Scientific Foundation SPIROSKI, Skopje, Republic of North Macedonia
South East European Journal of Architecture and Design. 2025 Sep 14; 11:9-14.
https://doi.org/10.3889/seejad.2025.6044
eISSN: 1857-9353
Section: *Articles in Architecture*

Comparison of Architecture Related Research Ranking and Outputs Between Latvia, North Macedonia and Slovenia

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Edited by: Ivo Spiroski
Citation: Ladinski VB. Comparison of Architecture Related Research Ranking and Outputs Between Latvia, North Macedonia and Slovenia. SEE J Archit Des. 2025 Sep 14; 11:9-14. https://doi.org/10.3889/seejad.2025.6044
Keywords:
Latvia, North Macedonia, Slovenia, Research, Ranking, Output, Architecture
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Received: 31-Dec-2024
Revised: 10-Jul-2025
Accepted: 12-Aug-2025
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Funding: This research has been carried by the author in his own place and time and has not been supported by any institutional or other funding.
Competing Interests: The authors have declared that no competing interests exist

Abstract

AIM: The aim of this research is to compare the research ranking and outputs in Architecture between three Eastern European Countries of approximately similar population size: Latvia, North Macedonia, and Slovenia.

MATERIAL AND METHODS: The research is based on the study of primary and secondary resources in order to establish, analyse and compare the research ranking and output in Architecture between three Eastern European countries. The research is divided into two parts. The first part aims to establish the ranking and research outputs in All Subject Areas, and in Architecture in each of the three analysed countries based on data available from SCImago Lab (1996 – 2023 year). The second part of the study investigates a range of economic and social factors that may influence the observed outcomes.

RESULTS: The findings of this study highlighted supremacy of Slovenia followed by Latvia and North Macedonia, both in All Subject Areas, as well as in Architecture. Whilst Latvia and North Macedonia are more closely positioned on these ranking tables, there is a significant gap between them and Slovenia. This is particularly noticeable in relation to the Architecture related results whereby Slovenia's ranking is higher than number of larger by population and older independent countries like Romania or Bulgaria.

CONCLUSION: This study confirmed the initial assumptions that the research ranking, and outputs are not necessarily related purely to the population size of the country, but that other factors play a more important role. The findings suggest that the gross domestic products, the total and per capita, and the allocation of countries budget for research and development play a larger role then the number of school of architecture or the number of architects in the country.

Introduction

The 20th Century has been marked up by notable changes in academia that emerged in the prevailing competitive neo-liberal environment supported by the development of information technologies and the emergence of scientometrics, ultimately leading to the industrialisation of science. This gained even more prominence at the turn of the century when the individual and institutional research ranking and outputs facilitated benchmarking thus shaping not only personal carriers and progression, but also those of the institutions that employed them. As a result, the h-index, that measures both the productivity and citation impact of the publications, has become important indicator for the individual scientist and their institution, despite concerns about the emergence of an environment that ultimately may adversely affect the research quality [1], [2].

North Macedonia has not been exempted from these global development. For example, Nikoljski Panevski, Petanovski and Spiroski (2015) examined the "Published Papers about Interior Design from South East Europe in the Scopus Database (1977 – 2015)" [3], whilst Tasic, Petanovski and Spiroski (2016) explored the "Architecture from South East Europe in the Scopus Database (1962 – 2015)" [4]. Equally, for over a decade the Republic of North Macedonia Ministry for Education and Science [5] has been engaging the Shanghai Ranking Consultancy to carry out the Academic Ranking of the universities in North Macedonia using the Academic Ranking of World Universities (ARWU) system.

Inspired by these developments, the aim of this paper is to examine and compare the research ranking and outputs in Architecture among three Eastern European countries of approximately similar population, between 1.8 and 2.1 million, in an attempt to highlight the potential factors that influence the observed outcomes. The three countries in question are Latvia, North Macedonia and Slovenia.

Materials and Methods

The research is based on the study of primary and secondary resources in order to establish,

analyse and compare the research ranking and output in Architecture between three Eastern European countries (listed in alphabetical order) – Latvia, North Macedonia and Slovenia. The research assumption is that the research ranking and outputs in Architecture in the analysed three countries are not related to the population size of the country but to other factors that are expected to be identified through this study.

