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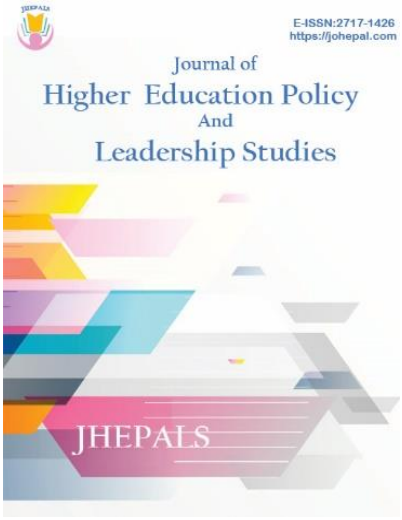
Universities Research Performance in the United Arab Emirates and Oman: Challenges of Higher Education Systems



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Universities Research Performance in the United Arab Emirates and Oman: Challenges of Higher Education Systems

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Abstract

This article analyzes research performance in universities in two member countries of the Gulf Cooperation Council (GCC): the United Arab Emirates (UAE) and the Sultanate of Oman. Both have introduced reforms, innovations, and investments into their educational systems. Many international university branches were established, but their impact on research performance has yet to be closely evaluated. The article includes the following: first, descriptive analysis of research performance through total number of publications, citable documents, and average number of citations per document; second, analysis of priority subject areas and an overview of university rankings; third, challenges for research in higher educational institutions. Among sociocultural predictors of academic performance are historical context, English language proficiency, the modern educational system's drawbacks, and higher education's privatization and commercialization. Highlighted are institutional and organizational obstacles related to employment conditions of expatriates, along with the research environment and challenges that hinder internationalization.

Keywords: Higher Education; University Research Performance; Academic Productivity; Research Challenges; Oman; UAE

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Introduction

During the past few decades, higher education of the Arab countries of the Persian Gulf system has boomed, undergoing considerable transformation. Two tendencies are becoming evident. The first is privatization because public universities could not accommodate the demand for higher education *and* cover all research needs, thus accounting for the necessity of establishing more private institutions. The second tendency is internationalization, that is, establishment of foreign university branch campuses in the Arab countries of the Persian Gulf (Romani, 2009). These changes aimed to decrease the countries' excessive oil dependence, develop human resources, and increase the region's global competitiveness. Since 2000s, GCC countries introduced number of educational reforms and strategic plans in collaboration with such international organizations as UNESCO and the World Bank to improve the quality of higher education and increase the student enrollment rates. However, experts state, that the outcomes of current higher education reforms still did not reach the target (Baghdady, 2017).

In this study, we evaluate the research performance in the United Arab Emirates (UAE) and in Oman as two country-case studies of the Persian Gulf.[*] In general, the region is of interest for studies in higher education because it is a young, wealthy, ambitious, and continuously introducing reforms, innovations, and investments into its developing education system.

On the one hand, the UAE and Oman have many commonalities, including being bordered by large territories and having similar cultures. On the other hand, the two countries differ in their economies and education policies. Oman has fewer oil resources than the UAE, but its labor force is comprised predominantly of nationals, while the UAE labour force includes mainly of non-nationals (Gonzalez et al., 2008; Shomotova & Karabchuk, 2022). In 2021 there were 89% of expatriate population in the UAE (Federal Competitiveness and Statistical Center, 2022) and 38% of expatriate in Oman (National Center for Statistics and Information, 2021).

Both countries undertook tremendous efforts to strengthen higher education by spending huge amounts on their public universities, bringing in branches of foreign universities, attracting international students, and developing research foundations and institutions. Particularly noticeable is the presence of well-established international university branches in both countries, such as Australian, British, French, German and North American (Wilkins 2001, 2010, 2011). Such circumstances offer an opportunity to trace research performance and to estimate how well these institutions contributed to publication output.

Comparing the publication activity of these two countries with that of global leaders, we see that it is not as high as expected. In 2016, the UAE published 5,300 documents and Oman, 1777. That same year, China published 496,397, the United Kingdom 204,237, and the United States 669,204 (Scimago Journal & Country Rankings, 2016). So why the establishment of foreign university branches did not help much to increase considerably the

[*] To avoid ambiguity in defining the countries of the Arab countries of the Persian Gulf, we considered only members of the Gulf Cooperation Council (GCC), that is, Bahrain, Kuwait, Qatar, Saudi Arabia, the Sultanate of Oman, and the United Arab Emirates.

research performance of these countries? What challenges does scientific research in higher educational institutions face in the UAE and Oman?

This study addresses these questions through detailed analysis. First, the article descriptively analyzes the UAE and Oman's research performance during the last two decades, including total number of publications, citable documents, and average number of citations per document. We also define priority subject areas and best research universities in the countries. Second, the study discloses challenges for research in higher education institutions via thorough literature review and discusses sociocultural context-related factors, drawbacks of the modern higher education system, institutional and organizational challenges, and human resource constraints.

Research Performance: UAE and Oman

The overview of main research performance indicators helps to evaluate how much the UAE and Oman advanced in conducting research since the mid-1990s and also understand whether their higher education system reforms were sufficiently effective to increase their academic performance.

Analytical Strategy

We draw on data provided by the Scimago Journal & Country Rankings, including Scopus publications encompassing articles, reviews, and conference proceedings. It provides a broad time span, therefore, we can analyze indicators in dynamics from 1996 to 2021. Scimago Journal Rankings considers journals published in non-English languages and citations originating from them (Falagas et al. 2008) in contrast to the other widely used citation database Web of Science, which underestimates this category of journals significantly. Thus, the Scopus database is especially advantageous to this study since researchers from the Arab countries of the Persian Gulf frequently use the Arabic language. Moreover, the Scimago takes the quality of citations into account by excluding self-citations from consideration and ascribing greater weight to citations from more prestigious journals.

