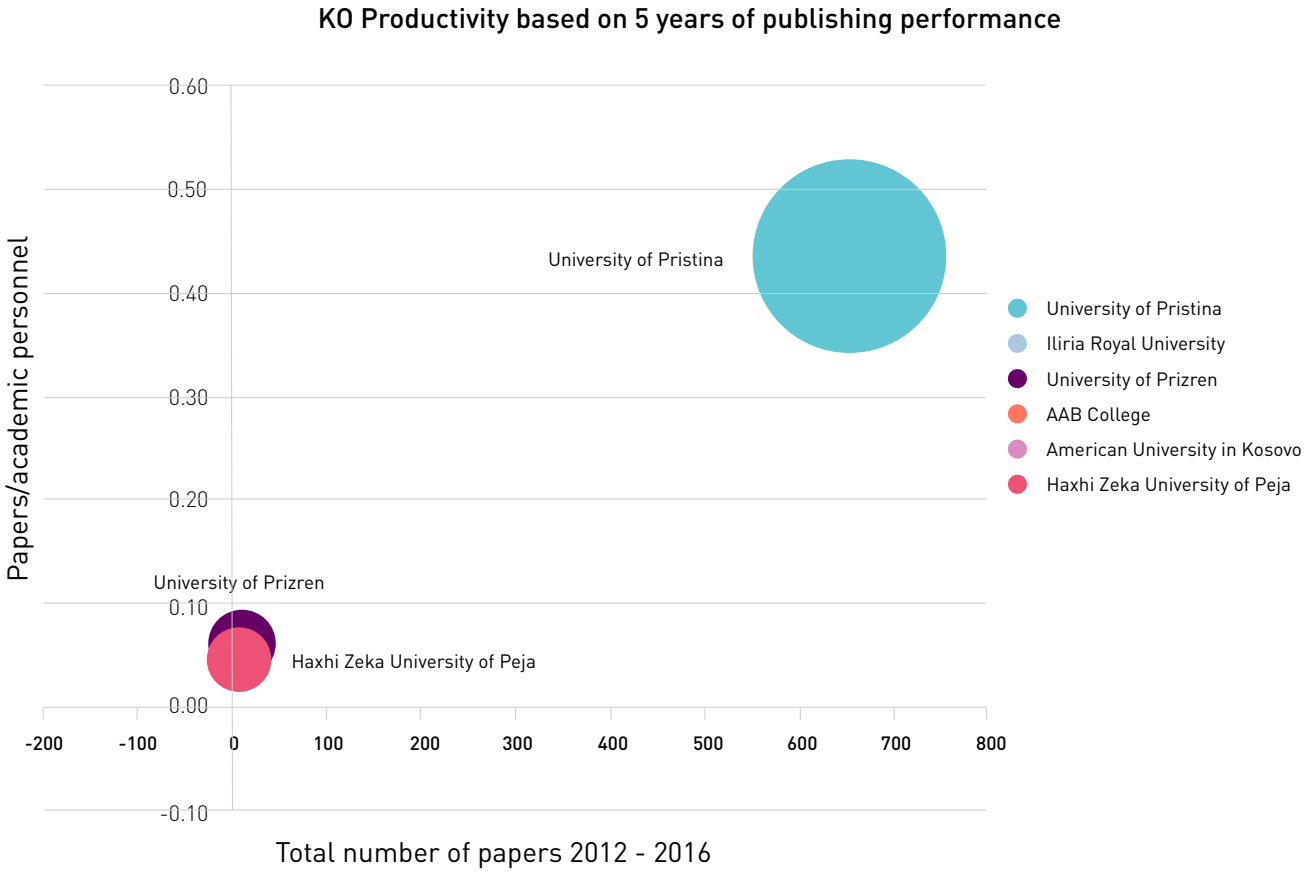


*Figure 9 Relative productivity of HEIs in Kosovo (2012-2016)*




The largest and most productive university, both by absolute and relative number, is the University of Pristina. Apart from this, the productivity of other universities is negligible. The data on academic staff for the University of Business and Technology was unavailable so relative performance for this university was not calculated.

*Table 13 Breakdown of number of papers in 2012-2016 for the five most productive areas of each university in Kosovo*

| Area | University of Pristina | University for Business and Technology | University of Prizren | Haxhi Zeka University of Peja | Iliria Royal University | AAB College |
|---|---|---|---|---|---|---|
| Medicine | 143 | | | | 4 | |
| Engineering | 81 | 26 | 5 | 1 | 1 | |
| Agricultural and Biological Sciences | 104 | | | 3 | | |
| Environmental Sciences | 90 | | | | | |
| Social Sciences | 82 | 3 | 4 | | | 1 |
| Computer Science | | 3 | 3 | | | 1 |
| Arts and Humanities | | 1 | 3 | | 1 | |
| Economics, Econometrics and Finance | | | 3 | 1 | 1 | |
| Materials Science | | 2 | | | | |
| Pharmacology, Toxicology and Pharmaceutics | | | | 2 | | |
| Business, Management and Accounting | | | | | | 1 |
| Environmental Science | | | | 1 | | |
| Health professions | | | | | 1 | |
| Mathematics | | | | | | 1 |
| **Total** | **500** | **35** | **18** | **8** | **8** | **4** |

Compared to other universities, there is a clear dominance of the University of Pristina with most productive areas in medicine, agricultural and biological sciences and environmental science. Compared to the productivity of the University of Pristina, the productivity of other universities is small.

The only research institute included in this analysis is the National Institute of Public Health of Kosovo. The data for this institute is shown in the tables below without the data related to personnel.

*Table 14 Scientific productivity of research institutes in Kosovo*

| Name | Number of papers | | | | | |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 5y total |
| National Institute of Public Health of Kosovo | 4 | 0 | 7 | 1 | 6 | 18 |

*Table 15 Breakdown of number of papers in 2012-2016 for the five most productive areas of each research institutes in Kosovo*

| Area | Institute of Public Health |
|---|---|
| Medicine | 15 |
| Immunology and Microbiology | 6 |
| Agricultural and Biological Sciences | 3 |
| Biochemistry, Genetics and Molecular Biology | 2 |
| Pharmacology, Toxicology and Pharmaceutics | 2 |
| **Total** | **28** |

## Montenegro

The analysis for Montenegro included three universities for which data on productivity and academic staff was available. The raw data is presented in the table below.

*Table 16 Scientific productivity and number of academic staff for universities in Montenegro*

| Type | Name | Number of papers | | | | | 5y total | Academic staff | 5y papers/ person | 2016 papers/ person |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2012 | 2013 | 2014 | 2015 | 2016 | | | | |
| Public | University of Montenegro | 198 | 248 | 285 | 260 | 299 | 1290 | 890 | 1.52 | 0.35 |
| Private | University Donja Gorica | 2 | 4 | 5 | 7 | 10 | 28 | 256 | 0.11 | 0.04 |
| Private | University Mediteran | 3 | 4 | 10 | 6 | 6 | 29 | 25 | 1.16 | 0.24 |

*Figure 10 Relative productivity of HEIs in Montenegro (2016)*

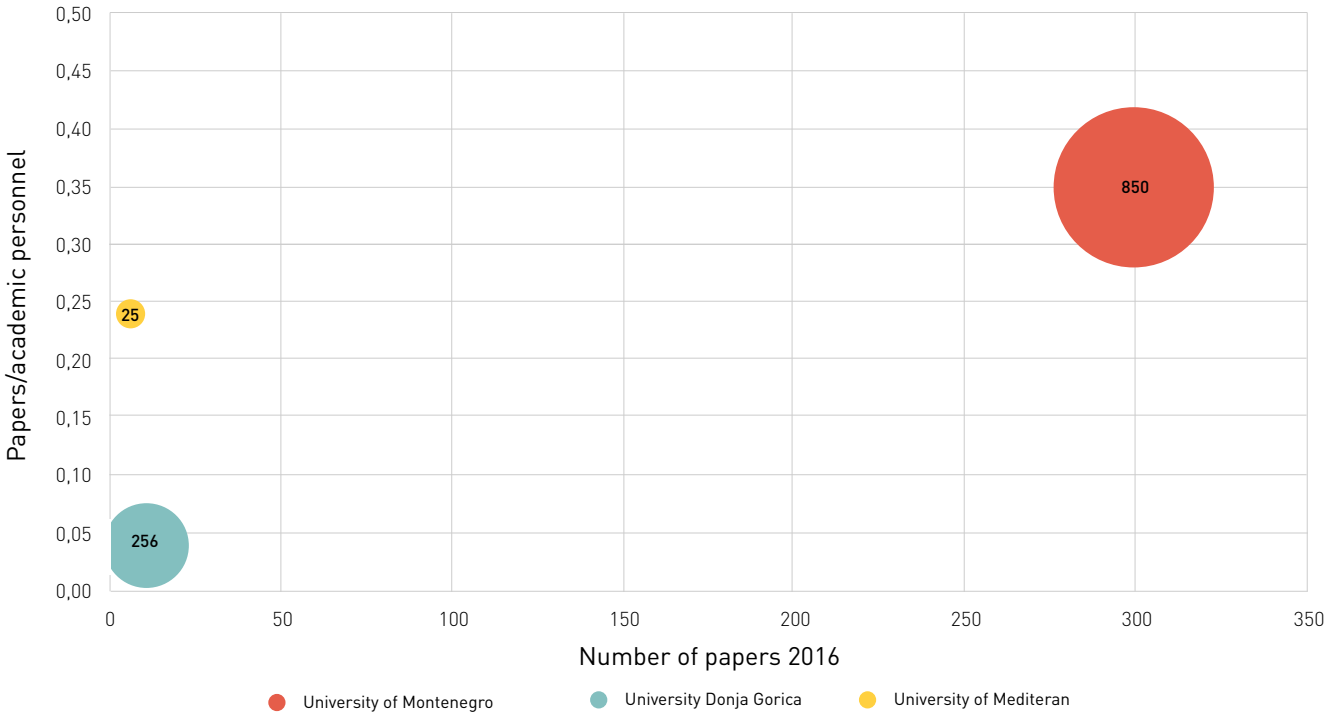
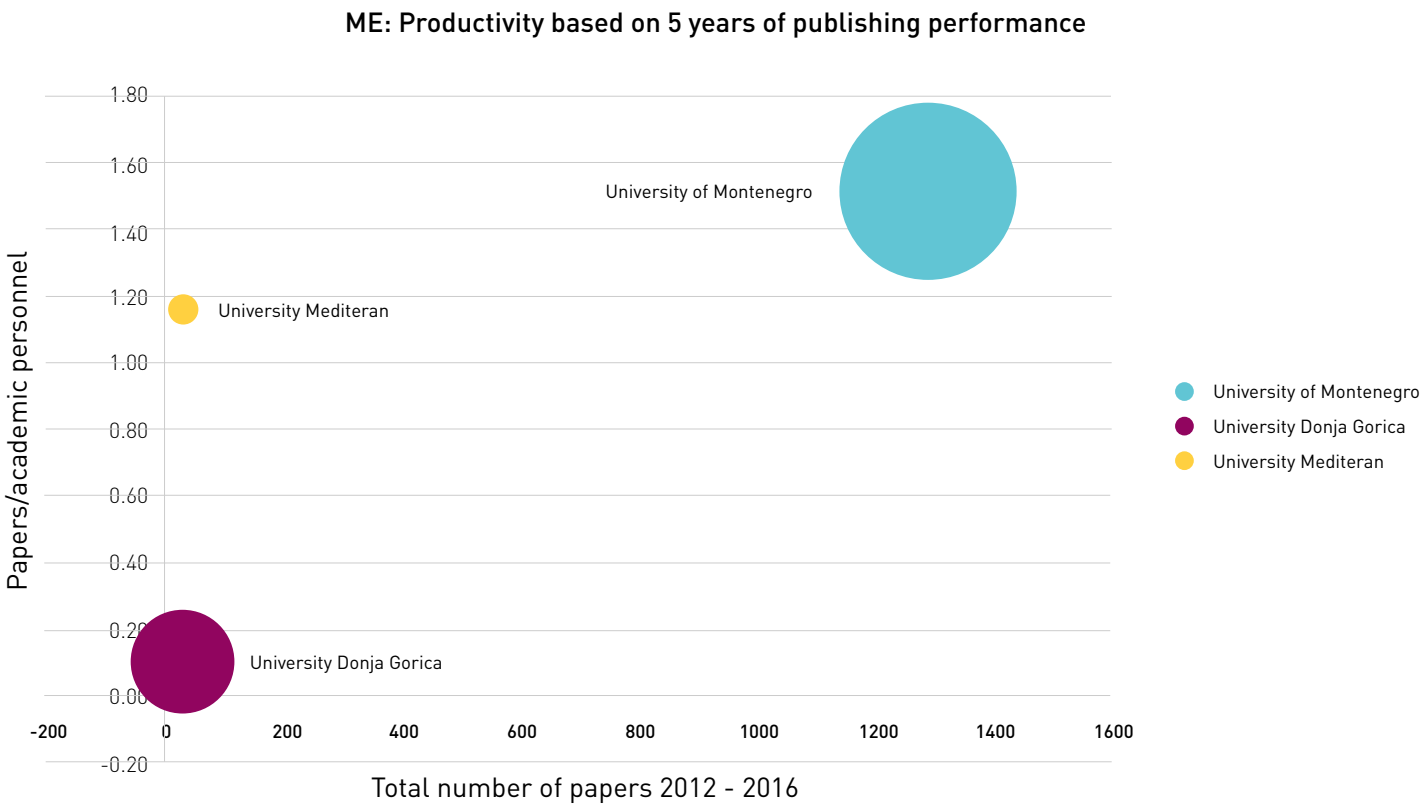