The research is divided in two parts. Initially, the first part aims to establish the ranking and research outputs in All Subject Areas, and in Architecture in each of the three analysed countries based on data available from SCImago Lab for the period between 1996 and 2023 as observed on 25.12.2024. Then, the second part of the study investigates a range of factors that may influence the observed outcomes like population size, total and per capita gross domestic product, national expenditure on education and research and development (R&D), number of architects, number and year of foundation of the schools of architecture, number of SCImago, Scopus and Web of Science listed journals in each country, year when the country gained independence, membership of the European Union as well as the three university rankings platforms: ARWU, THE and QS.

Research Limitations

Only responses received and materials made available until 30.12.2024 have been incorporated in this paper. Data used for the analysis has been based on the cites source but without listing any qualifications for the information listed in original source. Within the comparison tables for research ranking and outputs the number of citation and self-citations have been omitted for clarity of the tables.

Language Conventions

The British Permanent Committee on Geographical Names (PCGN) System has been used throughout this paper to Romanise the original Cyrillic words.

Results

The results of the primary part of the research are shown in Table 1 for All Subject Areas, and in Table 2 for Architecture only. These two tables contain the research ranking and outputs for Eastern Europe countries plus the top and bottom ranked countries in the World for comparison, whilst the observed three countries are highlighted within the tables [6].

Table 1: SCImago Eastern Europe country ranking for All Subject Areas including the first and the last ranked country in the World (1996 – 2023)

World Ranking	Eastern Europe Rank	Country	Documents	Citable documents	Citations per document	H index
1	*N/A*	*United States*	*16047770*	*13969135*	*32.11*	*3051*
12	1	Russian Federation	1722547	1672245	9.02	753
17	2	Poland	964968	914009	14.44	738
29	3	Czech Republic	468680	447299	16.26	625
43	4	Ukraine	302055	292719	8.1	358
44	5	Romania	299401	284747	11.24	419
46	6	Hungary	268747	251684	20.78	599
50	7	Slovakia	162757	156095	13.38	355
51	8	Croatia	154324	145561	13.65	380
52	9	Serbia	142159	133376	14	350
54	10	Slovenia	136232	127869	19.26	409
59	11	Bulgaria	117142	111549	13.99	347
63	12	Lithuania	79503	75747	14.71	298
67	13	Estonia	62678	58118	25.15	383
72	14	Belarus	53486	52220	11.89	232
78	15	Latvia	40648	38687	13.39	225
88	16	Georgia	31114	27715	20.41	248
92	17	Armenia	24346	23387	18.78	235
93	18	Azerbaijan	24299	23563	10.1	153
95	19	Bosnia and Herzegovina	22802	21091	9.69	144
98	20	North Macedonia	18164	16972	14.48	170
109	21	Moldova	11316	10676	15.14	144
117	22	Albania	9354	8580	11.09	104
124	23	Montenegro	7367	6935	11.27	95
243	*N/A*	*Heard Island and McDonald Islands*	*2*	*2*	*8*	*2*

Source: SCImago (2024): SJR – SCImago Journal & Country Ranking, (Accessed on 25.12.2024): https://www.scimagojr.com/

From both tables it can be observed that Slovenia has the highest ranking and output from all three observed countries being ranked 54th out of 243 in the World and 10th out of 23 in Eastern Europe in relation to All Subject Areas, and 48th out of 177 in the World and 5th out of 23 in Eastern Europe for Architecture.

Latvia follows with the second highest ranking among the three observed countries being ranked 78th out of 243 in the World and 15th out of 23 in Eastern Europe in relation to All Subject Areas, and 77th out of 177 in the World and 15th out of 23 in Eastern Europe for Architecture.

North Macedonia has the lowest ranking from all three observed countries being ranked 98th out of 243 in the World and 20th out of 23 in Eastern Europe in relation to All Subject Areas, and 88th out of 177 in the World and 17th out of 23 in Eastern Europe for Architecture.