As a rule, the average number of citations per document is considered a key indicator of a country's publication activity. Nevertheless, analysis of this indicator alone can distort results because the average number of citations per document tends to increase when the number of publications decreases. Therefore, jointly analyzing the number of publications, the number of citable documents, and the average number of citations per document is more accurate.

Total publication output: Number of publications, citable documents, and average number of citations per document

From 1996 to 2021, the total number of publications in both the UAE and Oman demonstrates steady growth, a respective average of 30.3. and 20.2 percentage points. As result, in 2021 the total number of published documents reached 12968 in the UAE and 3577 in Oman (Figure 1).

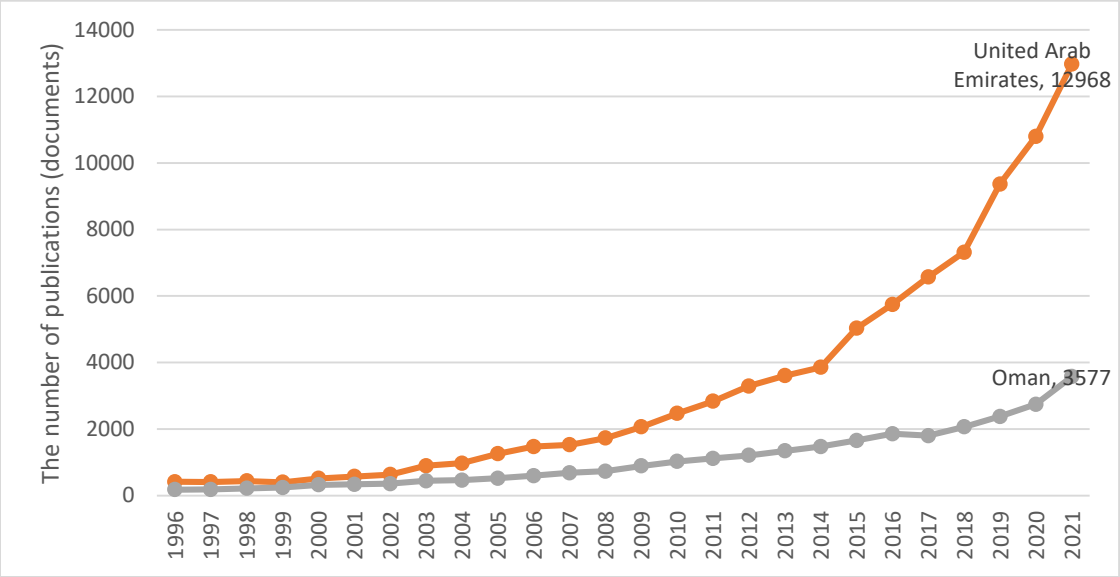

Figure 1. Dynamics of the total number of publications in the UAE and Oman, 1996–2021 (Source: The Scimago Journal & Country Rankings)

However, in comparison to other GCC countries the overall the ranking of both countries in the Middle East Ranking has never scored higher than 6 for UAE and 10 for Oman (Figure 2).

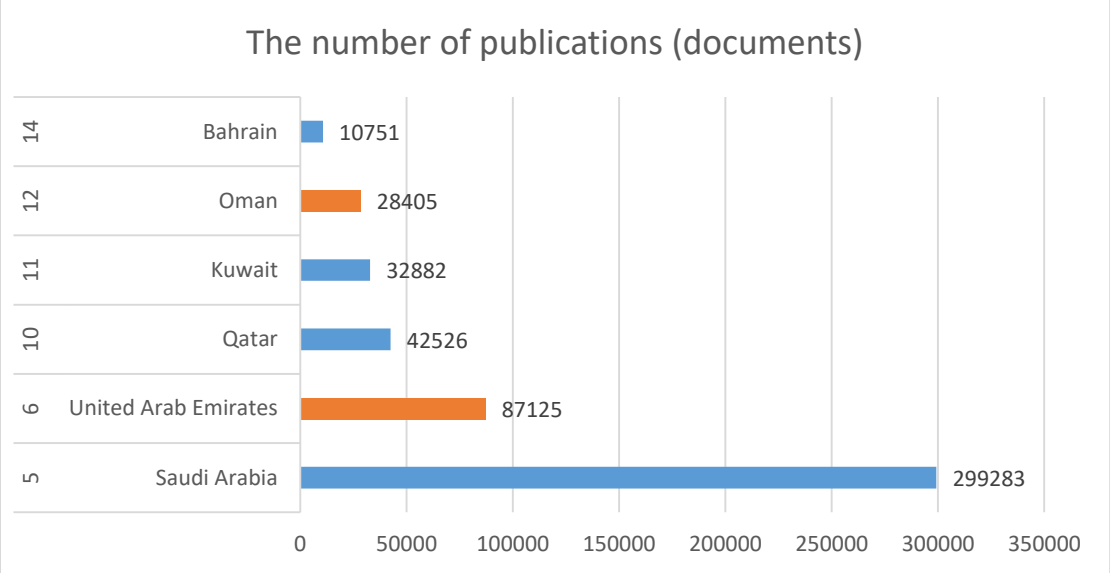

Figure 2. Dynamics of the number of publications in the GCC Countries by country and ranking, 1996–2021 (Source: The Scimago Journal & Country Rankings

The largest increment occurred predominantly after 2003, likely because, in the 21st century, international university branch campuses were established (e.g., New York University and Université Paris-Sorbonne in Abu Dhabi, German University of Technology in Muscat). Additionally, some private and quasi-governmental universities received boosting investments: Khalifa University, Masdar Institute of Science and Technology, American University of Sharjah, University of Sharjah, and American University of Ras Al Khaimah in the UAE and Muscat University, Sohar University, University of Nizwa, and Al Sharqiyah University in Oman.

