A COMPREHENSIVE STATISTICAL AND ANALYTICAL INVESTIGATION OF THE LIBYAN SCIENTIFIC COMMUNITY

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Abstract

Background: The Libyan scientific community includes a wide range of institutions. These comprise public and private universities, an Open University, technical higher institutions, vocational institutions, scientific societies, scientific publishing associations, as well as petroleum training and qualification institutes. **Aims of the study:** This study sought to assess the activity of the Libyan scientific community and to identify the challenges facing its development. **Methodology:** The present study relies on published data drawn from information collected from multiple sources, including survey studies and public and international reports produced by local and global organizations. **Results:** Based on the collected data, in 2023 Libyan government universities recorded 28. In addition, a total of 73 scientific societies were established in Libya. Moreover, a total of (183) academic journals were approved by the Libyan authority for scientific research, including journals belonging to 25 universities, 5 technical institutes, 4 technical colleges, 9 scientific research centers, 13 scientific societies, and 6 private and public universities. Furthermore, the data recorded a total of 4246 Master of Science theses and 436 PhD dissertations in the database system of the Libyan Central Library.

Key words: Scientific community – Journals – Libyan institutions

Introduction

Libyan universities are undergoing rapid transformation driven by economic, political, technical, and social factors, including an uncertain political climate and the absence of clearly defined higher-education objectives. In addition, budgetary constraints have reduced spending on scientific research, leaving relatively few initiatives that support such research. Universities are expected to tackle societal challenges in Libya through research initiatives (Suwaed, 2017). Many Arab colleges—including those in Libya—face difficulties in advancing both education and scientific research. Open admissions, limited financial resources, and underinvestment in public institutions have therefore weakened the research environment in Arab universities (Anderson, 2012).

Naifah (2008) specified the major factors obstructing scientific research in Arab universities as follows. First, there are problematic factors, including the lack of both strategic plans and innovation. Second, university personnel lack professional development, research funding, incentives, and security. Third, a disconnect exists between research conducted within universities and the country's social development. In Morocco, for example, Alrashdan (2003) reported that "Arab universities maintain a low impact stature on their surroundings."

Moreover, Aladwan (2013) identified additional challenges facing research activities at Arab universities, including the low rate of expenditure on scientific research and the absence of a clear strategic plan for research.

Libya records a lower rate of scientific medical publications in international, peer-reviewed journals than Tunisia. This gap significantly influences the standing of the country's academic institutions, academic system, and academic staff. The results may be indicative of current attitudes and perceptions toward research within Libyan medical academia. This report highlights the need for timely action to enhance the value of research and publishing in higher education and to set appropriate promotion requirements for senior positions (Bakoush *et al.*, 2007).

The history of Libya's Higher Education (HE) system dates back to December 1955, when a Royal Decree established the University of Libya (Al-Jama'a Al-Libya) through the efforts of King Idris I. The first two faculties—the Faculty of Arts and the Faculty of Education, both founded by Royal Decree—were established in Benghazi. With the creation of the first University of Libya, the Kingdom laid the groundwork for the establishment of several additional universities in the near future, as anticipated by Article 1 of the same Royal Decree. It is essential to note that, in the King's vision, the University of Libya was not intended only for the University of Benghazi and the Benghazi region; rather, it was meant to function as a national hub. In this regard, the later creation of the University of Tripoli, established under that designation in 1973 (UNIMED, 2020), can be understood.

Insufficient financial resources further intensify the challenges associated with scientific study. At present, Libya and other Arab nations allocate less to scientific research development than other regions of the world (Tashani, 2009). Specifically, nearly 74% of the research carried out by faculty members at Nile Valley University and Shindy University does not receive financial support from the Ministry of Higher Education, the universities themselves, or the business sector (Farah and Othman, 2008). In addition, governments allocate budgets for scientific research at below 0.5 percent of public income, whereas governments in industrialized nations spend more than 2% of their budgets on research, offering an opposing view (Alshardan, 2003). Two focus groups identified a lack of research capabilities as a key factor that contributes to the low research quality of faculty members. Many academics lack essential research skills—such as proposal writing, administration, team building, and information technology—despite holding an MA or PhD degree (Suwaed, 2017).

Methodology

This study is grounded in previously published data obtained by compiling information drawn from multiple sources. Specifically, the dataset draws on findings reported in survey-based studies and on international reports produced under the leadership of both local and global organizations. In addition, the compilation incorporates contributions from dependent researchers, whose work was included to support and extend the information collected across these sources.

