**Supplementary Material**

**Evaluating the scientific performance of institutions within the university: an example from the University of Belgrade’ leading institutions**

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As we can see from TABLE SIa, the Institute Vinča leads the way with 2100 published papers. In addition, the quality of the journals in which those papers were published is quite high. The median value of indicator *AVG\_JIF\_PERCENTILE* is 66.309, meaning that half the Vinča papers came out in journals which are in top 33.691% in their respective JCR subject category.

TABLE SIa. Number of published papers, median and interquartile range for indicator *Average Journal Impact Factor Percentile* for five leading institutes

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | InstVinča | InstICTM | Inst Biol Res | InstPhys | Inst Mult Disc Res |
|   | Number of papers | 2100 | 1163 | 1109 | 954 | 531 |
| AVG\_JIF\_PERCENTILE | Median  | 66.309 | 63.057 | 55.195 | 74.423 | 65.382 |
| IQR | 35.965 | 41.114 | 47.165 | 33.950 | 44.056 |

A remarkable result was achieved by the Institute of Physics. Fully half of its papers were published in journals which are placed in top 25.577% of the respective JCR subject category. On the other hand, the Institute for Biological Research “Siniša Stanković” has the lowest median value and highest interquartile range (IQR) among the top institutes (large variability of the observed indicator), meaning that its performance is weaker than the previously mentioned institutes.

TABLE SIb. Number of published papers, median and interquartile range for indicator *Average Journal Impact Factor Percentile* for faculties of medical sciences

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | FacMed | FacPharm | FacVet Med | FacDent |
|  | Numberof papers | 2456 | 780 | 287 | 312 |
| AVG\_JIF\_PERCENTILE | Median  | 40.256 | 51.611 | 33.784 | 32.916 |
| IQR | 50.676 | 48.711 | 41.063 | 59.661 |

Our results show that the Faculty of Medicine has the largest number of published papers (2456), but they are published in journals with lower ratings on the *AVG\_JIF\_PERCENTILE* indicator than those of the Institute Vinča and the Institute of Physics. A similar conclusion can be deduced for both the Faculty of Veterinary Medicine and the Faculty of Dental Medicine, while the Faculty of Pharmacy with a median value of 51.611 for indicator *AVG\_JIF\_PERCENTILE* has the best performance in the group of faculties of medical sciences (TABLE SIb).

TABLE SIc. Number of published papers, median and interquartile range for indicator *Average Journal Impact Factor Percentile* for faculties of sciences and mathematics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | FacBiol | FacChem | FacPhys Chem | FacPhys | FacMath |
|  | Number of papers | 950 | 974 | 602 | 383 | 365 |
| AVG\_JIF\_PERCENTILE | Median  | 44.031 | 63.057 | 68.375 | 76.866 | 62.071 |
| IQR | 44.709 | 40.626 | 38.579 | 24.451 | 44.967 |

In the group of faculties of sciences and mathematics, the Faculty of Physical Chemistry and the Faculty of Physics stand out. Half of the papers from the Faculty of Physical Chemistry are published in the top 31.625% of journals, while half of the papers written by authors from the Faculty of Physics are in the top 23.134% of journals (TABLE SIc).

TABLE SId. Number of published papers, median and interquartile range for indicator *Average Journal Impact Factor Percentile* for faculties of technology and engineering sciences (top 5 in terms of number of published papers)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Fac Techn Met | Fac Elect Eng | FacMech Eng | FacAgr | FacMin Geol |
|  | Number of papers | 1343 | 697 | 692 | 619 | 378 |
| AVG\_JIF\_PERCENTILE | Median  | 63.333 | 60.294 | 55.455 | 47.283 | 49.156 |
| IQR | 45.901 | 41.516 | 44.625 | 47.159 | 48.453 |

TABLE SIe. Number of published papers, median and interquartile range for indicator *Average Journal Impact Factor Percentile* for faculties of technology and engineering sciences (rest[[1]](#footnote-1))

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | FacOrg Sci | FacTech Bor | FacTransport | FacForestry | FacCivil Eng |
|  | Numberof papers | 333 | 264 | 224 | 205 | 182 |
| AVG\_JIF\_PERCENTILE | Median  | 39.091 | 46.019 | 55.532 | 28.313 | 44.815 |
| IQR | 46.991 | 42.420 | 46.795 | 37.393 | 48.895 |

Among faculties of technology and engineering sciences, the Faculty of Technology and Metallurgy leads the way with more than 1300 published papers, half of those having appeared in the top 36.667% of journals (TABLE SId). Among faculties of technology and engineering sciences with fewer published papers (TABLE SIe), the Faculty of Transport and Traffic Engineering exhibits the best performance, with a median value for the indicator *Average Journal Impact Factor Percentile* of 55.532 (meaning that half of its papers were published in the top 44.468% of journals.