Growth of the publications number is associated with a decreased number of influential publications: percentage of cited documents in both countries decreased. Despite the indicator undergoing some fluctuations, the trend was unsystematic. In the UAE, citable documents peaked to 99.3 percent in 1997, but dropped to 89.8 percent by 2016. In Oman, citable documents amounted to 96.7 percent in 1997, but dropped to 89.6 by 2018. By 2021, both countries have increased scores reaching 94.7 in the UAE and 93.9 in Oman (see Table 1).

Table 1.
Percentage of cited documents among those published, 1996-2021

Year	United Arab Emirates	Oman
1996	97.60%	98.88%
1997	99.26%	96.74%
1998	98.86%	95.83%
1999	96.50%	94.56%
2000	97.47%	92.24%
2001	97.02%	94.05%
2002	96.83%	96.93%
2003	95.97%	96.85%
2004	94.45%	96.74%
2005	94.58%	95.00%
2006	93.34%	92.44%
2007	93.32%	91.50%
2008	91.90%	93.05%
2009	93.47%	90.70%
2010	92.55%	88.86%
2011	92.94%	92.22%
2012	90.58%	89.08%
2013	90.49%	89.56%
2014	92.01%	88.26%
2015	90.47%	91.48%
2016	89.80%	90.58%
2017	90.88%	89.07%
2018	91.11%	89.64%
2019	93.16%	91.33%
2020	92.93%	91.73%
2021	94.72%	93.91%

The average number of citations per document also demonstrates gradual reduction; the growth rate is negative and amounts to approximately 10 percentage points in both countries (Figure 3). In recent years the growth rate's absolute value increased sharply: for the UAE, this indicator amounted to 31 percent in 2014 and reached the extreme point of 74 percent in 2016; in Oman, the figures were 26 and 82 percent, respectively.

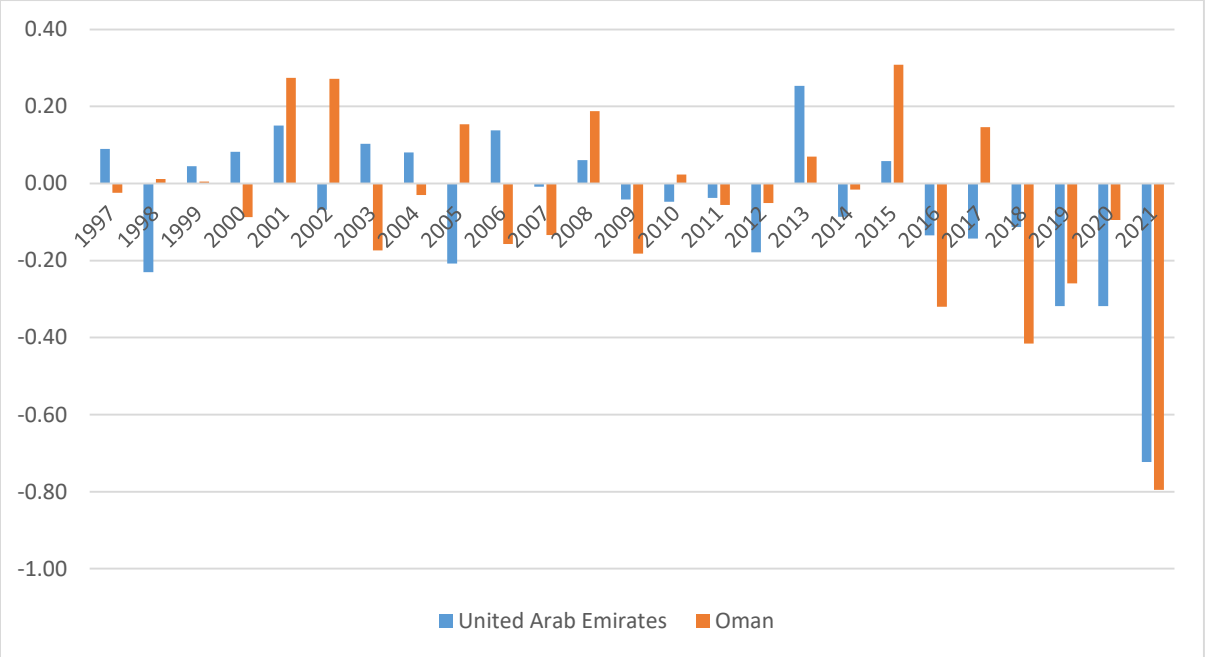

Figure 3. Annual growth rate for average number of citations per document in the UAE and Oman, 1997–2021 (Source: Calculations by the authors based on the Scimago Journal & Country Rankings)

One of the possible explanations to these dynamics could be low survival rate of the international university branches. Actually, a number of foreign universities had to close their campuses due to the global economic crisis. This could have resulted in significantly decreased publication output, particularly in co-authorship with foreign researchers. However, since 2018 this average number of publications in both countries has increased gradually (see Figure 1 above).

Priority Research areas

To define priority research areas in the UAE and Oman, we calculated the thematic specialization index. At the preliminary step, the entire number of publications is differentiated according to subject area. In our research, we used the classification proposed by the Scimago Journal and Country Rankings Project. To design the classification, this project applied reference linguistic analysis (Gómez-Núñez et al., 2010), which resulted in 27 subject fields.