Table 2: SCI Imago Eastern Europe country ranking for Architecture including the first and the last ranked country in the World (1996 – 2023)

World Rank	Eastern Europe Ranking	Country	Documents	Citable documents	Citations per document	H index
1	*N/A*	*United States*	*36734*	*35056*	*5.96*	*135*
21	1	Russian Federation	1774	1151	2.09	24
24	2	Poland	1640	1593	3.12	26
39	3	Czech Republic	887	867	2.85	19
40	4	Hungary	878	837	3.15	22
48	5	Slovenia	640	631	3.04	21
51	6	Croatia	598	582	2.17	15
53	7	Romania	549	533	2.84	18
58	8	Serbia	407	391	3	12
60	9	Slovakia	351	342	2.64	14
64	10	Lithuania	258	256	3.02	13
67	11	Ukraine	240	231	3.47	16
71	12	Bosnia and Herzegovina	177	172	4.72	12
74	13	Estonia	159	151	4.64	13
76	14	Bulgaria	121	109	1.92	7
77	15	Latvia	117	115	2.73	10
84	16	Albania	68	56	3.1	8
88	17	North Macedonia	61	56	3.54	10
92	18	Armenia	53	50	0.34	2
103	19	Georgia	31	25	1.29	3
106	20	Belarus	27	23	2.22	5
105	21	Montenegro	27	25	1.52	4
119	22	Azerbaijan	14	12	0.71	2
135	23	Moldova	7	7	0.71	1
177	*N/A*	*Somalia*	*1*	*0*	*0*	*0*

Source: SCImago (2024): SJR – SCImago Journal & Country Ranking, (Accessed on 25.12.2024): https://www.scimagojr.com/

Despite the same year of independence and the similar population size, there is a notable deference in the economic performance of the analysed countries (Table 3). For example, the Real GDP (PPP) of Slovenia is about 1.4 times higher than that of Latvia, regardless that they are both EU members) and 2.4 times higher than that of North Macedonia.

Similar trends can be observed in relation to the Research and Development Expenditure with Slovenia allocating about 2.9 times more of its GDP than Latvia and 5.6 times more than North Macedonia. Considering the difference in the Real GDP (PPP) between the countries the difference in the Research and Development expenditure is even higher [7], [8], [9].

Table 4 showcase compares the difference between the number of schools of architecture, the year of the establishment of the oldest one, the number of licensed architect and the number of architectural journals included on the SCImago Lab, Scopus and Web of Science data bases.

As it can be seen Latvia has the oldest university with a school of architecture dating back to 1862 (Riga Technical University) in comparison to North Macedonia that has the newest oldest university in the country, the University Ss Cyril and Methodius in Skopje founded in 1949.

However, only Slovenia has Architecture related journals listed in the SCImago Lab database. As it can be seen Latvia has the smallest number of licensed architects whilst Slovenia has the highest [6], [10], [11], [12], [13], [14].

The comparison between the universities in each country are shown on Table 5 where it can be observed that Latvia and Slovenia have only two schools of architecture each, in comparison to North Macedonia with seven schools of architecture.

Regardless, only the University of Ljubljana appears in all three major university ranking tables by ARWU, THE and QS, The Riga Technical University and the University of Maribor appear in two ranking tables (THE and QS) and, out of the seven universities offering studies in architecture in North Macedonia, only the University Ss Cyiril and Methodius in Skopje is listed on the THE ranking table [10], [11], [12], [15], [16], [17].

Table 3: Comparison between Population, Real GDP (PPP), Real GDP per capita, Spending on Education, R&D Spending, EU Membership, and Date of Independence for Latvia, North Macedonia and Slovenia

Country	Population	Real GDP (PPP) (US$)	Real GDP per capita (US$)	Spending on Education (%)	R&D Spending (%)	EU Member Since	Before Part of
Latvia	1,801,246 (2024 est.) *Ranking 153*	71.154 bill (2023 est.) *Ranking 109*	37,800 (2023 est.) *Ranking 65*	6.0 (2020 est.) *Ranking 44*	0.74 (2021)	01.05.2004	USSR until 21.08.1991
N. Macedonia	2,135,622 (2024 est.) *Ranking 149*	42.444 bill (2023 est.) *Ranking 136*	23,400 (2023 est.) *Ranking 90*	Not Available	0.38 (2022)	Not Applicable	Yugoslavia until 08.09.1991
Slovenia	2,097,893 (2024 est.) *Ranking 151*	102.036 bill (2023 est.) *Ranking 97*	48,100 (2023 est.) *Ranking 46*	5.8 (2020 est.) *Ranking 49*	2.13 (2021)	01.05.2004	Yugoslavia until 25.06.1991

Source: CIA (2024): The World Factbook, (Accessed on 29.12.2024): https://www.cia.gov/the-world-factbook/; World Bank Group Data (2024): Research and development expenditure (% of GDP), License: CC BY-4.0, (Accessed on 29.12.2024): https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS; EC (2024): From 6 to 27 members, (Accessed on 29.12.2024): https://neighbourhood-enlargement.ec.europa.eu/enlargement-policy/6-27-members_en