Data Analysis and Discussion

According to Table (1), the University of Tripoli was ranked as the highest institution in Libya. It achieved first place in the local ranking and recorded a score of 5316 in the world

ranking in the AD Scientific Index 2024, among 29 evaluated Libyan institutions. In addition, no Libyan institution was listed among the world's top 3% of scientists. Within this distribution, only one comparatively limited entry from the University of Tripoli appeared in the world top 10%, and just two scientists from that same university were recorded in the world top 20%. Finally, the University of Tripoli had three scientists placed in the world top 30%.

In the same index, the University of Benghazi reported two scientists in the world top 30%. Sebha University, Al Zawiya University, Bright Star University, and Tobruk University each reported one scientist in the world top 30%. With respect to the classification of scientists in Libya Top 3.000, the study used the Hi index. As clearly observed, a substantial shortage in the abundance of scientific platforms is occurring among Libyan academic staff, which may be attributed to limited advanced information about these platforms, particularly Google Scholar.

At the same time, the scarcity of publications in English constitutes a further significant reason, reinforced by the very small number of publications appearing in highly indexed journals. The Hi index scale is determined by the citations recorded for researchers' publications; therefore, the lower the Hi index number, the fewer the publication-related citations performance. Khalil and Halis (2017) reported that Libyan higher education faces multiple challenges, including unqualified technical staff, a lack of hiring criteria, government restrictions, inefficient programs, inadequate buildings, insufficient nationalism, and limited financial resources. This set of challenges may help explain why Libyan institutions have low ranking outcomes as well as weak academic qualifications.

To address these issues, Libyan institutes should analyze educational quality through strategic allocation of funding to higher education institutions. Moreover, promoting scientific research and information technology within colleges may enhance education quality and better meet current academic needs (Nelson 2016).

Table (1). All Types of Institutions in Libya top 3.000 in A D ranking system 2024

	Institution	Country Rank	Region Rank	World Rank	Country	Institution Type of	Founded	Scientists in Libya Top 3.000	Top 3% Scientists in World	Top 10% Scientists in World	Top 20% Scientists in World	in World
1	University of Tripoli	1	169	5316	Libya	Public	1955	570	0	1	2	3
2	University of Benghazi	2	395	9608	Libya	Public	1955	474	0	0	0	2
3	Sebha University	3	418	9892	Libya	Public	1983	288	0	0	0	1
4	Omar Al Mukhtar University	4	428	9999	Libya	Public	1960	261	0	0	0	0
5	Al Zawiya University	5	477	10669	Libya	Public	1988	57	0	0	0	1

6	Bright Star University	6	496	10949	Libya	Public	1981	4	0	0	0	1
7	Tobruk University	7	534	11277	Libya	Public	2016	41	0	0	0	1
8	Sabratha University	8	576	11877	Libya	Public	2015	97	0	0	0	0
9	Libyan International Medical University	9	588	11973	Libya	Private	2007	39	0	0	0	1
10	Bani Walid University	10	621	12511	Libya	Public	2016	2	0	0	0	0
11	Fezzan University	11	650	12867	Libya	Public	2017	3	0	0	0	0
12	Alasmarya Islamic University	12	696	13767	Libya	Public	1995	125	0	0	0	0
13	Misurata University	13	713	13867	Libya	Public	1984	43	0	0	0	0
14	University of Elmergib	14	724	14071	Libya	Public	2001	196	0	0	0	0
15	Sirte University	15	772	14879	Libya	Public	1991	87	0	0	0	0
16	Libyan Academy for Postgraduate Studies	16	795	15186	Libya	Public	1988	36	0	0	0	0
17	College of Electronic Technology-Bani Walid	17	801	15208	Libya	Public	1976	21	0	0	0	0
18	College of Electrical and Electronics Technology, Benghazi	18	846	15644	Libya	Private	1973	11	0	0	0	0
19	Libyan Petroleum Institute	19	875	16187	Libya	Institution	1977	4	0	0	0	0
20	University of Derna	20	910	17146	Libya	Public	1993	39	0	0	0	0
21	University of Gharyan	21	913	17171	Libya	Public	1991	59	0	0	0	0
2	College of Industrial	22	941	1771	Libya	Public	199	7	0	0	0	0

2	Technology, Misurata			1			9					
23	Biotechnology Research Center, Tripoli	23	963	17978	Libya	Private	2012	8	0	0	0	0
24	College of Engineering Technology Houn	24	978	18193	Libya	Public	2011	19	0	0	0	0
25	Surman College of Science and Technology	25	1038	19146	Libya	Public	2016	8	0	0	0	0
26	Collage of Medical Technology, Misrata	26	1140	20407	Libya	Public	1984	1	0	0	0	0
27	Aljafara University	27	1248	21913	Libya	Private	2014	2	0	0	0	0
28	High Institute of Sciences and Technology Bin Ghashir	28	1268	22167	Libya	Public	2020	1	0	0	0	0
29	Sirte Oil Company	29	1315	22915	Libya	Company	1	0	0	0	0	0

As shown in Table (2), the total number of scientific journals approved by the Libyan authority for scientific research is (183). These journals are distributed across 25 universities, 5 technical institutes, 4 technical colleges, 9 scientific research centers, 13 scientific societies, and 6 private and public universities. The evidence from these figures indicates that the publication landscape in Libya is very weak, and that additional scientific journals should be established. Moreover, many of these journals do not focus on specific branches of science; instead, they function primarily as general journals. In addition, only a small proportion of them release issues on a monthly basis.