At the next step, we calculated a given subject area's weight, that is, among all publications, the share belonging to a subject area. Noteworthy is that the sum of weights for all subject areas can exceed 1 because the Scimago Journal and Country Rankings Project can ascribe a publication to more than one subject area. Finally, to define a given country's thematic specializations, we divided a subject area's country weight by the corresponding global weight. Therefore, the index reflects the degree to which a country's thematic

publication structure differs from that of the world. If the index for a given subject area exceeds 1, the area can be considered a country's thematic specialization (Kotsemir 2012).

First, we examine publication structures of the UAE and Oman and compare them with the global structure. Table 2 displays calculation results obtained on pooled data for the period from 1996 to 2021. Such subject areas as medicine, engineering, computer science, physics and astronomy, biochemistry, genetics, and molecular biology had the greatest share of global publications, while decision sciences, dentistry, and veterinary science amounted with the least percentage. Distribution of publications in the UAE and Oman was close to the global structure with respect to subject areas that provide the largest and the smallest percentages of publications. Research papers in engineering, medicine, and computer science comprise the greatest share of total publications. Additionally, studies in agricultural and biological sciences make up nearly 9 percent in Oman. Besides the scarce research in dentistry, health professions, and veterinary science, multidisciplinary studies are rather unpopular in UAE and Oman.

Table 2.
Structure of publications by subject area, pooled data, 1996–2021

Subject area	Weight in the world structure	Weight in the UAE	Weight in Oman
Agricultural and Biological Sciences	0.073	0.038	0.087
Arts and Humanities	0.025	0.020	0.015
Biochemistry, Genetics, and Molecular Biology	0.120	0.069	0.070
Business, Management, and Accounting	0.022	0.073	0.052
Chemical Engineering	0.045	0.055	0.054
Chemistry	0.089	0.058	0.072
Computer Science	0.117	0.209	0.132
Decision Sciences	0.013	0.033	0.027
Dentistry	0.005	0.011	0.001
Earth and Planetary Sciences	0.054	0.069	0.076
Economics, Econometrics, and Finance	0.015	0.036	0.027
Energy	0.034	0.087	0.074
Engineering	0.191	0.271	0.196
Environmental Science	0.056	0.067	0.082
Health Professions	0.015	0.009	0.007
Immunology and Microbiology	0.032	0.017	0.023
Materials Science	0.107	0.088	0.075
Mathematics	0.074	0.086	0.083
Medicine	0.294	0.202	0.274
Multidisciplinary	0.018	0.016	0.016
Neuroscience	0.028	0.015	0.011
Nursing	0.015	0.009	0.015
Pharmacology, Toxicology, and Pharmaceutics	0.032	0.030	0.032
Physics and Astronomy	0.141	0.092	0.085
Psychology	0.021	0.013	0.010
Social Sciences	0.070	0.098	0.081
Veterinary Sciences	0.009	0.007	0.008

Source: Calculations by the authors based on the Scimago Journal & Country Rankings data

In the UAE, the main specialization areas for published research are business management and accounting; the energy sector; decision sciences; economics, econometrics, and finance; and social sciences (Table 2). Results show that Oman has almost the same subject leaders in the thematic specialization structure as the UAE, except for dentistry, engineering, social sciences, and veterinary science.

Additionally, to expose differences between publication structures, we compared the UAE and Oman's ratios of weights ascribed to given fields. As Table 3's far right column "Oman/UAE" demonstrates, the index value takes its maximum for agricultural and biological sciences, immunology, medicine, and nursing, thus evidencing that these subject areas are significantly more pronounced in Oman than in the UAE. At the same time research publications in dentistry; computer science; energy, economics, engineering, psychology, and social sciences are more typical for the latter.

Table 3.
Thematic specialization index calculated on pooled data, 1996–2016

Subject Area	UAE/World Weight	Oman/World Weight	Oman/UAE
Agricultural and Biological Sciences	0.52	1.19	2.30
Arts and Humanities	0.80	0.63	0.79
Biochemistry, Genetics, and Molecular Biology	0.57	0.58	1.02
Business, Management, and Accounting	3.34	2.39	0.71
Chemical Engineering	1.21	1.18	0.98
Chemistry	0.66	0.81	1.22
Computer Science	1.78	1.12	0.63
Decision Sciences	2.58	2.07	0.80
Dentistry	2.14	0.26	0.12
Earth and Planetary Sciences	1.28	1.41	1.10
Economics, Econometrics, and Finance	2.42	1.82	0.75
Energy	2.59	2.20	0.85
Engineering	1.42	1.02	0.72
Environmental Science	1.20	1.46	1.22
Health Professions	0.62	0.44	0.71
Immunology and Microbiology	0.53	0.71	1.34
Materials Science	0.83	0.70	0.85
Mathematics	1.17	1.13	0.96
Medicine	0.69	0.93	1.35
Multidisciplinary	0.91	0.90	0.99
Neuroscience	0.54	0.40	0.74
Nursing	0.64	1.04	1.61
Pharmacology, Toxicology, and Pharmaceutics	0.94	0.98	1.05
Physics and Astronomy	0.66	0.61	0.92
Psychology	0.64	0.45	0.71
Social Sciences	1.41	1.17	0.83
Veterinary Sciences	0.81	0.95	1.17

Source: Calculations by the authors based on the Scimago Journal & Country Rankings data

University Performance in Research

Let us turn to the two countries' university rankings as the last step in comparative analysis of their research performance. This step is crucial for revealing the difference between

private higher education institutions and international university campuses because these two types are often envisioned as more progressive than their alternatives (government-funded and locally controlled higher education institutions, respectively). University rankings show whether expectations for these institutions' higher performance are justified. Widely recognized ranking systems use a range of criteria to define a university's position, for example, employer reputation, international student-faculty ratios,[*] campus facilities, and many others; however, as this article's focus, we consider only publication performance.