Table 4: Comparison between the Number of Schools of Architecture, the Oldest School of Architecture, the Number of Architecture Journals on SCImago, Scopus and Web of Science for Latvia, North Macedonia and Slovenia

Country	Number of Schools of Architecture	Year of First School of Architecture Established	Number of Licensed Architects	Number of Architecture Journals on SCimago	Number of Architecture Journals in Scopus	Number of Architecture Journals in WoS
Latvia	2	1862	900	0	0	0
North Macedonia	7	1949	1242	0	0	0
Slovenia	2	1919	1500	2	2	1

Source: AIKA (2024): Study Programmes. Higher Education Quality Agency (Accessed on 29.12.2024): https://eplatforma.aika.lv/index.php?r=site%2Fprogram%2Flist&Name=architecture&Institution=&StudyDirection=21&IKKDescriptionShort=&StudyYears=&StudyMonths=&Lang=&Key=architecture&Level=&KP=&IKKGroup=&Degree=&Qualification=&AccreditationStatus=accreditated&AccreditationLength=&AccreditationTo=&JointStatus=&detail-search=; MON (2024): Akreditirani visokoobrazovni ustanovi vo Republika Severna Makedonija, Republic of North Macedonia Ministry for Education and Science (Accessed on 29.12.2024): https://www.mon.gov.mk/page/?id=2047 https://www.mon.gov.mk/page/?id=2047; NAKVIS (2024): List of Accredited Higher Education Institutions, Study Programmes and Higher Vocational Colleges, Slovenian Quality Assurance Agency for Higher Education, (Accessed on 29.12.2024): https://nakvis.si/accreditations-and-evaluations/public-records/?lang=en; ACE (2024): Architects of Europe – Country Profile, (Accessed on 29.12.2024): https://ace-cae.eu/databank/#country-profile; Komora na Ovlasteni Arhitekti I Ovlasteni Inženeri (2024): Členovi, (Accessed on 29.12.2024): https://www.komoraoai.mk/clenovi-vo-komorata.html; SCImago (2024): SJR – SCImago Journal & Country Ranking, (Accessed on 25.12.2024): https://www.scimagojr.com/

Discussion

This research focused on comparison in research ranking and outputs in Architecture in three Eastern European countries of approximate similar population (1.8 – 2.1 million) that have become independent only in 1991 after seceding from USSR (Latvia) and Yugoslavia (North Macedonia and Slovenia).

Based on the obtained results, Slovenia has the highest research ranking and output in All Subject Areas and in Architecture from the three analysed countries, with a notably high results in the field of Architecture, even in comparison with larger and older Eastern European countries like Romania and Bulgaria. The more modest research ranking and output in Latvia and North Macedonia appear to be closely aligned to the population size of these countries.

This research has identified that North Macedonia leads with seven active schools of architecture in the country in comparison with the two each in Latvia and Slovenia, despite the fact that the oldest school of Latvia was established in 1862 (Riga Technical University) whilst the newest but oldest school in North Macedonia was established in 1949. Five of the seven active schools of architecture in North Macedonia are less than 20 years old being founded between 2005 and 2016.

Despite the largest number of schools of architecture out of the seven universities in North Macedonia only the University Ss. Cyril and Methodius – Skopje reaches only one of the three major university rankings schemes, the THE. The Riga Technical University is the only one from Latvia on the university ranking lists by the THE and QS, whilst both universities from Slovenia are ranked with the University of Maribor being ranked by the THE and QS, whilst the University of Ljubljana by all three the ARWU, THE and QS. The supremacy of the Slovenian school is probably supported by the presence of two of their academic journals in the SCIMago and Scopus databases and one in the Web of Science databased, whilst no academic journals from Latvia and North Macedonia are incorporated in these databases.