*Figure 11 Relative productivity of HEIs in Montenegro (2012-2016)*




Of the three universities, there is an evident dominance of the University of Montenegro, by all indicators. However, the relative productivity even for this university is relatively low with 0.35 papers per scientist per year.

*Table 17 Breakdown of number of papers in 2012-2016 for the five most productive areas of each university in Montenegro*

| Area | University of Montenegro | University Mediteran | University Donja Gorica |
|---|---|---|---|
| Engineering | 410 | 9 | 9 |
| Computer Science | 336 | 21 | 7 |
| Agricultural and Biological Sciences | 223 | | |
| Mathematics | 144 | 5 | 8 |
| Social Sciences | 122 | 3 | 4 |
| Economics, Econometrics and Finance | | | 4 |
| Business, Management and Accounting | | 2 | |
| **Total** | **1235** | **40** | **32** |

Dominant areas for the University of Montenegro are engineering, computer science, and agricultural and biological sciences. Although some other areas occur as dominant areas in the other two universities, the productivity in absolute numbers is low.

The analysis of the research performance of institutes is shown only in absolute numbers because of the scarce availability of data on the number of employees dedicated to research. The table below shows the data on institutes that are not affiliated to a university.

*Table 18 Scientific productivity for research institutes in Montenegro*

| Name | Number of papers | | | | | |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 5y total |
| Institute for Public Health | 4 | 14 | 6 | 6 | 12 | 42 |
| Institute of Hydrometeorology and Seismology | 3 | 0 | 1 | 4 | 1 | 9 |
| Clinical Centre of Montenegro | 12 | 22 | 11 | 23 | 24 | 92 |
| Institute of Modern Technology | 0 | 0 | 2 | 0 | 0 | 2 |
| Agency for Medicines and Medical Devices | 0 | 0 | 2 | 1 | 1 | 4 |

In the next table, the analysis of five-year productivity in the five most dominant areas for each institute is shown.

*Table 19 Breakdown of number of papers in 2012-2016 for the five most productive areas of each research institute in Montenegro*

| Area | Clinical Centre of Montenegro | Institute for Public Health | Institute of Hydrometeorology and Seismology | Agency for Medicines and Medical Devices | Institute of Modern Technology |
|---|---|---|---|---|---|
| Medicine | 84 | 24 | | 4 | |
| Biochemistry, Genetics and Molecular Biology | 11 | 4 | | | |
| Environmental Science | | 7 | 2 | | |
| Social Sciences | 8 | | | 1 | |
| Chemistry | | 7 | 1 | | |
| Agricultural and Biological Sciences | | 5 | 1 | | |
| Earth and Planetary Sciences | | | 5 | | |
| Neuroscience | 4 | | | | |
| Arts and Humanities | 3 | | | | |
| Computer Science | | | | | 2 |
| Energy | | | 2 | | |
| Pharmacology, Toxicology and Pharmaceutics | | | | 2 | |
| Engineering | | | | | 1 |
| **Total** | **110** | **48** | **11** | **7** | **3** |

The two most productive institutes are the Clinical Centre of Montenegro and the Institute for Public Health, with dominant productivity in medicine and the area of biochemistry, genetics and molecular biology.

## Serbia

The analysis for Serbia included 11 universities for which data on productivity and academic staff was available. The raw data is presented in the table below.

*Table 20 Scientific productivity and number of academic staff for universities in Serbia*

| Type | Name | Number of papers | | | | | 5y total | Academic staff | 5y papers/ person | 2016 papers/ person |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2012 | 2013 | 2014 | 2015 | 2016 | | | | |
| Public | University of Belgrade | 3811 | 3923 | 3951 | 3780 | 3812 | 19277 | 4289 | 4.49 | 0.89 |
| Public | University of Novi Sad | 1288 | 1226 | 1203 | 1145 | 1209 | 6071 | 3711 | 1.64 | 0.33 |
| Public | University of Niš | 770 | 851 | 835 | 788 | 736 | 3980 | 1558 | 2.55 | 0.47 |
| Public | University of Kragujevac | 529 | 561 | 478 | 513 | 536 | 2617 | 811 | 3.23 | 0.66 |
| Public | State University of Novi Pazar | 64 | 62 | 80 | 82 | 83 | 371 | 347 | 1.07 | 0.24 |
| Public | University of Defence | 27 | 67 | 43 | 60 | 89 | 286 | 451 | 0.63 | 0.20 |
| Public | John Naisbitt University | 50 | 29 | 39 | 28 | 19 | 165 | 500 | 0.33 | 0.04 |
| Public | Singidunum University | 42 | 47 | 46 | 64 | 50 | 249 | 140 | 1.78 | 0.36 |
| Private | Union University | 16 | 15 | 10 | 13 | 9 | 63 | 125 | 0.50 | 0.07 |
| Private | Alfa BK University | 5 | 4 | 13 | 4 | 4 | 30 | 69 | 0.43 | 0.06 |
| Private | Educons University | 33 | 37 | 21 | 26 | 19 | 136 | 90 | 1.51 | 0.21 |

*Figure 12 Relative productivity of HEIs in Serbia (2016)*

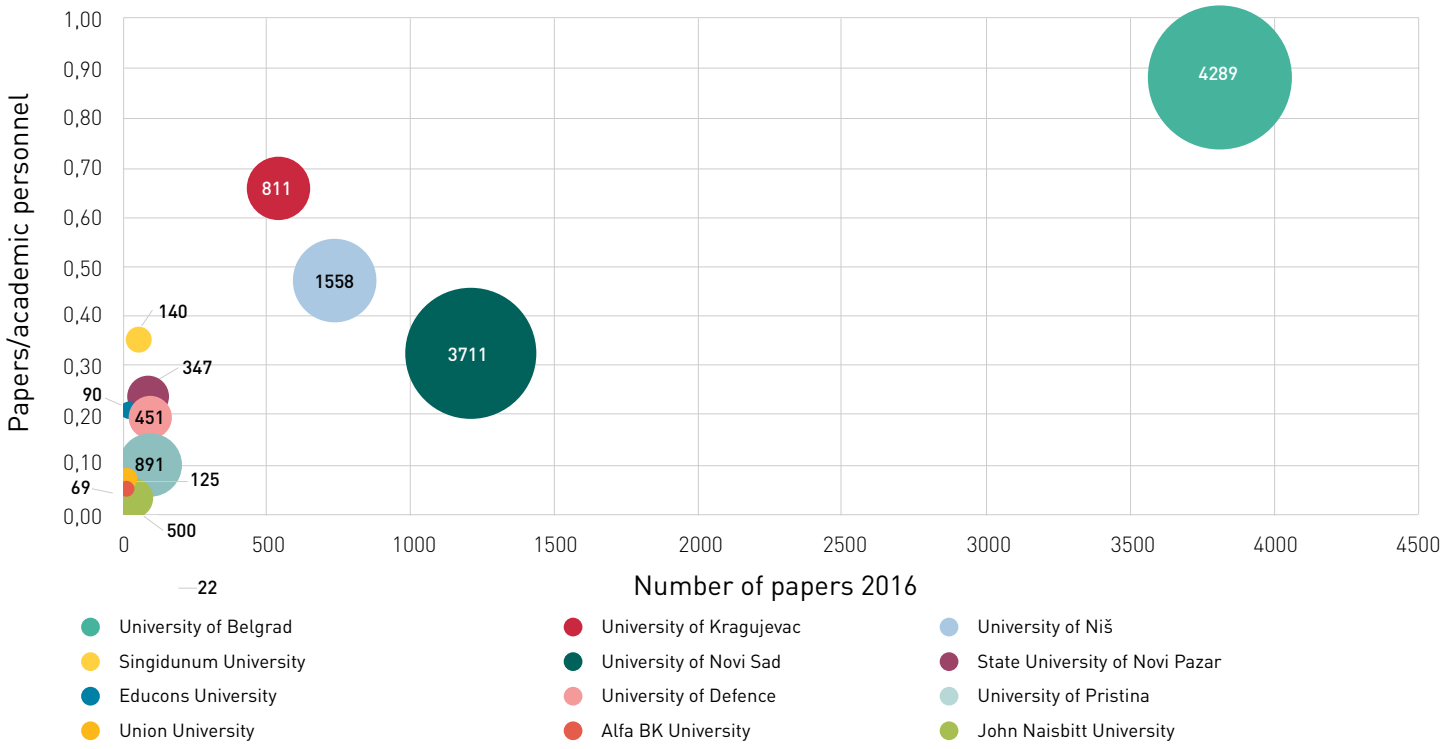
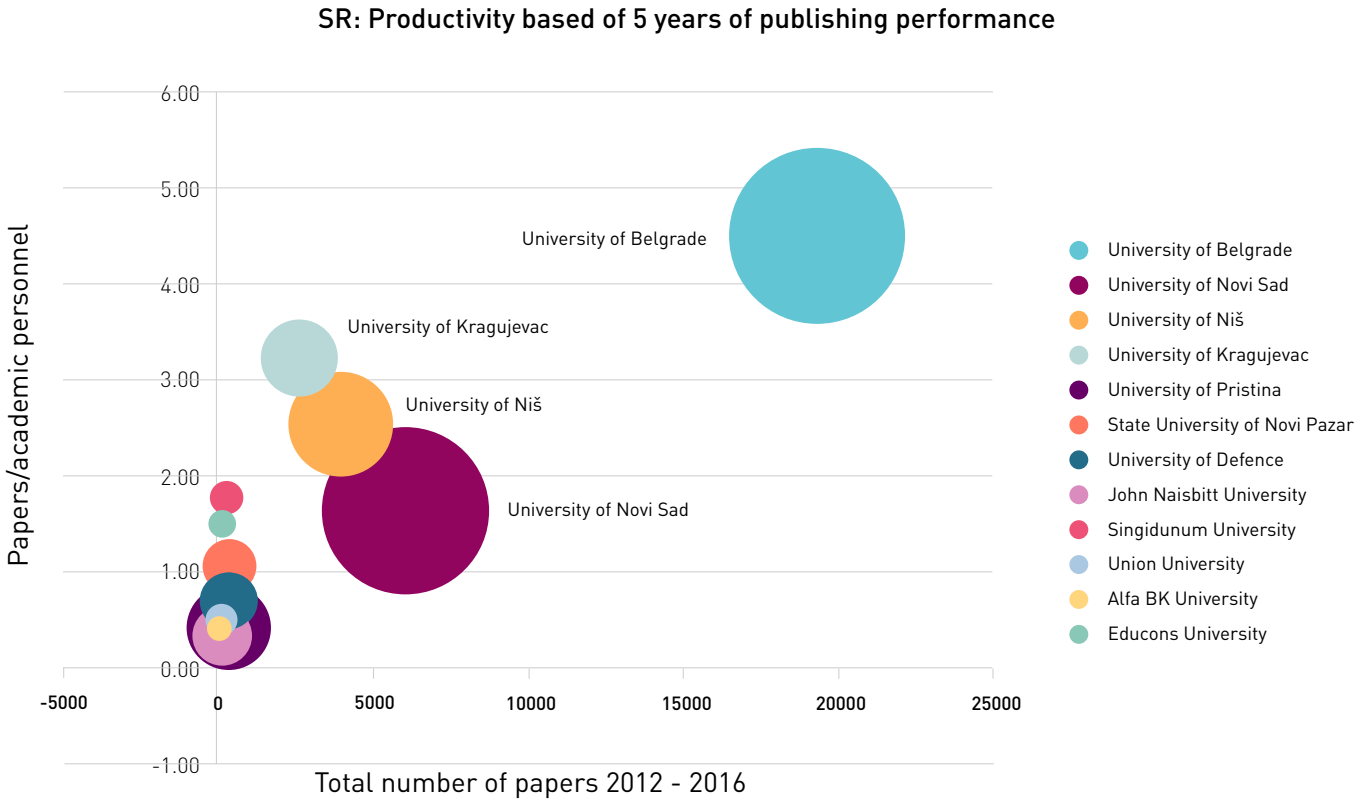