Considering the large number of institutions together with their staff members, the data make the shortage of publications per staff member clearly visible. Libya, in particular, has markedly fewer publications: 2.4 publications per million population per year, and 0.4 publications per one billion US$ GDP. Regarding citation performance, Bakoush *et al*., 2007 surveyed medical research publications in Libya during 2002–2006 and reported that medical research publications in Libya were very low when compared with related research in Tunisia and Morocco. They concluded that Libya's medical research output is approximately twenty times lower than that of other countries with similar backgrounds, and that it needs to be strengthened.

At the same time, the quality of scientific research is closely linked to the quality of scientific activities within any institution. The Libyan situation is not an exception: the majority of Libyan journals are not indexed in any scientific database platform. In addition, Libyan researchers show a very limited presence in major scientific search and indexing engines.

With respect to subject areas, the largest share of publications by Libyan researchers in both Libyan journals and non-Libyan journals is concentrated in the humanities, whereas only a very small number appears in applied sciences. The structure of academic postgraduate programs is divided as follows: Humanities (206), Applied sciences (158), and Medical sciences (46). In parallel, the proportions of academic staff members' graduation in public universities are recorded as (4%, 5%, 11%, 29%, and 51%) for full professors, associate professors, assistant professors, lecturers, and assistant lecturers, respectively (Elkhouly *et al.*, 2021). Overall, most Libyan staff members are lecturers and assistant lecturers (80%). At the same time, most postgraduate programs emphasize humanities specializations.

Therefore, a plausible explanation for the low numbers of recorded Libyan scientists in the A.D ranking system is the lack of qualification, skills, and promotion, alongside the low publication rates compared with global levels.

Table (2) Number of scientific journals established by Libyan institutions 2024

	Institutions	Number of scientific journals
1	Sabratha University	2
2	Misurata University	12
3	University of Benghazi	16
4	University of Tripoli	12
5	Omar Al Mukhtar University	7
6	Sirte University	9
7	Moohammed ben ali esenusi university	6
8	Alasmarya Islamic University	10
9	University of Elmergib	14
10	Al zytona university	12
11	Nalut university	2
12	Sebha University	3
13	Bani Walid University	5
14	Al Zawiya University	7
15	Tobruk University	4
16	Libyan Academy for	5

	Postgraduate Studies	
17	The Libyan open university	1
18	University of Gharyan	4
19	Sedra gulf university	1
20	Bright star university	1
21	Ajdabia university	2
22	Aljafara University	1
23	Fezzan university	1
24	Zentan university	1
25	Al. gofra university	1
26	Ministry of technical education institutes	9
27	Libyan authority for scientific research	6
28	Scientific research centers authorized by the Libyan authority for scientific research	9
29	Scientific societies authorized by the Libyan authority for scientific research	14
30	Private universities	6
Total		183

The data presented in Table (3) indicate that, among a total of 7,804 scientific theses, the field of Religions achieved the greatest relative abundance, accounting for 9.905%. This was followed by Education and psychology, each recording 9.098%, and by law, which also reported 9.098%. By contrast, the lowest abundance was recorded for Truism, at 0.32%.

In addition, the applied science fields—Mathematics, Physics, Biology, Botany, Zoology, Medical science, Engineering, Ecology, Agriculture, and related sub-areas—reported the following relative abundances: 0.73, 0.602, 0.782, 0.935, 0.833, 1.192, 0.615, 4.165, 0.564, and 4.895, respectively. Among these applied-science categories, Agriculture recorded the highest percentage at 4.895%, whereas Ecology registered the lowest percentage at 0.564%.

These findings make it clear that the applied science branches together accounted for only 15.313% of the total number of theses recorded. Furthermore, according to information published by the electronic archiving department of the Libyan Central Library, the archive contained 4,600 scientific theses up to the present time, comprising 4,400 theses in Arabic and 1,200 theses in English, covering the period from the beginning of the department's work in 2019 until now.

Elkhouly *et al*, 2021 concluded that higher education constitutes the most important sector in the Libyan scientific community. They further emphasized that improving the education system in Libya requires addressing obstacles and implementing innovative solutions, including the adoption of new technology, revision of the curriculum, and the establishment of quality assurance mechanisms. Achieving success also requires strengthened laws and more effective financial methods, along with clearly defined objectives and a post-graduation structure. Finally, the proliferation of private institutions that lack clear aims and plans should be halted. In addition, the negative effects of randomized research efforts must not be overlooked, particularly those efforts that rely on very classic and poor ideas regardless of the true needs of society.