In general, the list of universities in the international rankings has dramatically increased in both countries. Thus, in 2016 there were only eight universities in the UAE and only one Omani university (Sultan Qaboos University) listed in the international ranking. Private institutions including international university branches, demonstrated relatively low research performance and were mostly not in the ratings. Today, there are already sixteen universities in the UAE and five universities in Oman that are present in SJR Research Rank in 2022 (See table 4). The numbers doubled within last five year, which speaks for the universities' racing into the global rankings.

Table 4.
The research rank of the universities in the UAE and Oman by Middle East, Global and Country ranks in 2022.

Middle East Rank	Global Rank	GCC Rank	Country Rank	Institution	Type of University Ownership
32	371	8	1	United Arab Emirates University	Public
41	382	11	2	British University in Dubai	Private
42	383	13	3	New York University Abu Dhabi	Private
44	385	14	1	Sultan Qaboos University	Public
47	388	15	4	Mohammed Bin Rashid University of Medicine and Health Sciences	Private
50	392	16	5	Khalifa University	Non-for-profit
59	403	18	6	University of Sharjah	Private
60	404	19	2	University of Nizwa	Non-for-profit
64	408	21	7	Gulf Medical University	Private
75	419	28	8	Zayed University	Public
85	429	35	9	Al Ain University	Private
90	434	38	10	Ajman University of Science and Technology	Private
90	434	39	10	Abu Dhabi University	Private
97	441	43	11	American University of Sharjah	Private
104	448	47	3	Dhofar University	Non-for-profit
106	450	49	4	Sohar University	Private
119	464	56	12	Birla Institute of Technology and Science Pilani	Private
120	465	59	13	American University of Ras Al Khaimah	Private
121	468	61	5	University of Technology and Applied Sciences	Public
129	476	63	14	Higher Colleges of Technology	Public
134	484	64	15	Amity University	Private

Source: The Scimago Journal & Country Rankings. Note: Only Omani universities are highlighted in grey.

[*] See, for example, Times Higher Education Ranking, URL: https://www.timeshighereducation.com/world-university-rankings; The QS World University Ranking, URL: https://www.topuniversities.com/qs-world-university-rankings/methodology

The fact of the increased number of the universities can contribute to the growth of research productivity in the region. According to Karabchuk et al., (2022), the annual number of publications and citations were higher among private universities such as Khalifa University and University Sharjah in the UAE in 2018. There is a steady growth in research efficiency among both private and public universities in GCC countries.

In 2022 according to the Scimago Institutions Rankings, despite its leading position in the country, Sultan Qaboos University ranks in the 14th place in the Persian Gulf region and 44th for research performance in the Middle East and 385th in Global Rank (Table 4). Among UAE universities, the UAE University ranks 8th in the Persian Gulf region, the 32nd in Middle East and 387th in the world. Both public universities in their respective countries followed by research leading private universities such as British University in Dubai and New York University Abu Dhabi in the UAE, and University of Nizwa and Dhofar University in Oman.

Looking closer at the Scimago Institution Rankings we can identify Scimago index, which is a weighted sum of three institutional components comprising scientific, economic, and social characteristics (SIR Methodology, 2022). The research factor contributes 50% to the overall rank of the institution, and the rest divided into innovation (30%) and societal (20%)[*]. This study focuses on the analysis of the research factors including the following eleven indicators:

1. Normalized Impact (NI) (13%);
2. Excellence with Leadership (EwL) (8%);
3. Output (O) (8%);
4. Scientific Leadership (L) (5%);
5. Not Own Journals (NotOJ) (3%);
6. Own Journals (OJ) (3%);
7. Excellence (Exc) (2%);
8. High Quality Publications (Q1) (2%);
9. International Collaboration (IC) (2%);
10. Open Access (OA) (2%);
11. Scientific Talent Pool (STP) (2%).

Best Country Quartile is obtained by the institution in its country comparing the quartiles based on the overall indicator, research factor, innovation factor and societal factor (Figure 4). Saudi Arabia (33) is the leading country by the number of universities in the best country quartile among GCC countries. The UAE follows Saudi Arabia with 13 universities, and six of them are in Q1 such as United Arab Emirates University, British University in Dubai, Mohammed Bin Rashid University of Medicine and Health Sciences, Khalifa University, University of Sharjah and American University of Sharjah. While Oman has only five universities in the best research quartiles, and two of them are in Q1 such as Sultan Qaboos University and University of Nizwa. Bahrain and Qatar have only three universities representing country in best research quartile.