*Figure 13 Relative productivity of HEIs in Serbia (2012-2016)*




As it can be seen from the picture, the larger universities have better relative performance (y-axis), with the exception of Singidunum University, which is also the only private university in the top five universities by relative performance. There is an evident dominance of the University of Belgrade, both by size and relative production of papers.

*Table 21 Breakdown of number of papers in 2012-2016 for the five most productive areas of each university in Serbia*

| Area | University of Belgrade | University of Novi Sad | University of Niš | University of Kragujevac | State University of Novi Pazar |
|---|---|---|---|---|---|
| Medicine | 4699 | 975 | 1170 | 819 | 74 |
| Engineering | 3365 | 1430 | 901 | 605 | 80 |
| Chemistry | 2543 | 639 | 367 | 371 | |
| Physics and Astronomy | 3527 | | | | |
| Biochemistry, Genetics and Molecular Biology | 2660 | | | 394 | 50 |
| Computer Science | | 1030 | 551 | | 55 |
| Agricultural and Biological Sciences | | 1050 | | | |
| Mathematics | | | 577 | | 82 |
| Materials Science | | | | 304 | |
| Social Sciences | | | | | |
| Environmental Science | | | | | |
| Economics, Econometrics and Finance | | | | | |
| **Total** | **16794** | **5124** | **3566** | **2493** | **341** |

| Area | University of Defence | Singidunum University | John Naisbitt University | Educons University | Union University | Alfa BK University |
|---|---|---|---|---|---|---|
| Medicine | 227 | | | | | |
| Engineering | 27 | 69 | 33 | 21 | 16 | 10 |
| Chemistry | 9 | | | 18 | | |
| Physics and Astronomy | 15 | | | | | |
| Biochemistry, Genetics and Molecular Biology | | | | | | |
| Computer Science | | 88 | 50 | 17 | 32 | 4 |
| Agricultural and Biological Sciences | | | 28 | 19 | | |
| Mathematics | | 26 | 26 | | 17 | |
| Materials Science | 9 | | | | 5 | |
| Social Sciences | | 47 | | | 9 | 5 |
| Environmental Science | | 24 | | 31 | | 5 |
| Economics, Econometrics and Finance | | | 21 | | | |
| **Total** | **287** | **255** | **158** | **106** | **79** | **30** |

The most dominant area for all universities is engineering which is ranked in the top five research areas among all universities, and computer science which is the dominant area in eight out of 11 universities. It should be noted that the largest universities have dominant research production in the fields of medicine, engineering and chemistry. Some specifics of the universities are the number of papers in the field of agricultural and biological sciences for the University of Novi Sad, mathematics for the University of Niš, materials science for the University of Kragujevac, and social and environmental sciences for Singidunum University.

The analysis of the research performance of institutes is shown only in absolute numbers because of the scarce availability of data on the number of employees dedicated to research. The table below shows the data on institutes that are not affiliated to any university.

*Table 22 Scientific productivity for research institutes in Serbia*

| Name | Number of papers | | | | | |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 5y total |
| Institute of Field and Vegetable Crops | 95 | 54 | 60 | 56 | 69 | 334 |
| Oncology Institute of Vojvodina | 38 | 41 | 33 | 20 | 20 | 152 |
| Fruit Research Institute | 54 | 20 | 13 | 14 | 19 | 120 |
| Mathematical Institute of SASA | 25 | 23 | 17 | 27 | 21 | 113 |
| Scientific Veterinary Institute Novi Sad | 20 | 9 | 15 | 18 | 19 | 81 |
| Mihajlo Pupin Institute | 23 | 11 | 15 | 18 | 7 | 74 |
| Lola Institute | 18 | 19 | 6 | 5 | 5 | 53 |
| Mental Health Institute | 5 | 6 | 6 | 6 | 12 | 35 |
| Institute for Cardiovascular Diseases of Vojvodina | 5 | 9 | 12 | 3 | 6 | 35 |
| Institute of Economic Sciences | 6 | 7 | 8 | 4 | 7 | 32 |
| The Highway Institute | 1 | 4 | 2 | 6 | 2 | 15 |
| Biosense Institute | 0 | 0 | 0 | 0 | 7 | 7 |

In the next table the analysis of five-year productivity in the five most dominant areas for each institute is shown.

*Table 23 Breakdown of number of papers in 2012-2016 for the five most productive areas of each research institute in Serbia*

| Area | Biosense Institute | Institute of Economic Sciences | Mihajlo Pupin Institute | Institute for Cardiovascular Diseases of Vojvodina | Mental Health Institute | Oncology Institute of Vojvodina |
|---|---|---|---|---|---|---|
| Agricultural and Biological Sciences | 1 | | | | 3 | |
| Biochemistry, Genetics and Molecular Biology | | | | 4 | 5 | 42 |
| Medicine | | | | 30 | 26 | 101 |
| Engineering | 4 | 10 | 38 | 4 | | 10 |
| Mathematics | | | 10 | | | |
| Computer Science | 3 | | 46 | 2 | | |
| Chemistry | | | | | | 30 |
| Veterinary Science | | | | | | |
| Physics and Astronomy | | | 4 | | | |
| Pharmacology, Toxicology and Pharmaceutics | | | | | | 23 |
| Environmental Science | 1 | | | | | |
| Immunology and Microbiology | | | | | | |
| Environmental Science | | 6 | | | | |
| Economics, Econometrics and Finance | | 16 | | | | |
| Materials Science | | | | | | |
| Decision Sciences | | | | | | |
| Earth and Planetary Sciences | 1 | | | | | |
| Social Sciences | | 7 | 5 | | | |
| Business, Management and Accounting | | 7 | | | | |
| Neuroscience | | | | | 5 | |
| Psychology | | | | | 4 | |
| Arts and Humanities | | | | 2 | | |
| Chemical Engineering | | | | | | |
| **Total** | **10** | **46** | **103** | **42** | **43** | **206** |

| Area | Institute of Field and Vegetable Crops | Fruit Research Institute | Lola Institute | Mathematical Institute of SASA | Scientific Veterinary Institute Novi Sad | The Highway Institute |
|---|---|---|---|---|---|---|
| Agricultural and Biological Sciences | 269 | 107 | | | 33 | 2 |
| Biochemistry, Genetics and Molecular Biology | 113 | 22 | | | 5 | |
| Medicine | | | | | 17 | |
| Engineering | 16 | | 34 | 8 | | 5 |
| Mathematics | | | | 91 | | |
| Computer Science | | | 18 | 15 | | |
| Chemistry | 31 | | | | | |
| Veterinary Science | | | | | 38 | |
| Physics and Astronomy | | | 7 | 13 | | |
| Pharmacology, Toxicology and Pharmaceutics | | | | | | |
| Environmental Science | 21 | | | | | |
| Immunology and Microbiology | | 4 | | | 16 | |
| Environmental Science | | 9 | | | | 4 |
| Economics, Econometrics and Finance | | | | | | |
| Materials Science | | | 13 | | | |
| Decision Sciences | | | 5 | 7 | | |
| Earth and Planetary Sciences | | | | | | 11 |
| Social Sciences | | | | | | |
| Business, Management and Accounting | | | | | | |
| Neuroscience | | | | | | |
| Psychology | | | | | | |
| Arts and Humanities | | | | | | 1 |
| Chemical Engineering | | 3 | | | | |
| **Total** | **450** | **145** | **77** | **134** | **109** | **23** |

## Summative analysis of scientific productivity of universities for all countries

The figure directly below includes summed data per country for the number of published papers in 2016 and academic staff for all universities analysed within each country. This is followed by the counterpart showing five years of data.

*Figure 14 Summative analysis of country data on published papers and number of academic staff for all countries 2016*