Table (3) Number of theses in Arabic language recorded by the Libyan authority for scientific research

	Field	Number of thesis in Arabic language	%
1	General knowledge	192	2.46
2	Philosophy	239	3.063
3	Religions	773	9.905
4	politics science	196	2.512
5	Economics	409	5.241
6	Law	705	9.034
7	Management	363	4.651
8	Social service	143	1.832
9	Education and psychology	710	9.098
10	Sports	376	4.818
11	Calculation	186	2.383
12	Sociology	313	4.011
13	Arabic language	600	7.688
14	Mathematics	57	0.73
15	Physics	47	0.602
16	Chemistry	61	0.782
17	Biology	73	0.935
18	Botany	65	0.833
19	Zoology	93	1.192
20	Medical science	48	0.615

21	Engineering	325	4.165
22	Ecology	44	0.564
23	Agriculture	382	4.895
24	Arts	110	1.41
25	Arabic literature	388	4.972
26	History	472	6.048
27	Geography	409	5.241
28	Truism	25	0.32
Total		7804	

As shown in Table (4), the capacity associated with information and communications technology (ICT) requirements within the ministry institutions is extremely weak. The following evidence summarizes the main challenges that emerged from the survey.

All respondents involved in the assessment—including the Ministry of Education, other ministries, and partner institutions—stated a strong commitment to strengthening Libya's education system. However, the social and institutional environment is characterized by complexity, significant risk, and rapid change, which makes it difficult to put in place the reforms needed to align with international standards. Identifying, developing, and implementing appropriate solutions therefore demands sustained patience, significant effort, and continued support. Consequently, the establishment of a more advanced educational quality control system is highly difficult to achieve under the current circumstances.

Table (4): Summary of Perceptions of Infrastructural Capacity in Information and Communications Technology (ICT) reported by the Libyan ministry of education

Item	Usage
Desktop Computers	Less than half of the need
Laptops	Not Available
Servers	Most needs not met
Network Materials	Not Fully Defined
Routers	Needs Upgrade
Needs and capacity unknown, requires needs assessment	Internet Capacity
Wireless Services	Limited
Operational Applications	Poor
Educational Applications	Not in use

Backup Systems	Poor
Cyber Security Systems	Poor
End Point Protections	Poor
Services Level Agreements with Suppliers	Poor

References

Aladwan S. (2013) Scientific research & higher education in the Arab world. Paper presented at the 1st Annual Higher Education Leadership Forum: Inspiring the Leaders of Today, Dubai, 12–13.

Alrashdan, A. (2003) Higher Education in the Arab World: Hopes and Challenges Altbach P, Knight J. (2007) The internationalization of higher education: Motivations and realities. Journal of Studies in International Education. 11:290–305.

Anderson, L. (2012). Fertile ground: The future of higher education in the Arab World. Social Research. 2012;79(3):771–784.

Bakoush .O, Al-Tubuly A.A, Ashammakhi .N,, and Elkhammas E.A (2007) PubMed Medical publications from Libya. Libyan J Med, AOP:125-128.

Elkhouly. A. R, Masoud. O.M and Shafsha. H.A (2021) Higher education in Libya, challenges and problems: a descriptive study. American Research Journal of Humanities & Social Science (ARJHSS) Volume-04, Issue-12, pp-52-61.

Farah A, and Othman A. (2008) Quality at Sudan's universities a case study: Nile river state universities. Paper presented at the 2nd Arab Conference: Arab Universities Challenges and Ambition, Marrakesh, Morocco, 21–24.

Khalil. D and Halis. M (2017) Challenges Facing the Quality of Education in the Libyan Higher Technical Colleges. Imperial Journal of Interdisciplinary Research (IJIR) Vol-3, Issue-10:112-118.

Naifah A. (2008) Quality of education and its impact on accreditation and world ranking. Paper presented at the Workshop: University Ranking and Accreditation, King Saud University, Riyadh, Saudi Arabia, 1–2 June 2008.

Nilson, L. B. (2016). Teaching at its best: A researchbased resource for college instructors. John Wiley & Sons.

Suwaed. H. (2017). An Investigation Into The Factors That Impede Scientific Research In Higher Education In Libya: Time To Act. British Journal of Education 5(12): 91-100.

Tashani, O. (2009). The Scientific Research in Libya: The Role of the New Generation of Researchers. Libyan J Med. 2009; 4(4): 129–130.Published online 2009 Dec

USAID (2020). Libya ministry of education human and institutional capacity assessment final report august 2019. pp188.