Table 5: Comparison between Schools of Architecture, their years of establishment, as well as the University ranking (where available) by ARWU, THE and QS platforms for each country

No.	Latvia	N. Macedonia	Slovenia
1	Riga Technical University (1862) THE: 1001-1200 (2025) QS: 721-730 (2025)	University "Ss. Cyril and Methodius" – Skopje (1949) THE: 1500+ (2025)	University of Ljubljana (1919) ARWU: 501-600 (2024) THE: 801-1000 (2025) QS: =596 (2025)
2	RISEBA University of Applied Sciences – Riga (1992)	University of Tetovo (1994)	University of Maribor (1975) THE: 1201-1500 (2025) QS: 901-950 (2025)
3		University American College Skopje (2005)	
4		International Balkan University – Skopje (2006)	
5		MIT University – Skopje (2007)	
6		International University Vision – Gostivar (2014)	
7		Mother Theresa University – Skopje (2016)	

Source: AIKA (2024): Study Programmes. Higher Education Quality Agency (Accessed on 29.12.2024): https://eplatforma.aika.lv/index.php?r=site%2Fprogram%2Flist&Name=architecture&Institution=&StudyDirection=21&IKKDescriptionShort=&StudyYears=&StudyMonths=&Lang=&Key=architecture&Level=&KP=&IKKGroup=&Degree=&Qualification=&AccreditationStatus=accreditated&AccreditationLength=&AccreditationTo=&JointStatus=&detail-search=; MON (2024): Akreditirani visokoobrazovni ustanovi vo Republika Severna Makedonija, Republic of North Macedonia Ministry for Education and Science (Accessed on 29.12.2024): https://www.mon.gov.mk/page/?id=2047; NAKVIS (2024): List of Accredited Higher Education Institutions, Study Programmes and Higher Vocational Colleges, Slovenian Quality Assurance Agency for Higher Education, (Accessed on 29.12.2024): https://nakvis.si/accreditations-and-evaluations/public-records/?lang=en; Shanghai Ranking (2024): 2024 Academic Rankings of World Universities 2024, (Accessed on 29.12.2024): https://www.shanghairanking.com/rankings/arwu/2024; THE-Times Higher Education (2024): World University Rankings 2025, (Accessed on 29.12.2024): https://www.timeshighereducation.com/world-university-rankings/latest/world-ranking; QS Top Universities (2024): QS World University Rankings 2025: Top Global Universities, (Accessed on 29.12.2024): https://www.topuniversities.com/world-university-rankings

Slovenia and North Macedonia appear to have a higher number of Licensed Architects then Latvia, but this does not necessarily mean that they have more researchers in the filed than Latvia.

Based on the available results, it appears that Slovenia has economic supremacy too with real GDP

(PPP) of $102.036 billion in comparison to the $71.154 billion in Latvia and only $42.444 billion in North Macedonia. Similar results are observed in relation to research and development related expenditure whereby Slovenia allocates 2.13 per cent of their GDP in comparison to 0.74 per centin Latvia, and 0.38 per cent in North Macedonia. Considering the three countries real GDP (PPP) it appears that Slovenia is able to invest in research and development about $2.173 billion (PPP) in comparison with $526 million (PPP) by Latvia and $161 million (PPP) by North Macedonia. It is expected that the EU membership by Slovenia and Latvia will provide for an additional access to research and development funding for these two countries in comparison with North Macedonia.

Based on the results of this research, the suggestion is that the state of the countries' economy and the level of investment in research and development play the major contribution to research ranking and output within each countries, rather than the number of universities or schools of architecture. On other hand it can be possibly argued that the number of universities and schools of architecture in North Macedonia are a reflection of this country not been part of the EU that would limit the opportunities for students' mobility and opportunities to study abroad with the more advantageous tuition fees. Therefore, it can be assumed that the larger number of schools of architecture reflects the local market needs to educate but within the affordable means for the local educational market.

Acknowledgements

With thanks to the Republic of Slovenia Ministry of Education, Science and Sport the Republic of Latvia Ministry of Education and Science Department of Higher Education, Science and Innovation, and the Republic of North Macedonia Ministry of Education and Science for the information provided.

Conclusions

The findings of this study have point out to the research ranking and outputs supremacy of Slovenia followed by Latvia and North Macedonia, both in All Subject Areas, as well as in Architecture. Whilst Latvia and North Macedonia are more closely positioned on these ranking tables, there is a significant gap between them and Slovenia. This is particularly noticeable in relation to the Architecture related results whereby Slovenia's ranking is higher than number of larger by population and older independent countries like Romania or Bulgaria.

This study has confirmed the initial assumptions that the research ranking, and outputs are not necessarily related purely to the population size of the country, but that other factors probably play a more important role. The findings suggest that the gross domestic products, the total and per capita, and the allocation of countries budget for research and development play a larger role then the number of school of architecture or the number of architects in the country.

It is hoped that the findings of this research may inform and influence government policies. especially if they want to enhance the research ranking and outputs of the higher education institutions located and accredited in these countries in the future.

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