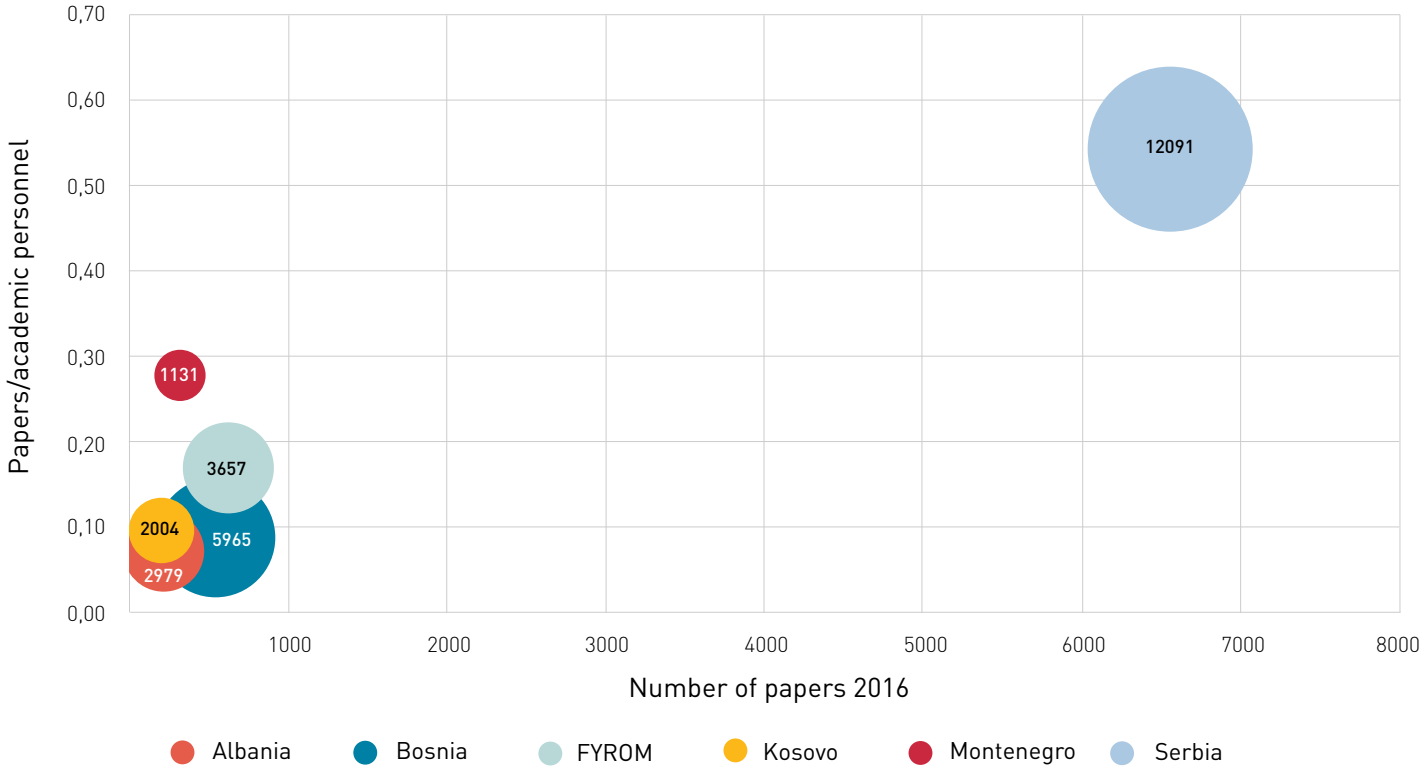
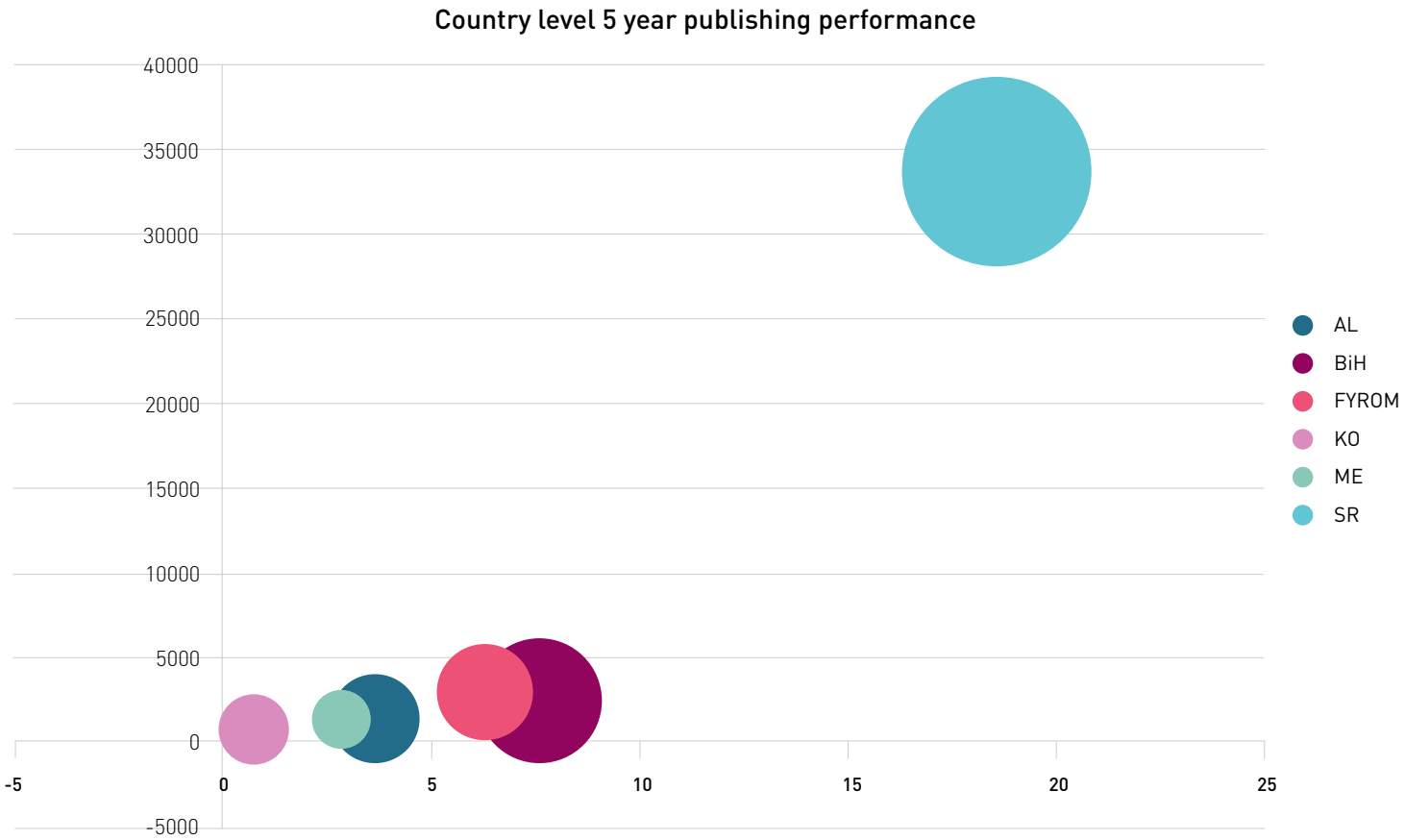


*Figure 15 Summative analysis of country data on published papers and number of academic staff for all countries 2012-2016*



# Appendix 2 Survey instruments

Three online questionnaires were sent to 246 HEIs in the region, targeting

| | | Responses |
|---|---|---|
| Q1 | Leadership at HEIs e.g. rectors and vice-rectors for research | 37 |
| Q2 | Management at sub-units at each HEI (faculties, departments or institutes) e.g. deans and vice-deans, heads of departments | 141 from 39 HEIs |
| Q3 | Individual researchers | 1 204 from 70 HEIs |

Surveys were sent by email to the institutional leadership (rector, vice-rector research), and followed up through emails and telephone calls. Despite these efforts, response rates remained relatively low. It is interesting to note that even if institutional (Q1) and faculty leadership (Q2) decided not to respond, they nevertheless forwarded Q3 to researchers at their institutions.

## Overview of the final sample

The majority of the responding institutions were public universities (see Table 1), although the questionnaires were distributed to a large number of institutions of different types.

*Table 24 Type of HEI as main employer of the respondents*

| | Frequency | Percent | Valid Percent |
|---|---|---|---|
| Public university | 1046 | 86.9 | 87.2 |
| Private university | 71 | 5.9 | 5.9 |
| Public college | 6 | 0.5 | 0.5 |
| Private college | 2 | 0.2 | 0.2 |
| Research institute | 65 | 5.4 | 5.4 |
| Other | 10 | 0.8 | 0.8 |
| **Total** | **1200** | **99.7** | **100.0** |

### Sample Q1: Leadership of HEIs - rectors and vice-rectors for research

*For a full list of the responding institutions see Appendix 2a List of HEIs responding to Q1*

With 37 responses, the overall level of response was low for some of the countries; it should be noted that some universities that have been highlighted by their high research productivity did not respond to this questionnaire. For example, neither the St. Cyril and Methodius University in Skopje nor Goce Delčev University of Štip were amongst the respondents from the Former Yugoslav Republic of Macedonia.

## Sample 2: Senior managers of sub-units (faculties, departments, institutes)

*For the full list of participating entities see Appendix 2b List of HEIs and their units responding to Q2.*

A total of 141 responses were received to Q3. The largest total number of responses came from Serbia (58), originating from faculties, departments and institutes at 17 HEIs. The lowest response rate was from the Former Yugoslav Republic of Macedonia where three questionnaires were returned from a single HEI, the International Balkan University. The sample overview is important as the type of HEI e.g. primarily teaching or research focused, is likely to influence the response to questions such as the quality of research infrastructure and facilities. It should be noted that in Serbia and Montenegro there are some 'standalone' institutes/faculties, which are not affiliated to any HEI and are therefore counted as HEI equivalents e.g. the BioSense Institute in Serbia.

Sample Q3: Individual researchers

For a full list of institutions see Appendix 2c - number of individual researchers from a named institution who responded to Q3

A total of 1 204 individuals from 70 HEIs responded to the questionnaire. Appendix 2c provides an overview of the response Q3. These are shown overall by country and by institution.

The largest total number of responses came from Serbia (785). These originated from 18 HEIs. Almost as many institutions from Albania were represented in the sample (18) but with only 93 individuals responding. Bosnia Herzegovina and Montenegro had 10 and nine institutions represented by 136 and 128 responses respectively, while five institutions were represented from the Former Yugoslav Republic of Macedonia and six from Kosovo with 19 and 40 responses total for each country. 47 of the HEIs had five or fewer responding researchers and of these, 32 had only a single (1) respondent.

Understanding this sample composition is important as it has a significant influence on interpreting responses and drawing meaningful conclusions. While the individual view of a rector could be judged to be representative of the view of an institution (Q1) or even the view of four or five deans could represent the view of senior management at a small HEI (Q2), a single researcher (Q3) cannot accurately represent the view of the full research body of an institution.

## Appendix 2a List of HEIs responding to Q1

| | |
|---|---|
| Albania | Metropolitan University of Tirana |
| Albania | University "Aleksander Xhuvani" of Elbasan |
| Albania | Luarasi University |
| Albania | University of Medicine in Tirana |
| Albania | University of Sports in Tirana |
| Albania | EPOKA University |
| Albania | University "Aleksander Moisiu", Durres |
| Albania | Agricultural University of Tirana |
| Albania | University "Ismail Qemali" of Vlora |
| Bosnia and Herzegovina | University of Bihac |
| Bosnia and Herzegovina | Logos centar College Mostar |
| Bosnia and Herzegovina | Herzegovina University |
| Bosnia and Herzegovina | Sarajevo School of Science and Technology |
| Bosnia and Herzegovina | University of Banja Luka |
| Bosnia and Herzegovina | University of Sarajevo |
| Former Yugoslav Republic of Macedonia | Institut za Komunikaciski Studii |
| Former Yugoslav Republic of Macedonia | Institut Za Opstestveni I Humanisticki Nauki Skopje |
| Kosovo | Higher Technical Professional School Zvecan |
| Kosovo | Universum College |
| Kosovo | University Mitrovica |
| Kosovo | University of Gjilan "Kadri Zeka" |
| Kosovo | University of Prishtina "Hasan Prishtina" |
| Montenegro | Mediterranean University |
| Montenegro | University Donja Gorica |
| Montenegro | University of Montenegro |
| Serbia | BioSens Institute |
| Serbia | John Naisbitt"University |
| Serbia | Vinca Institute of Nuclear Sciences |
| Serbia | Institute of International Politics and Economics (IIPE) |
| Serbia | Institute of Chemistry, Technology and Metallurgy |
| Serbia | Institute of Soil Science |
| Serbia | University of Novi Pazar |
| Serbia | Singidunum University |
| Serbia | University of Niš |
| Serbia | University of Belgrade |
| Serbia | University of Kragujevac |
| Serbia | University of Novi Sad |

## Appendix 2b List of HEIs and their units responding to Q2

N.B.: Some faculties and departments submitted the questionnaire twice, by different staff members. Some submissions mentioned only the name of the HEI, but not the faculty or department. In both cases, the answers have been included.