[*] For more details, see SIR Methodology. Scimago Institutions Rankings. URL: http://www.scimagoir.com/methodology.php

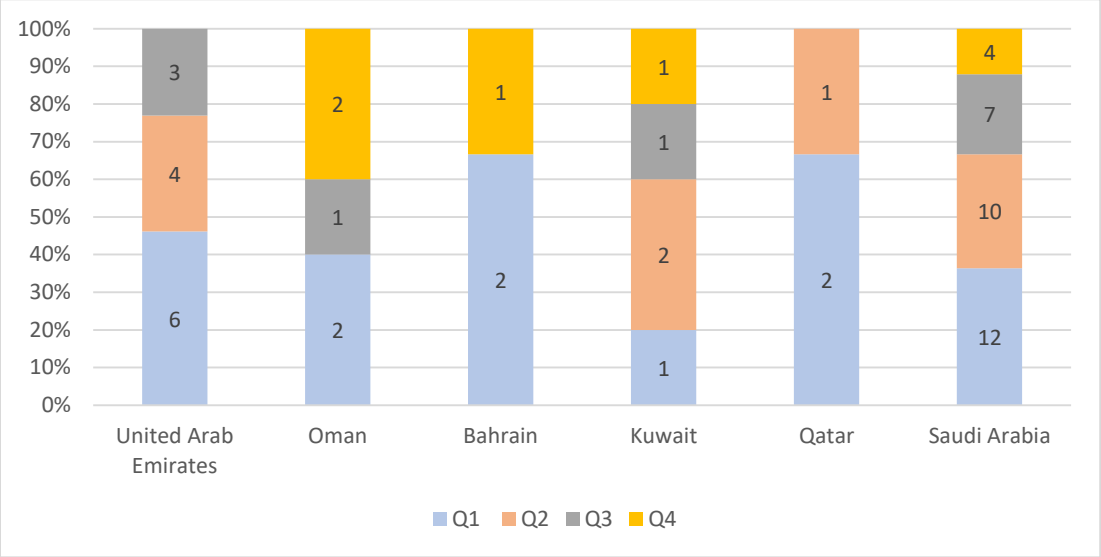

Figure 4. The number of universities in the GCC by Best Country Quartile of the Research rank (Source: Calculations by the authors based on the data from Scimago Journal & Country Rankings)

All in all, ranking scores reveal few differences between research performance of the two countries' private and public institutions. International university branches in GCC countries do not have a leading position in the region's research and academic performance; despite high expectations, their research performance is moderate. We can, however, define two categories of universities most successful in conducting research. The first are the oldest and largest highly reputable universities able to attract influential scientists for successful research collaboration, as illustrated by UAE University and Sultan Qaboos University. The second category is new universities that implement narrow specialization programs and have huge financial support, for example, the UAE's Khalifa University with a focus on engineering, New York University in Abu Dhabi with the focus on science and social sciences.

Factors Shaping Research Performance in the UAE and Oman

Despite GCC countries' higher education institutions have great potential for research their contribution to world science is still rather modest. Based on our thorough literature review, this section provides explanations of small gains in the UAE and Oman's scientific output. First, we examine sociocultural context-related factors affecting their research activity. Second, we consider the current educational systems' drawbacks in the two countries, predominantly, institutional obstacles and human resources constraints. Third, we address challenges that hinder higher education reforms' effective implementation.

Sociocultural Background

As a rule, research traditions and educational standards are deeply rooted in a given society's historical and cultural experience. The GCC countries well illustrate this point. Compared with countries whose universities have been established since the Middle Ages, the Persian Gulf history of higher education is rather short since their universities were

founded only in the 1960s-1970s, specifically, in the UAE in 1976 and in Oman in 1986. The region's historical background enables us to understand this peculiarity.

Throughout the 19th century and the first half of the 20th century, the GCC countries were under the British Protectorate (Kazim, 2000). However, the discovery of oil at the beginning of the 20th century and the oil industry's later growth favored the Persian Gulf's independence. Oil revenues greatly strengthened local rulers' power, and tribal boundaries became more evident, generating a new perception of identity in shaykhdoms (Smyth, 1993). Thus, contributions to public welfare, including education, have increased, especially after the GCC countries gained independence from British control. In particular, establishment of higher education institutions grew rapidly.

Prior to 1970, Oman had no formal higher education. Only after Qaboos bin Said rose to power as Sultan did the educational system undergo considerable change as a part of a large-scale reform process. Currently the only public university in Oman, Sultan Qaboos University was founded in 1986. But besides that, throughout the 1970s and 1980s, numerous colleges were established and began offering predominantly vocational training, particularly in areas of teaching and health (Baporikar & Shah, 2012).

In 1971, when the UAE was established as a federal state, it had no universities. However, in 1976, UAE University was founded in Al Ain City, the Emirates of Abu Dhabi. The Higher Colleges of Technology became the second public higher education institution, providing vocational and technical education (Wilkins 2010). In 1998, the federal government established Zayed University (Gonzalez et al., 2008). During the last 15 years, the UAE witnessed huge investments in higher education institutions by its private sector (Lefrere, 2007). Indeed, the UAE's expansion and diversity of private higher education institutions reflects the international trend of commercializing education as a global trade product (Altbach, 2001; Lefrere, 2007; Rid Ge et al. 2016). Interestingly, some private universities might also have government investments because royal family members might "own" a university, but those universities are not governed or administered as if they are public (Samier, 2015).

Despite all this growth, there was a low survival rate. By 1995, the life span of more than 60% of universities established after 1970 had not exceeded 15 years (Fergany, 2000). This problem originates in a political symbolism ascribed to higher education. In other words, establishment of universities was a tool to gain and strengthen local rulers' power in emerging states without British control and Western imperialism (Romani, 2009). To increase their legitimacy, new governments launched programs to develop education and science. Under these conditions, predictably, only the governmental method of funding was justifiable. In sum, over-politicization of education and, consequently, excessive governmental control of education and research placed several constraints on subject areas and teaching methods and minimized international research collaboration.[*] All these factors had a detrimental effect on higher education institutions and especially on research in the two countries. Finally, such modest academic performance pushed the educational system to change.

When discussing sociocultural prerequisites for education and research, we must consider the Persian Gulf region's linguistic background. According to the 2016 Education

[*] For more on the challenge of university governance in the GCC countries, see Costandi et al. (2019).