In our paper, we emphasized the importance of qualitative aspects (percentile-based indicators, which are not influenced by the size of institution) of publication performance of UB institutions. On the other hand, number of papers should be considered cautiously (it is likely that institutions with larger number of academic staff will produce more papers). Still, no official data concerning the number of academic staff employed at each faculty and institute (especially not historically) is publicly available; thus, making it impossible to provide a methodologically sound analysis by incorporating the size of the institutions. If we, as proposed by the reviewer, apply the number of academic staff presented in Zivkovic et al. paper[[2]](#footnote-2), results (TABLE SII) are quite appealing for Faculty of Physical Chemistry and Faculty of Chemistry.

TABLE SII. Publications per Researcher Ratio for the analysed faculties, listed in a decreasing order

|  |  |  |  |
| --- | --- | --- | --- |
| Faculties | Number of published papers | Number of researchers | Publications per Researcher |
| Fac Phys Chem | 602 | 41 | 14.68 |
| Fac Chem | 974 | 73 | 13.34 |
| Fac Med | 2456 | 254 | 9.67 |
| Fac Techn Met | 1343 | 152 | 8.84 |
| Fac Biol | 950 | 115 | 8.26 |
| Fac Phys | 383 | 59 | 6.49 |
| Fac Pharm | 780 | 144 | 5.42 |
| Fac Elect Eng | 697 | 163 | 4.28 |
| Fac Min Geol | 378 | 110 | 3.44 |
| Fac Math | 365 | 111 | 3.29 |
| Fac Dent | 312 | 95 | 3.28 |
| Fac Tech Bor | 264 | 81 | 3.26 |
| Fac Mech Eng | 692 | 214 | 3.23 |
| Fac Agr | 619 | 261 | 2.37 |
| Fac Vet Med | 287 | 127 | 2.26 |
| Fac Org Sci | 333 | 162 | 2.06 |
| Fac Forestry | 205 | 105 | 1.95 |
| Fac Transport | 224 | 142 | 1.58 |
| Fac Civil Eng | 182 | 158 | 1.15 |

Besides analysing the quality of journals in which UB academic staff publishes, we performed percentile-based analysis in terms of the quality of the published papers from 2009 to 2014. As we can see from Figure S1a, researchers from the Institute Vinča published a considerable number of cited papers. Namely, 0.2% of their papers are in the group of highly-cited papers (Top 1%), 5.1% papers are in the second group (papers which are in Top 1-10% by citations in research field), 7.82% of papers are in group of Top 10-20%, 29.93% of papers are in the category Top 20-50%, while 56.94% are, based on citation, in bottom-half. Among the leading institutes, the Institute for multidisciplinary studies performs quite well with only 49.47% of papers in bottom-half (the best result among the leading institutes). On the other hand, the faculties of medical sciences are far behind these results, as can be seen from Figure S1b.

FIGURE S1a. Percentage of papers belonging to certain percentile groups (five leading institutes)



FIGURE S1b. Percentage of papers belonging to certain percentile group (faculties of medical sciences)



Although the Faculty of Biology has, besides the Faculty of Chemistry, the largest number of published papers among faculties of sciences and mathematics, they are less cited than the other faculties from the group with 70.14% of papers origination from the Faculty of Biology appearing in bottom-half of the citation metrics (Figure S1c). On the other hand, the Faculty of Technology and Metallurgy (Figure S1d) is shown to have not only a large number of published papers but also a high citation score of those papers. In particular, 0.43% of papers are in the group of best papers (Top 1%), 7.04% of papers are in second group (papers rated as Top 1-10% by citation in a certain research field for a particular year), 9.61% of papers published by researchers from the Faculty of Technology and Metallurgy are in the Top 10-20%, 28.82% of papers are in Top 20-50%, while 54.11% of papers are placed in bottom-half. The results from the remaining technology and engineering sciences faculties are presented in Figure S1e.

FIGURE S1c. Percentage of papers belonging to certain percentile group (faculties of sciences and mathematics)



FIGURE S1d. Percentage of papers belonging to certain percentile group (faculties of technology and engineering sciences - top 5)



FIGURE S1e. Percentage of papers belonging to certain percentile group (faculties of technology and engineering sciences - rest)



Particularly impressive is the performance of Faculty of Mathematics and Faculty of Mechanical Engineering which exceed in terms of Top 1% publications, with 2.38% and 2.49% respectively.

1. The Faculty of Architecture and faculties of social sciences and humanities group have not been presented due to the relatively small number of published papers [↑](#footnote-ref-1)
2. Zivkovic et al. used web site of each faculty for the year 2015 as the source of data for number of employed academic staff; our analysis covered papers published in 2009-2016 period, so the indicator Publications per Researcher should be interpreted with care; the institutes were not included into the Zivkovic et al. paper. [↑](#footnote-ref-2)