| Country | HEI name | 'Unit': Faculty/Institute/ Department |
|---|---|---|
| Albania | Agricultural University of Tirana | Agribusiness Management Department |
| | Agricultural University of Tirana | Department of Finance and Accounting, Faculty of Economy and Agribusiness |
| | Agricultural University of Tirana | Department of Forestry |
| | Agricultural University of Tirana | Faculty of Biotechnology and Food |
| | Agricultural University of Tirana | Faculty of Biotechnology and Food, Department of Food Science and Biotechnology |
| | Agricultural University of Tirana | Faculty of Economy and Agribusiness, Department of Rural Tourism Management |
| | Agricultural University of Tirana | Faculty of Economy and Agribusiness |
| | Agricultural University of Tirana | Faculty of Veterinary Medicine, Morphofunctional Subjects Department |
| | Agricultural University of Tirana | Horticulture and Landscape Architecture Department |
| | EPOKA University | Department of Political Science and International Relations |
| | EPOKA University | Faculty of Economics and Administrative Sciences/ Department of Economics |
| | European University of Tirana | Project Development and Partnership |
| | University "Ismail Qemali" of Vlora | Department of Foreign Languages |
| | University "Ismail Qemali" of Vlora | Faculty of Human Sciences |
| | University "Ismail Qemali" of Vlora | Faculty of Public Health |
| | University "Ismail Qemali" of Vlora | Faculty of Public Health, Department of Health Care |
| | University "Ismail Qemali" of Vlora | Study Centre for Scientific Research |
| | University "Ismail Qemali" of Vlora | |
| | Sports University Of Tirana | Faculty Of Physical Activity And Recreation |

| Country | HEI name | 'Unit': Faculty/Institute/ Department |
|---|---|---|
| Albania | University of Sports in Tirana | Faculty of Physical Activity and Recreation / Department of Physical Activity, Recreation and Tourism |
| | University of Sports in Tirana | Physical Activity and Recreation |
| | University of Sports in Tirana | Sport Sciences Research Institute |
| | University of Tirana | Faculty of Social Sciences |
| | University of Tirana | |
| Bosnia and Herzegovina | Logos centar College Mostar | Logos centar College Mostar, Department of Road Traffic |
| | Logos centar College Mostar | Logos Centar College Mostar, Department of Security Studies |
| | Logos centar College Mostar | Studies in Energetics |
| | Sarajevo School of Science and Technology | Computer Science / Information Systems |
| | University "Vitez" Vitez | Institute of University |
| | University of Banja Luka | Faculty of Agriculture |
| | University of Banja Luka | Faculty of Agriculture |
| | University of Banja Luka | Faculty of Medicine |
| | University of Banja Luka | Faculty of Philology, Department of Italian Language and Literature |
| | University of Banja Luka | Rectorate |
| | University of Bihac | School of Law |
| | University of Sarajevo | Faculty of Agriculture and Food Sciences |
| | University of Sarajevo | Faculty of Electrical Engineering in Sarajevo |
| | University of Sarajevo | Faculty of Health Studies in Sarajevo |
| | University of Sarajevo | Faculty of Mechanical Engineering |
| | University of Sarajevo | School of Economics and Business Sarajevo-University of Sarajevo, Management and Organisation |
| | University of Sarajevo | School of Economics and Business Sarajevo |
| | University of Sarajevo | |
| | University of Tuzla | Faculty of Humanities and Social Sciences |
| | University of Zenica | Faculty of Medicine - Department of Nursing |
| | University of Zenica | Metallurgical Institute "Kemal Kapetanović" Zenica |
| | University of Zenica | Polytechnic Faculty |

| Country | HEI name | 'Unit': Faculty/Institute/ Department |
|---|---|---|
| Former Yugoslav Republic of Macedonia | International Balkan University | Faculty of Economics and Administrative Sciences |
| | International Balkan University | Faculty of Engineering/Computer Engineering/International Balkan University |
| | International Balkan University | Law Faculty |
| Kosovo | University Mitrovica | Faculty of arts |
| | University of Prishtina "Hasan Prishtina" | Faculty of Electrical and Computer Engineering |
| | University of Prishtina "Hasan Prishtina" | Faculty of Mechanical Engineering |
| | University Mitrovica | Faculty of Medicine |
| | University of Prishtina "Hasan Prishtina" | Faculty of Physical Education and Sport |
| | University Mitrovica | Faculty of Sciences and Mathematics |
| Montenegro | Faculty of Business and Tourism | Faculty of Business and Tourism Budva |
| | Mediterranean University | Faculty for Information Technology |
| | Mediterranean University | Faculty of Law |
| | Mediterranean University | Faculty of Tourism |
| | Faculty of Management Herceg Novi | Faculty of Management Herceg Novi |
| | University Donja Gorica | Faculty for Information Systems and Technologies |
| | University Donja Gorica | Faculty for International Economics, Finance and Business |
| | University of Montenegro | Civil Engineering Faculty |
| | University of Montenegro | Department of French Language and Literature |
| | University of Montenegro | Faculty for Sport and Physical Education |
| | University of Montenegro | Faculty of Dramatic Arts |
| | University of Montenegro | Faculty of Economics |
| | University of Montenegro | Faculty of Electrical Engineering |
| | University of Montenegro | Faculty of Fine Art |
| | University of Montenegro | Faculty of Law |
| | University of Montenegro | Faculty of Mathematics and Natural Sciences |
| | University of Montenegro | Faculty of Mechanical Engineering |
| | University of Montenegro | Faculty of Metallurgy and Technology |
| | University of Montenegro | Faculty of Metallurgy and Technology |

| Country | HEI name | 'Unit': Faculty/Institute/ Department |
|---|---|---|
| Montenegro | University of Montenegro | Faculty of Philology |
| | University of Montenegro | Faculty of Philosophy |
| | University of Montenegro | Historical Institute |
| | University of Montenegro | Institute of Marine Biology |
| | University of Montenegro | Maritime Faculty Kotor |
| | University of Montenegro | Medical faculty |
| | University of Montenegro | |
| | University of Montenegro | |
| Serbia | "Business Academy" University | Faculty of Applied Management Economics and Finance |
| | "Business Academy" University | Faculty of Dentistry in Pancevo |
| | "Business Academy" University | Faculty of Law for Commerce and Judiciary |
| | "John Naisbitt" University | Faculty of Arts and Design |
| | "John Naisbitt" University | Faculty of Biofarming |
| | "John Naisbitt" University | Faculty of Civil Aviation |
| | "John Naisbitt" University | Faculty of Computer Science |
| | "John Naisbitt" University | Faculty of Culture and Media |
| | "John Naisbitt" University | Faculty of Management Zajecar |
| | "John Naisbitt" University | Faculty of Management Zajecar |
| | "John Naisbitt" University | Geo-economic Faculty |
| | "Metropolitan" University | Faculty of Economics |
| | "Singidunum" University | Faculty for Applied Ecology FUTURA |
| | "Singidunum" University | Faculty of Health, Legal and Business Studies |
| | "Singidunum" University | Faculty of Media and Communications |
| | BioSens Institute – Institute for research and development of information technology in biosystems | |
| | Institute for Medical Research | Institute for Medical Research |
| | Institute for Philosophy and Social Theory of the University in Belgrade | Institute for Philosophy and Social Theory |
| | Institute of Economic Sciences | Institute of Economic Sciences |
| | Institute of Food Technology in Novi Sad | Institute of Food Technology |
| | Institute of International Politics and Economics (IIPE) | Institute of International Politics and Economics |
| | Institute of Social Sciences Belgrade | Center for Sociological and Anthropological Research |
| | Institute of Soil Science | Demographic Research Centre |

| Country | HEI name | 'Unit': Faculty/Institute/ Department |
|---|---|---|
| Serbia | Scientific Institution Institute of Chemistry, Technology and Metallurgy | Centre of Microelectronic Technologies |
| | Scientific Institution Institute of Chemistry, Technology and Metallurgy | Department of Electrochemistry |
| | Scientific Institution Institute of Chemistry, Technology and Metallurgy | Department of Chemistry |
| | University of Belgrade | Centre of Catalysis and Chemical Engineering |
| | University of Belgrade | Faculty of Biology |
| | University of Belgrade | Faculty of Economics |
| | University of Belgrade | Faculty of Geography |
| | University of Belgrade | Faculty of Mechanical Engineering |
| | University of Belgrade | Faculty of Medicine |
| | University of Belgrade | Faculty of Special Education and Rehabilitation |
| | University of Belgrade | School of Electrical Engineering |
| | University of Belgrade | Faculty of Physical Chemistry |
| | University of Kragujevac | Faculty of Agronomy |
| | University of Kragujevac | Faculty of Economics |
| | University of Kragujevac | Faculty of Education University of Kragujevac, Jagodina |
| | University of Kragujevac | Faculty of Engineering |
| | University of Kragujevac | Faculty of Hotel Management and Tourism in Vrnjacka Banja |
| | University of Kragujevac | Faculty of Law |
| | University of Kragujevac | Faculty of Mechanical and Civil Engineering in Kraljevo |
| | University of Kragujevac | Faculty of Medical Sciences |
| | University of Kragujevac | Faculty of Philology and Arts, English Department |
| | University of Kragujevac | Faculty of Science |
| | University of Kragujevac | Faculty of Technical Sciences Cacak |
| | University of Kragujevac | Teachers Training Faculty in Uzice |
| | University of Niš | Faculty of Medicine |
| | University of Niš | Faculty of Philosophy, Niš |
| | University of Niš | Faculty of Sciences and Mathematics |
| | University of Niš | Faculty of Technology in Leskovac |
| | University of Niš | Pedagogical Faculty in Vranje |

| Country | HEI name | 'Unit': Faculty/Institute/ Department |
|---|---|---|
| Serbia | University of Novi Sad | Faculty of Agriculture |
| | University of Novi Sad | Faculty of Medicine Novi Sad |
| | University of Novi Sad | Faculty of Philosophy |
| | University of Novi Sad | Faculty of Sciences |
| | University of Novi Sad | Faculty of Technology Novi Sad |
| | University of Novi Sad | Technical Faculty "Mihajlo Pupin" Zrenjanin, Serbia |

## Appendix 2c Number of individual researchers from a named institution who responded to Q3

| Country | HEI | No. of responses | Total |
|---|---|---|---|
| Albania | Agricultural University of Tirana | 24 | 93 |
| | Albanian University | 2 | |
| | Aldent University | 1 | |
| | EPOKA University | 17 | |
| | European University of Tirana | 2 | |
| | Ministry of Education and Sports | 1 | |
| | Veterinary Diagnostic and Food Safety Laboratory, Tirana, BIO-V (Laborator Biodiagnostik Veterinar dhe Ushqimi, BIO-V) | 1 | |
| | National Agency of Natural Resources | 1 | |
| | Institute of Cultural Monuments "Gani Strazimiri" | 1 | |
| | University "Aleksander Moisiu", Durres | 1 | |
| | University "Aleksander Xhuvani" of Elbasan | 1 | |
| | University "Fan Noli" of Korca | 2 | |
| | University "Ismail Qemali" of Vlora | 5 | |
| | University "Luigj Gurakuqi" of Shkodra | 3 | |
| | University of Medicine in Tirana | 10 | |
| | University of New York in Tirana | 2 | |
| | University of Sports in Tirana | 12 | |
| | University of Tirana | 5 | |
| | Institute of Public Health | 1 | |
| | n.a. | 1 | |
| Bosnia and Herzegovina | n.a. | 3 | 136 |
| | International University of Sarajevo | 2 | |
| | Logos centar College Mostar | 1 | |
| | University of Sarajevo Institute of History | 1 | |
| | Sarajevo School of Science and Technology | 3 | |
| | University of Banja Luka | 50 | |
| | University of Bihac | 10 | |
| | University of Sarajevo | 50 | |
| | University of Tuzla | 1 | |
| | University of Zenica | 14 | |
| | Language institute | 1 | |