First (EF) English Proficiency Index, the Arab countries of the Persian Gulf scores are in the proficiency band "very low," except for the UAE[*] in the "low" band. Very low proficiency presupposes that on average, a citizen of a given country has the following skills: "to introduce oneself simply, to understand simple signs expressed in English, and an ability to give directions to a tourist," while low proficiency encompasses abilities "to navigate an English-speaking country as a tourist, to engage in small talk with colleagues, and to understand simple e-mails from colleagues."[†]

Since the index is constructed on results of Internet-based English tests, scores are biased, but upward, because the index tends to overestimate English proficiency due to the self-selected sample's excluding those without Internet access. The GCC population experienced various challenges in learning English, for instance, lack of assessment tools, teachers' insufficient proficiency, and many others (Morgan, 2017). Therefore, within the last 20 years, education in the UAE and Oman have faced many reforms and curriculum changes, for example, switching to English as the main language of instruction.

Until recent years, English was a sign of Westernization (Benahnia, 2015), so the majority of the population were resistant to learning it. From 1997 to 2000, Findlow (2006) conducted a survey in the UAE to examine the linguistic shift in higher education institutions. Findings evidence that Arabic and English languages have different connotations. Students who prefer English as a medium of higher education support an "ideology of pragmatism" (Findlow, 2006). In other words, they believe that high English proficiency helps them be employed in a private sector associated with internationalization and modernity. Arabic is the primary language in the Arab Region so there are some programs that are still taught in the Arabic Language such as Law, Education and Religious studies those who prefer being taught in Arabic are eager to save their countries' traditions and authentic culture.

Moreover, internationalization plays a vital role in this regard (Altbach, 2015; Knight & de Wit, 2018). Particularly, international collaboration helps increase the number of co-authored publications in higher-impact papers (Knobel et al., 2013) and increase the research productivity, reputation, and ranking of the university/country in non-English-speaking countries (Hammond, 2019; Postiglione, 2020).

The Modern Higher Education System's Challenges in the UAE and Oman

The reforms' motivation springs from awareness of the need for involvement in globalization through increased international competitiveness. Reformers recognized the GCC countries' over-dependence on oil and highlighted the importance of building a knowledge-based, diversified economy (Rassekh, 2004). Additionally, there was a strong need to increase the percentage of highly qualified nationals in the labor force, known in the literature as "Emiratization" (the UAE; Al-Ali, 2008) and "Omanization" (Al-Lamki, 2000).

As discussed earlier, government-funded higher education institutions demonstrated academic performance that was not very high and could not meet the growing demand of booming population numbers. One of the policy directions was to encourage private sector investments in education (Mazawi, 2008). For example, according to FCSA (2018), in 2017,

[*] EF English Proficiency Index, URL: http://www.ef.edu/epi/regions/middle-east-and-north-africa/

[†] EF EPI Proficiency Bands. EF English Proficiency Index, URL: http://www.ef.edu/epi/about-epi/proficiency-bands/

there were 79 private higher education institutions in the UAE, while Oman has only 16 private universities and colleges (Ministry of Higher Education, Scientific Research and Innovation, 2022). Privatization thus contributed to increased research funding (Mazawi, 2008).

Federal universities could not accommodate the quickly increasing number of young people (Karabchuk & Shomotova, 2022). Thus, both Oman and the UAE started to rely more on international private universities to meet their growing high education demand (Gonzalez et al., 2008). Furthermore, private higher education institutions comprise not only local institutions, but also foreign universities governed from abroad but funded locally. This trend reflects internationalization of higher education in the GCC countries what speaks for the improvements in educational infrastructure (Rassekh, 2004).

Five years ago, most private higher education institutions demonstrated lower research performance than government-funded universities. In 2022 the research ranking of some private institutions both in the UAE and Oman is climbing up pretty fast. Should we expect fast growth in publication productivity in the coming years in these two countries? What could be potential challenges for that?

The first challenge for at least Oman nowadays is the brain drain. Improvements in graduates' qualifications but lack of job opportunities has created a mismatch resulting in a brain drain. Oman's relatively low wages push highly skilled workers to emigrate, especially to the UAE and Qatar since those countries provide higher-paid jobs. Areas suffering the most are the financial sector, information technology, and medicine.[*] Moreover, a significant brain drain from academia hinders Omani research performance.

A second challenge for both countries is researchers' lack of job autonomy. Indeed, most faculty members and researchers believe they are restricted to some extent by their institutions (Austin et al., 2014; Romanowski & Nasser, 2010, 2015). For this reason, self-censorship is widely practiced in the GCC countries. Moreover, national and expatriate academics differ in their perceptions of academic freedom (Romanowski & Nasser, 2015), with local faculty members feeling the need for academic freedom more strongly than researchers from foreign countries.

A third challenge is job insecurity for most expatriate faculty in higher education institutions. As a rule, expatriates are employed on a contractual basis with a probationary period. Working contracts usually extend from two to four years with possible prolongation, but usually without a tenure scheme, so job insecurity is higher (Mazawi, 2003; Austin et al., 2014). Unsurprisingly, organizational loyalty is very low among expatriates, at least partly because they are not involved in long-term planning (Schoepp, 2011).