| Country | HEI | No. of responses | Total |
|---|---|---|---|
| Former Yugoslav Republic of Macedonia | International Balkan University | 8 | 19 |
| | Republic of Macedonia Goce Delcev State University Stip | 1 | |
| | Ss. Cyril And Methodius University in Skopje | 7 | |
| | State University of Tetova | 1 | |
| | University St Kliment Ohridski Bitola | 2 | |
| Kosovo | University of Priština temporarily settled in Kosovska Mitrovica | 11 | 40 |
| | University of Priština - Zvečan Faculty of Arts | 5 | |
| | University Mitrovica | 6 | |
| | University of Gjilan "Kadri Zeka" | 1 | |
| | University of Mitrovica "Isa Boletini" | 1 | |
| | University of Prishtina "Hasan Prishtina" | 16 | |
| Montenegro | Faculty of Business and Tourism | 1 | 128 |
| | Faculty of International Hotel and Touristic Management | 1 | |
| | Mediterranean University | 6 | |
| | Faculty of Management Herceg Novi | 1 | |
| | Agency for Medicines and Medical Devices of Montenegro | 1 | |
| | Faculty of Electrical Engineering | 1 | |
| | Center for Ecotoxicological Research | 1 | |
| | University Donja Gorica | 4 | |
| | University of Montenegro | 112 | |
| Serbia | "Business Academy" University | 3 | 785 |
| | "John Naisbitt" University | 8 | |
| | "Metropolitan" University | 6 | |
| | "Singidunum" University | 5 | |
| | Institute for Medical Research | 1 | |
| | Institute for Philosophy and Social Theory of the University in Belgrade | 7 | |
| | Institute of Food Technology in Novi Sad | 2 | |
| | Institute of International Politics and Economics (IIPE) | 1 | |
| | Institute of Social Sciences Belgrade | 4 | |
| | Scientific Institution Institute of Chemistry, Technology and Metallurgy | 27 | |
| | The Institute for Recent History of Serbia | 1 | |

| Country | HEI | No. of responses | Total |
|---|---|---|---|
| Serbia | University of Arts in Belgrade | 1 | |
| | University of Belgrade | 95 | |
| | University of Kragujevac | 312 | |
| | University of Niš | 30 | |
| | University of Novi Sad | 274 | |
| | Institute for Oncology of Vojvodina | 1 | |
| | Institute of Cardiovascular Diseases of Vojvodina | 1 | |
| | n.a. | 6 | |

# Appendix 3 Site visits and semi-structured interviews

Site visits were made to all six countries where experts met representatives of all three main target groups for the questionnaires and toured facilities.

Meetings were also arranged with policy makers and some representatives of the private sector. Some Skype interviews also took place when representatives of an HEI had not been available to meet during a site visit. National institutions were selected based strongly on their research productivity.

HEIs who hosted a site visit were:

### Albania

- University of Tirana
- Agricultural University of Tirana

### Bosnia and Herzegovina

- University of Banja Luka
- University of Sarajevo

### Former Yugoslav Republic of Macedonia

- Ss. Cyril and Methodius University in Skopje

### Kosovo

- University of Pristina

### Montenegro

- University of Montenegro

### Serbia

- University of Belgrade
- University of Novi Sad

The semi-structured interviews had three specific objectives:

1. **To gain a better understanding of the present situation** – particularly the main challenges faced by policy makers, universities and research organisations, and individual researchers in realising their research potential.
2. **To uncover the root causes of the problems** highlighted by the survey instruments.
3. **To explore possible solutions designed to make research more competitive, as well as more effective, and to enhance research capacity.** The objective was to provide realistic and feasible recommendations to national and EU level policy makers.

The intention was to use the responses to the questionnaires for forming the basis of the interviews. However, since there were delays in many of the responses, there was not sufficient time to extract the data.

# Appendix 4 Online survey questionnaires

## Questionnaire 1 (Q1) Addressing leadership of universities / colleges / research institutions

The objective of this survey, funded by the European Commission (EC), is to gather information and opinions from higher education and research institutions in the Western Balkans in order to better support research capacity in the region. Please click here to view the letter of support by the EC.

The study is carried out under the SPHERE Initiative by a consortium comprised of the European University Association (EUA) and the University of Barcelona.

The study is composed of three surveys, each targeting a different institutional stakeholder. The surveys will take 5-15 minutes to complete.

The current questionnaire **(Q1) addresses leadership of universities / colleges / research institutions.**

The second questionnaire **(Q2) is addressed to the management of the individual research entities at your institution, such as faculties, departments, or institutes.**

The third questionnaire **(Q3) targets individual researchers working at your institution (different disciplines, different levels of seniority).**

Some terms throughout the questionnaire may need further explanation. The online version provides links to access additional explanation where required. Those terms are explained in the glossary at the end of the document.

1. **Please select your country from the drop-down menu**
   - Albania
   - Bosnia and Herzegovina
   - Kosovo
   - Former Yugoslav Republic of Macedonia
   - Montenegro
   - Serbia

2. **Please select the name of your institution (in English). In case your institution is not in the list, please select 'other' and indicate the name in the appropriate field.**

   [Drop-down list]

   *2.1 Other* _____

3. **Name of the institution (in original language)** _____

4. **Your name** _____

5. **Your position** _____

6. **Contact (email) in case of inquiries** _____

7. **Legal status of your institution. Please select one option:**

- Public
- Private
- Mixed (public-private)

*7.a What is the percentage of public funding that your institution receives?*

- Less than 20%
- Less than 50%
- 50% or more
- Information not available

8. **How would you describe the profile of your institution?** Please choose one option.

| | |
|---|---|
| Primarily teaching oriented | o |
| Primarily research oriented | o |
| Both teaching and research oriented | o |

9. **Please select the areas and fields in which your institution is undertaking research activities:**

ISCED Fields

10. What do you see as the main problems for research in your country?

| | Strongly agree | Agree to some extent | Disagree to some extent | Strongly disagree | Do not know, not applicable |
|---|---|---|---|---|---|
| Research is not given sufficiently high priority by the state | | | | | |
| There is no national strategy, which would provide a clear framework | | | | | |
| There is no or insufficient research funding | | | | | |
| There is no or insufficient research facilities | | | | | |
| Research is too much concentrated in a few institutions | | | | | |
| Higher education institutions are focusing too much on teaching, and neglect research | | | | | |
| Research is not sufficiently applied. It ignores the needs of the industry and society | | | | | |
| There is too much focus on applied research | | | | | |
| Interdisciplinary research is not sufficiently encouraged | | | | | |
| The best researchers are leaving the country, which is a problem | | | | | |
| The best researchers are leaving the country, but they still continue to contribute to national research | | | | | |
| Young researchers are leaving the country | | | | | |
| Young talented people look for careers outside of the research and higher education sector | | | | | |
| Other: _____ | | | | | |

11. What are the main problems that researchers face at your institution?

| | Strongly agree | Agree to some extent | Disagree to some extent | Strongly disagree | Do not know, not applicable |
|---|---|---|---|---|---|
| There is no or insufficient research funding | | | | | |
| There are no or insufficient research facilities | | | | | |
| Some research facilities can only be accessed by some researchers | | | | | |
| There is no or insufficient administrative capacity to prepare research proposals, manage research projects etc. | | | | | |
| Most researchers have no international research contacts | | | | | |
| Most researchers are not internationally mobile | | | | | |
| It is not possible to hire international researchers | | | | | |
| Most researchers have to teach, and cannot put enough focus on their research | | | | | |
| Most researchers have other jobs on the side and cannot put enough focus on their research | | | | | |
| Other: _____ | | | | | |

12. How would you describe research governance in your country?

| | Strongly agree | Agree to some extent | Disagree to some extent | Strongly disagree | Do not know, not applicable |
|---|---|---|---|---|---|
| Faculties/ departments/ institutes are autonomous and decide very much on what they do | | | | | |
| Individual professors/ researchers do very much what they want | | | | | |
| Ministry/ national research agency have a strong say | | | | | |
| In my own position, I can influence research agendas in my institution | | | | | |

13. Please indicate the approximate overall budget of your institution in Euro (€) for the year 2016. Please select one option.

- Less than €49,000
- €50,000 - €99,000
- €100,000 - €249,000
- €250,000 - €499,000
- €500,000 - €999,999 million
- €1 million - €5 million€
- More than €5 million

14. Approximately how much of this budget is to finance research activities?

- None - please explain below
- 5% or less
- 10% or less
- 20% or less
- 50% or less
- more than 50%

15.1 If you selected none above, please elaborate here_____

15. **Please rate the importance of funding sources for research.**

| Funding for research | Very Important | Of some Importance | Not important | Do not know/ does not apply |
|---|---|---|---|---|
| Institutional funding by government | | | | |
| Research grants (EU) | | | | |
| Other international research grants | | | | |
| Contracts from industry | | | | |
| Endowment income, donations | | | | |
| Other: _____ | | | | |

16. **Who decides on how this budget is allocated to the faculties/ departments?**

- Institutional leadership (rector, president, director)
- A central body of the institution (academic senate or similar)
- Ministry/ national agency
- Other

17. **Please provide the approximate number of staff in research and teaching (in full time equivalents - FTEs).**

| | Total number | How many of them are international? |
|---|---|---|
| Professors (full professors) | | |
| Other staff with responsibilities for research and teaching | | |
| Other staff with responsibilities for research only | | |
| Other staff with responsibilities for teaching only | | |

18. **Please indicate the approximate percentage of research and teaching staff holding PhD at your faculty**

- 0-24%
- 25-49%
- 50-74%
- 75-100%

## RESEARCH FACILITIES

**19. How would you describe the research facilities and infrastructure (labs, computer labs, libraries, research support services etc.) at your institution?**

| |
|---|
| Generally very good |
| Generally very good, and we have been improving over recent years |
| Generally not so good, but we have some good facilities |
| Generally not so good |

**20. How would you generally describe facilities and infrastructure at your institution**

| | International standard, or close to it | Good national standard | Insufficient | Not applicable/ do not know |
|---|---|---|---|---|
| Research support services / unit | | | | |
| Research laboratories | | | | |
| Teaching labs (if different from research labs) | | | | |
| Large research equipment that requires technicians | | | | |
| Scientific databases (e.g. ISI Web of Knowledge) | | | | |
| Knowledge Transfer Office | | | | |
| Incubators | | | | |
| Research ethics committee | | | | |
| Libraries | | | | |
| Research publication repositories | | | | |
| Computer equipment | | | | |
| IT services | | | | |
| Accommodation for visiting scholars | | | | |
| Buildings/premises in general | | | | |
| Power supply/ electricity | | | | |
| Communication infrastructure (telephone, internet etc.) | | | | |

21. **Does your institution have/ engage in any of the following?**

| | Yes, very strong | Yes, occasionally/ some | No | Do not know/ not applicable |
|---|---|---|---|---|
| Spin-offs | | | | |
| Research collaboration with industry | | | | |
| International research collaboration | | | | |
| Research collaboration with public/ state offices and agencies | | | | |
| Patents | | | | |

22. **In your opinion, what could be done to improve the situation for research in your country, at the level of your institution, by your government and by the EU?**

23. **Is there any other important information with regard to research and research capacity that you want to convey?**

24. **If you would like a copy of the final report of this study, please indicate:**

- Yes
- No

THANK YOU FOR YOUR TIME IN COMPLETING THIS QUESTIONNAIRE

You have completed this survey. Your participation is highly valuable for this study. If you have any concerns about this survey, please contact us via hepu-surveys@eua.be.

## Glossary of Terms:

*Q9.*

**ISCED fields of education**

- General Programmes
  - Basic programmes
  - Literacy and numeracy
  - Personal development

- Education
  - Teacher training and education science
- Humanities and Arts
  - Arts
  - Humanities
- Social sciences, business and law
  - Social and behavioural science
  - Journalism and information
  - Business and administration
  - Law
- Science
  - Life sciences
  - Physical sciences
  - Mathematics and statistics
  - Computing
- Engineering, manufacturing and construction
  - Engineering and engineering trades
  - Manufacturing and processing
  - Architecture and building
- Agriculture
  - Agriculture, forestry and fishery
  - Veterinary
- Health and welfare
  - Health
  - Social services
- Services
  - Personal services
  - Transport services
  - Environmental protection
  - Security services

*Q20.*

**Research support services**

Services that support researchers and their research projects, for example in drafting proposals, preparation of applications, search for funding opportunities, general management.