Fourth, opportunities for career advancement are moderate, and salaries are not always competitive (Austin et al., 2014; Bhuian, 2016). Wages vary widely, depending on many factors, including not only qualifications and research skills, but also citizenship. As previous research has shown, financial rewards and incentives as bonuses for outstanding research performance are important mechanisms for stimulating growth of publications at universities (Jin & Jin, 2013; Janger & Nowotny, 2016). However, UAE and Omani higher education institutions seem to have omitted these from their policies, so lack of financial

[*] See, for example, the Oman brain drain could end up doing irreversible damage. Times of Oman. 2014. URL: http://timesofoman.com/article/29248/Oman/Oman-brain-drain-could-end-up-doing-irreversible-damage

incentives and rewards is another reason for the faculty's low motivation to work hard on publications (Karasheh et al., 2020).

Fifth, the distribution of working hours turns out to be unconducive to high research performance, as are high teaching loads and administrative duties in the two countries (Bhuian, 2016; Karasheh et al., 2020). Faculty members can spend only one-fifth of work time, or even less, on research (Bhuian, 2016).

The sixth challenge for both countries is the sustainability of the international university branches. Despite establishment of multiple foreign universities in the region, many of them had to be closed soon. For example, George Mason University and Michigan State University closed all undergraduate programs implemented in Dubai. In most cases, the two countries' level of pre-university education is insufficient to meet international university requirements. In 2009, for example, the UAE Michigan State University campus accepted only 10% of applicants (Wilkins, 2010). Highly reputable international universities cannot compromise on academic standards, resulting in low student numbers. Consequently, universities had to close their campuses. Later, established universities' international branches managed to recruit more international students, thus improving the situation, but, in fact, foreign universities' low survival rate explains the decreased number of influential publications in recent years. Furthermore, foreign universities' development depends on why they decided to operate in the GCC countries. Many private foreign institutions seek only commercial gain (Rid Ge et al., 2016). In such cases, parent organizations are not interested in controlling whether their campuses meet quality standards.

Finally, the low English proficiency of many faculty (Arab and non-Arab from non-English-speaking countries) and Arab-speaking students greatly challenges effective international research collaboration. As already mentioned, until the 1990s, the region's population resisted learning English because it was seen as a symptom of Westernization. Recently, attitudes toward English have changed, with more people becoming aware that English is a widely recognized means of communication and that it can help a person find a prestigious job. In Oman, for example, learning English is viewed as a powerful instrument that facilitates gradual replacement of labor migrants by highly qualified Omani specialists, an Omanization (Al-Jardani, 2012).

Concluding Remarks

This article attempted to contribute to the discussion on the academic productivity and publication activity in the UAE and Oman. The results demonstrated that in the UAE and Oman, research performance is rather moderate. However, publication output is gradually increasing, especially with a considerable jump in the UAE published and cited documents within the last 5 years. At the same time, the dynamics of influential studies are rather unstable. Indeed, the growth rate of citations per document remains negative until now. Compared to global research productivity, the two countries' research contributions are not very large, amounting to less than 1 percent of the global share. The same is true of distinct subject areas.

Summarizing the literature review's outcomes, we conclude that sociocultural prerequisites powerfully affect scientific performance in the UAE and Oman. First of all,

historical background defines the status of higher education and research, and it explains peculiarities in higher education institutions' development. Until recent years, the GCC were heavily investing in their education system and mainly receiving knowledge rather than generating it. In their policies, however, the Emirati and Omani governments prioritized higher education. The UAE's federal budget increased its educational allocation from AED 6.526 billion in 2016 (13.44% of federal budget) to AED 10.146 billion in 2020 (14.8%)[*] (1 USD=3.67 AED). In Oman, according to the National Centre for Statistics and Information, government spending on primary and secondary education rose by 130 per cent over the last decade (*The Oman Times* August 6, 2018). In 2017, expenditures of the ministry stood at OMR 1.239 billion, a significant spike from OMR 529,000 in 2008 (1 USD=0.38 OMR). In 2017, total government expenditure increased to 11 per cent, compared with 8 per cent a decade earlier.[†] We expect that research productivity will rise exponentially in the UAE and gradually in Oman as world-class education and highly qualified human resources are the main targets in these countries' visions (Fernandes et al., 2013; Jose & Chacko, 2017).

For a long time in the region, communication between teacher and student was excessively superior-subordinate, meaning that students perceived teacher-provided information as unquestionable truth, whereas discussion contributes to research (Al-Balushi & Ambusaidi, 2015). That is why these countries experienced many reforms and multiple changes in school and university curriculums. Currently, higher education focuses on developing students' critical thinking and critical information analysis skills that will lead to positive outcomes for future research (Al Farra, 2011).

Linguistic background is also significant. Part of the public still views Arabic as a means of saving their cultural heritage, and the largest UAE University's recent switch to English as the language of instruction has been debated. Some argue that doing so will enrich the educational process and enhance research productivity and academic performance in general, but others defend the native language and do not perceive it as an obstacle to educational development.

Other challenges stem from the modern higher education system's disadvantages: conditions for faculty members who are supposed to produce publications but experience heavy teaching loads and lack of financial motivation, lack of autonomy, lack of engagement in the decision-making process, and lack of support in career development. Academic wages are not that high in the UAE and quite low in Oman, but costs of living are quite high in both countries.

Institutional challenges relate mainly to gaps in the research environment and lack of opportunities for internationalization of the higher education system. Predominantly, results of poor pre-university training have a detrimental effect on international university branches' sustainability in GCC countries. For further economic development based on a strong higher education sector, both the UAE and Oman need to ensure the education sector's sustainability by providing an environment that promotes continuous quality improvement while ensuring innovation in educational infrastructure and programming (Jose & Chacko, 2017).

[*] https://u.ae/en/information-and-services/education/education-budget

[†] https://timesofoman.com/article/139390/oman/education/130-per-cent-rise-in-spending-on-oman-education

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