**Knowledge Transfer Office**

An office facilitating the transfer of research results and outputs into economy and society.

**Incubators**

A structure which supports the development of new businesses through staff, infrastructure and funding.

*Q21.*

**Spin-offs**

Companies or social enterprises established out of the institution's research (partially), self-owned, or sold to an external party.

## Questionnaire 2 (Q2) Addressing management of the individual research entities at your institution, such as faculties, departments, or institutes

The objective of this survey, funded by the European Commission (EC), is to gather information and opinions from higher education and research institutions in the Western Balkans in order to better support research capacity in the region. Please click here to view the letter of support by the EC.

The study is carried out under the SPHERE Initiative, by a consortium comprised of the European University Association (EUA) and the University of Barcelona.

The study is composed of three surveys, each targeting a different institutional stakeholder. The surveys will take 5-15 minutes to complete.

The first questionnaire **(Q1) addresses leadership of universities / colleges / research institutions.**

The current questionnaire **(Q2) is addressed to the management of the individual research entities at your institution, such as faculties, departments, or institutes.**

The third questionnaire (**Q3) targets individual researchers working at your institution** (different disciplines, different levels of seniority).

1. **Country**
   - Albania
   - Bosnia and Herzegovina
   - Kosovo (*)
   - the Former Yugoslav Republic of Macedonia
   - Montenegro
   - Serbia

2. **Please select the name of your higher education institution (in English) from the drop down list below. If your institution is not listed, please select 'other' and provide the name below.**
   [Drop-down list DEFINE]

   *2.1 If other please specify here* _____

3. **Name of the higher education institution (in original language)**

   _____

4. **Faculty/ department/ institute (in English)** _____

5. **Faculty/ department/ institute (in original language)** _____

6. **Your name** _____

7. **Your position** _____

8. **Contact (email) in case of inquiries** _____

9. **Legal status.** Please select one option:
   - Public
   - Private
   - Mixed (public-private)

   *9.a What is the percentage of public funding that your institution receives?*
   - Less than 20%
   - Less than 50%
   - 50% or more
   - Information not available

10. **Please choose the area and fields where your faculty/ department/ institute is carrying out most of its RESEARCH activities (in terms of publications and funding) - select a maximum of two within each field:**

    ISCED fields

11. What do you see as the main problems for research in your country?

| | Strongly agree | Agree to some extent | Disagree to some extent | Strongly disagree | Do not know, not applicable |
|---|---|---|---|---|---|
| Research is not given sufficiently high priority by the state | | | | | |
| There is no national strategy, which would provide a clear framework | | | | | |
| There is no or insufficient research funding | | | | | |
| There are no or insufficient research facilities | | | | | |
| Research is too much concentrated in a few institutions | | | | | |
| Higher education institutions focus too much on teaching, and neglect research | | | | | |
| Research is not sufficiently applied, ignores the needs of industry and society | | | | | |
| There is too much focus on applied research | | | | | |
| Interdisciplinary research is not sufficiently encouraged | | | | | |
| The best researchers are leaving the country, which is a problem | | | | | |
| The best researchers are leaving the country, but they still continue to contribute to national research | | | | | |
| Young researchers are leaving the country | | | | | |
| Young talented people go for careers outside of research and higher education. | | | | | |
| Other: _____ | | | | | |

12. **What are the main problems for research faced by researchers at your faculty/ department/ institute?**

| | Strongly agree | Agree to some extent | Disagree to some extent | Strongly disagree | Do not know, not applicable |
|---|---|---|---|---|---|
| There is no or insufficient research funding | | | | | |
| There are no or insufficient research facilities | | | | | |
| Existing research facilities can only be accessed by some researchers | | | | | |
| There is no or insufficient administrative support (e.g. to help to prepare research proposals, manage research projects) | | | | | |
| Most researchers have no international research contacts | | | | | |
| Most researchers are not internationally mobile | | | | | |
| It is not possible to hire international researchers | | | | | |
| Most researchers have a high teaching workload, and cannot put enough focus on their research | | | | | |
| Most researchers have other jobs on the side and cannot put enough focus on their research | | | | | |
| Other: _____ | | | | | |

13. What influences and governs research at your institution? Please tick all that apply.

| | Strongly agree | Agree to some extent | Disagree to some extent | Strongly disagree | Do not know, not applicable |
|---|---|---|---|---|---|
| Ministry/ national research agency has a strong say | | | | | |
| Central university level mostly decides | | | | | |
| Faculties/ departments/ institutes decide very much on what they do | | | | | |
| Individual professors/ researchers do very much what they want | | | | | |
| In my own position, I can influence research agendas at my faculty/department/ institute | | | | | |

14. What is the main impact of the research activities undertaken at your faculty/ department / institute?

| | High impact | To some extent | Low to none | Do not know / not applicable |
|---|---|---|---|---|
| Contribute to international research | | | | |
| Contribute to national research | | | | |
| Support of local/ regional innovation of development | | | | |
| Informing teaching, to be sure that teaching is based on up-to-date research | | | | |
| Other | | | | |

15. Does your faculty/department/ institute have a budget for research activities?

- No, there is no dedicated funding for research
- Yes, core funding
- Yes, competitive funding
- Yes, core funding and competitive funding

16. **Please indicate the approximate research budget of your faculty/department/ institute in Euro (€) for the year 2016.**

Total: _____EUR

Of which approximately stems from

the core budget: _____ %

competitive funding: ____ %

17. **Please rate the importance of funding sources for research**

| Funding for research | Very Important | Of some Importance | Not important | Do not know/ does not apply |
|---|---|---|---|---|
| Institutional funding by government | | | | |
| Research grants (EU) | | | | |
| Other international research grants | | | | |
| Contracts from industry | | | | |
| Endowment income, donations | | | | |
| Other: _____ | | | | |

18. **Is there any funding related to performance?**

- Yes
- No

*18.1 If yes, please select among the following output-oriented criteria the ones that are in place*

| Output-oriented criteria | Select all that apply |
|---|---|
| Yes, for the number of Master degrees awarded | |
| Yes, for the number of doctoral candidates that we support | |
| Yes, for the number of doctoral degrees that we award | |
| Research contracts with the ministry/ national agencies | |
| Research publications | |
| Other (please specify) | |

19. **Are there any other issues that are important with regard to research funding that you want to convey to us?**

20. The approximate number of staff in research and teaching at your faculty/department/institute

| | Total number | How many of these are international staff |
|---|---|---|
| Full professors | | |
| Other staff with responsibilities for research and teaching | | |
| Other staff with responsibilities for research only | | |
| Other staff with responsibilities for teaching only | | |

21. Please indicate the approximate percentage of research and teaching staff holding a PhD at your faculty

- 0-24%
- 25-49%
- 50-74%
- 75-100%

22. Please indicate the degree of autonomy of researchers to:

| | Yes, full autonomy | Yes, to some extent | No, or very limited autonomy | I do not know/ not applicable |
|---|---|---|---|---|
| To choose their own line of research | | | | |
| To manage their research funds | | | | |
| To select and hire staff | | | | |
| To carry out commercial activities | | | | |
| To take up other work (for earning an additional income) | | | | |

23. **Please indicate the approximate number of academic publications published by members of your faculty/ department/ institute in the last year**

| | Number |
|---|---|
| ISI journal articles | |
| Other journal articles (non-ISI) | |
| Papers presented at international conferences | |
| Papers presented at national conferences | |
| PhD theses | |
| Books | |
| Book chapters | |
| Reports | |

24. **Do your faculty/ department/ institute members engage in the following activities?**

| | Common practice | Possible, but rarely used/ done | Not practised | Not possible, due to regulations/ laws | Do not know/ not applicable |
|---|---|---|---|---|---|
| Collaborative research with international companies | | | | | |
| Contract research for international companies | | | | | |
| Collaborative research with domestic companies | | | | | |
| Contract research for domestic companies | | | | | |
| Working in industry (contract or part-time) | | | | | |
| Spin-off creation | | | | | |
| Patent activity | | | | | |
| Other: ___ | | | | | |

*24.1 If yes, approximately how many patents are owned by the faculty/ department/ institute members?*

25. **Does your faculty/ department/ institute have any partnerships with:**

| | Yes, on a regular basis | Occasionally | No, but we are trying | No |
|---|---|---|---|---|
| Local companies/ industry | | | | |
| National companies/ industry | | | | |
| International companies/ industry | | | | |

26. **Has your faculty/ department/ institute any specific strategy for contributing to local development or societal impact of science?**

- Yes/No
- If yes, please elaborate.

27. **Do colleagues at your faculty/ department/ institute have access to the following facilities and infrastructures, and rate their quality:**

| | International standard, or close to it | Good national standard | Insufficient | Not applicable/ do not know |
|---|---|---|---|---|
| Research support services / unit | | | | |
| Research laboratories | | | | |
| Teaching labs (if different from research labs) | | | | |
| Large research equipment that requires technicians | | | | |
| Scientific databases (e.g. ISI Web of Knowledge) | | | | |
| Knowledge Transfer Office | | | | |
| Incubators | | | | |
| Research ethics committee | | | | |
| Libraries | | | | |
| Research publication repositories | | | | |
| Computer equipment | | | | |
| IT services | | | | |
| Accommodation for visiting scholars | | | | |
| Buildings/premises in general | | | | |
| Power supply/ electricity | | | | |
| Communication infrastructure (telephone, internet etc.) | | | | |

28. How would you rate the quality of the following at your faculty/ department/ institute?

| | International standard, or close to it | Good national standard | Not so strong | Not applicable/ do not know |
|---|---|---|---|---|
| Research excellence | | | | |
| Attractive institutional environment | | | | |
| Industry contacts and collaboration | | | | |
| International networking | | | | |
| Quality assurance | | | | |

29. Do you award doctorates?

- Yes
- No

30. Number of doctoral candidates at your faculty / department / institute (by nationality- citizenship)

| | Nationality | Number (HC) | Total |
|---|---|---|---|
| Doctoral candidates | Foreign | | |
| | Local<br><br>(Non-Foreign) | | |

31. How frequent are the following?

| | Common practice | Possible, but rarely used | Not practised | Not possible, due to regulations/ laws |
|---|---|---|---|---|
| Doctoral theses can be written in English | | | | |
| PhD courses are taught in English | | | | |
| Entrepreneurial training is provided | | | | |
| Transferable skills training is provided | | | | |
| Interdisciplinary research is encouraged | | | | |
| International mobility for doctoral candidates (to attend conferences, access libraries and labs abroad) | | | | |
| International exchange of doctoral candidates | | | | |
| International joint doctoral programmes | | | | |
| Programmes in collaboration with industry | | | | |
| Support units for doctoral studies | | | | |
| Research study rooms for candidates | | | | |
| Provision of accommodation for doctoral candidates | | | | |

32. Please name and describe one highlight regarding the research at your institution that you would like to draw attention to. This does not necessarily have to be something that is internationally recognised, but can be a process, a project, a strategy, service or research output that you think is locally or nationally relevant:

33. In your opinion, what could be done to improve the situation for research, in your country, at the level of your institution, by your government and by the EU?

34. **Is there any other important information with regard to research and research capacity that you want to convey?**

35. **If you would like a copy of the final report of this study, please indicate:**

- Yes
- No

## THANK YOU FOR YOUR TIME IN COMPLETING THIS QUESTIONNAIRE

You have completed this survey. Your participation is highly valuable for this study. If you have any concerns about this survey, please contact us via hepu-surveys@eua.be.

## Glossary of Terms:

### *Q10.*

**ISCED fields of education**

- General Programmes
  - Basic programmes
  - Literacy and numeracy
  - Personal development
- Education
  - Teacher training and education science
- Humanities and Arts
  - Arts
  - Humanities
- Social sciences, business and law
  - Social and behavioural science
  - Journalism and information
  - Business and administration
  - Law

- Science
  - Life sciences
  - Physical sciences
  - Mathematics and statistics
  - Computing
- Engineering, manufacturing and construction
  - Engineering and engineering trades
  - Manufacturing and processing
  - Architecture and building
- Agriculture
  - Agriculture, forestry and fishery
  - Veterinary
- Health and welfare
  - Health
  - Social services
- Services
  - Personal services
  - Transport services
  - Environmental protection
  - Security services

*Q15.*

**Core funding**

Regular funding provided by ministry or research funding agency

**Competitive funding**

Distributed via competitive calls for proposals, for which your faculty, departments, institutes have to apply

*Q18.*

**Funding related to performance**

The allocation of funding considers the results of teaching (i.e. number of degrees awarded) or research results (i.e. publications).

*Q24.*

**Spin-off creation**

Companies or social enterprises that have been created following research and innovation projects carried out by a higher education institution. They may be partially owned by the university, or may be sold off.

*Q27.*

**Research support services**

Services that support researchers and their research projects, for example in drafting proposals, preparation of applications, search for funding opportunities, general management.

**Knowledge Transfer Office**

An office facilitating the transfer of research results and outputs into economy and society.

**Incubators**

A structure which supports the development of new businesses through staff, infrastructure and funding.

## Questionnaire 3 (Q3) Addressing individual researchers

The objective of this survey, funded by the European Commission (EC), is to gather information and opinions from higher education and research institutions in the Western Balkans in order to better support research capacity in the region. Please click here to view the letter of support by the EC.

The study is carried out under the SPHERE Initiative, by a consortium comprised of the European University Association (EUA) and the University of Barcelona.

The study is composed of three surveys, each targeting a different institutional stakeholder. The surveys will take 5-15 minutes to complete.

The first questionnaire **(Q1) addresses leadership of universities / colleges / research institutions.**

The second questionnaire (**Q2) is addressed to the management of the individual research entities at your institution, such as faculties, departments, or institutes.**

The current questionnaire **(Q3) targets individual researchers working at your institution** (different disciplines, different levels of seniority).

Some terms throughout the questionnaire may need further explanation. The online version provides links to access additional explanation where required. Those terms are explained in the glossary of terms at the end of the document.

## Q3 - Questionnaire Researchers

### PERSONAL INFORMATION

*Add introductory page (see other questionnaires)*

1. **Are you…?**

   Please select

   - Male
   - Female

2. **Academic degrees** (if you have several, just the ones that are most important for our researcher career)

| Degree | Year of award | Country of award |
|---|---|---|
| Undergraduate degree (or equivalent) | [Drop-down list –year] | [Drop-down list -country] |
| Master degree (or equivalent) | | |
| Doctorate | | |

3. **Country in which your institution is located. If your institution is not in the drop-down list, please select 'other' and specify the name below.**

4. **What is the name of your current employing institution/organisation (in case of several employers, please indicate the main one)?**

   [Drop-down list – universities]

   *If not in the list, please select 'Other' and specify here:*_____

5. **Type of institution?**

   - Public university
   - Private university
   - Public college
   - Private college
   - Research institute
   - Other

6. **What is your position?**

Please select

- Professor
- Associate Professor
- Lecturer
- Senior Research Fellow
- Postdoc/Research Fellow
- Research Assistant
- Teaching Assistant
- Dean, head of department or other senior administration position
- Other:___

7. **Which describes best your current employment situation** (please select all the appropriate responses)

- Permanent (tenure) contract
- Fixed term contract (display options):
  - <1year
  - 1-2 year
  - 2+ year
- Post-doctoral position (display options):
  - <2 year
  - 2-3 year
  - 3+ year
- Non-employment contract

  (e.g. fellowship/grant without social benefits)
- Other, please specify _____

8. **Is your contract?**

Please select

- Full-time
- Part-time (display options):

  <50%

  >50%

9. **Does your salary come from?**

- The institution's own funding
- Government
- National or international fellowship
- Other

10. **Do you also work in any other place?**

- No
- Yes, less than 8 hours per month
- Yes, less than 20 hours per month
- Yes, less than 30 hours per month
- Yes, 30 hours or more
- Yes, but irregularly
- Other

**If yes, in what sector**

- Teaching
- Public research institution
- Contract with a foreign research institution
- Public sector/ government
- Business sector/ private enterprise
- Contract with a foreign company
- Self-employed
- Other

11. **Are you teaching?**

- Yes/no

12. **If you are teaching: What is your weekly teaching work load at your main institution and, if applicable, at other institutions?**

| | 6 hours or less | 8 hours or less | 10 hours or less | More than 10 hours | None/ not applicable |
|---|---|---|---|---|---|
| At your institution | | | | | |
| At other institutions | | | | | |

13. **On average, how much time per week do you allocate to research?**

- None/ not applicable
- Less than 8 hours
- Less than 20 hours
- More than 20 hours
- Full time

14. **What is your main field of research?**

- Sciences
- Mathematics, statistics & computing
- Engineering, manufacturing & construction
- Medical and health sciences & services
- Agricultural sciences (incl. veterinary)
- Social sciences
- Law
- Business/economics
- Humanities and arts
- Education
- Services

15. **How do you usually conduct your research activities?**

| | Very commonly | Sometimes | Seldom | Never | Not applicable |
|---|---|---|---|---|---|
| Alone | | | | | |
| Within a research group/team | | | | | |
| Collaboration with colleagues from my institution | | | | | |
| Collaboration with colleagues from other institutions in my country | | | | | |
| Collaboration with colleagues from other institutions in the Western Balkans | | | | | |
| Collaboration with international colleagues | | | | | |
| Collaboration with domestic industry | | | | | |
| Collaboration with international industry | | | | | |
| Other: _____ | | | | | |

16. **How many PhD candidates are you currently supervising?**

- None
- 4 or less
- 10 or less
- 20 or less
- More than 20

17. **How much freedom do you have in your research:**

| | Yes, full autonomy | Yes, to some extent | No, or very limited autonomy | I do not know/ not applicable |
|---|---|---|---|---|
| To choose their own line of research? | | | | |
| To manage their research funds? | | | | |
| To select and hire staff? | | | | |
| To carry out commercial activities? | | | | |
| To engage in interdisciplinary research? | | | | |

18. Which of the following describes your situation?

| | Strongly agree | Agree to some extent | Disagree to some extent | Strongly disagree | I do not know, not applicable |
|---|---|---|---|---|---|
| I have access to the necessary research infrastructure (labs, computers, library etc.) to do my research | | | | | |
| I have the necessary staff support to do my research | | | | | |
| I have the necessary funding to do my research | | | | | |
| In my position, I have a high level of autonomy in developing my research | | | | | |
| I am involved in interdisciplinary research collaboration within my institution | | | | | |
| I am involved in interdisciplinary research collaboration with colleagues from other institutions | | | | | |
| I am involved in spin-off activities, research incubators or similar | | | | | |
| I am/have been involved in patents | | | | | |
| I frequently attend international conferences | | | | | |
| I am very dedicated to my work | | | | | |
| I am satisfied with my career | | | | | |
| I am satisfied with my salary | | | | | |
| I am proud to work at my institution/organisation | | | | | |
| My working situation is difficult, due to a high workload | | | | | |
| My working situation is difficult, due to bureaucracy, administration | | | | | |

19. Do you have access to the following? If yes, how would you rate the quality?

| | No access | International standard, or close to it | Good national standard | Insufficient | Not applicable/ do not know |
|---|---|---|---|---|---|
| Research support services / unit | | | | | |
| Research laboratories | | | | | |
| Teaching labs (if different from the research labs) | | | | | |
| Large research equipment that requires technicians | | | | | |
| Scientific databases (e.g. ISI Web of Knowledge) | | | | | |
| Knowledge Transfer Office | | | | | |
| Incubators | | | | | |
| Research ethics committee | | | | | |
| Libraries | | | | | |
| Research publication repositories | | | | | |
| Computer equipment | | | | | |
| IT services | | | | | |
| Accommodation for visiting scholars | | | | | |
| Buildings/premises in general | | | | | |
| Power supply/ electricity | | | | | |
| Communication infrastructure (telephone, internet etc.) | | | | | |

20. Have you published any of the following over the last year (2016)?

| | Yes, on a regular basis | No, but we are trying | No |
|---|---|---|---|
| ISI journal articles | | | |
| Other journal articles (non-ISI) | | | |
| Papers presented at international conferences | | | |
| Papers presented at national conferences | | | |
| PhD thesis | | | |
| Books | | | |
| Book chapters | | | |
| Reports | | | |

20.1 If co-authored, who do you write with most often?

| | Colleagues from my institution | Colleagues from other institutions | International colleagues |
|---|---|---|---|
| ISI journal articles | | | |
| Other journal articles (non-ISI) | | | |
| Papers presented at international conferences | | | |
| Papers presented at national conferences | | | |
| PhD thesis | | | |
| Books | | | |
| Book chapters | | | |
| Reports | | | |

21. Have you been involved in applications for research projects (regardless whether successful or not)?

| | National, involving colleagues from another institution | Horizon 2020 / FP7 | Other European projects | Other international projects |
|---|---|---|---|---|
| Frequently, as an applicant | | | | |
| Frequently, as a partner | | | | |
| Occasionally as an applicant | | | | |
| Occasionally as a partner | | | | |
| No | | | | |

22. **Were you involved in any research activity related with local development or any other kind of societal impact over the last year?**

- Yes
- No

If yes, please specify

23. **What are the main problems that you and fellow researchers face at your faculty/ department / institute?**

| | Strongly agree | Agree | Neither agree or disagree | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| There is no or insufficient research funding | | | | | |
| There are no or insufficient research facilities | | | | | |
| Some research facilities can only be accessed by some researchers | | | | | |
| There is no or insufficient administrative support (e.g. to help prepare research proposals, manage research projects etc.) | | | | | |
| Most researchers have no international research contacts | | | | | |
| Most researchers are not internationally mobile | | | | | |
| It is not possible to hire international researchers | | | | | |
| Most researchers have a high teaching workload and cannot put enough focus on their research | | | | | |
| Most researchers have other jobs on the side and cannot put enough focus on their research | | | | | |
| Other: _____ | | | | | |

24. What do you see as the main problems for research in your country?

| | Strongly agree | Agree | Neither agree or disagree | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| Research is not given sufficiently high priority by the state | | | | | |
| There is no national strategy which would provide a clear framework | | | | | |
| There is no or insufficient research funding | | | | | |
| There are no or insufficient research facilities | | | | | |
| Research is too much concentrated in a few institutions | | | | | |
| Higher education institutions are focusing too much on teaching, and neglect research | | | | | |
| Research is not sufficiently applied, and ignores the needs of industry and society | | | | | |
| There is too much focus on applied research | | | | | |
| Interdisciplinary research is not sufficiently encouraged | | | | | |
| The best researchers are leaving the country, which is a problem | | | | | |
| The best researchers are leaving the country, but they still continue to contribute to national research | | | | | |
| Young researchers are leaving the country | | | | | |
| Young talented people look for careers outside of the research and higher education sectors | | | | | |
| Other: _____ | | | | | |

25. **Please name and describe one highlight regarding the research at your institution that you would like to draw attention to? This does not necessarily have to be something that is internationally recognised, but can be a process, a project, a strategy, service or research output that you think is locally or nationally relevant:**

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