Scientific Productivity in the Library and Information Science Research Area in Middle Eastern Countries and What Should We Do Better?

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ABSTRACT
The objective of the Middle East (ME) chapter of the Association for Information Science and Technology (ASIS&T) is to facilitate personal networking and professionalism in the ME region and other parts of the world. For this purpose, six Middle Eastern countries were randomly selected and analyzed with bibliometric methods for scientific productivity in the library and information science (LIS) research area between 1979 and 2022. R programming language and Biliometrix Packages were used for the analysis. The relevant data were collected from the Web of Science on December 10, 2022. The productivity of ME countries in all document types was only 1.47%. Although academic productivity has increased considerably over the years, the contribution of Middle Eastern researchers to the global LIS literature remains very low and an emerging area for development. Six ME countries were randomly selected to assess their scientific production in the LIS field: Turkey (*f:*1,375), Iran (*f:*1,268), Kuwait (*f:*244), Egypt (*f:*232), Oman (*f:*164), and Iraq (*f:*48). The institutions that stood out with their scientific productivity were Hacettepe University (*f:* 259, Turkey), Islamic Azad University (*f:* 212, Iran), and the Egyptian Knowledge Bank (*f*: 207, Egypt). The study is crucial to appreciate the general situation of the LIS field in a region containing cities that have hosted the largest libraries in history (such as Alexandria, Ephesus, and Pergamon). The Middle East has an important heritage for library and information science and this study's findings open the discussion of how the region can perform better.

KEYWORDS
Middle East, Scientific Productivity, Library Science, Information Science, Collaboration, Research.

INTRODUCTION
For the past 5,000 years, the library has provided access to human history. Mesopotamia is recognized as the cradle of the great library tradition in antiquity (Köklü, 2009). The royal palace in Ebla, a city located within the borders of modern-day Syria, is the site where official records and archives were first assembled 5,000 years ago. Since the invention of writing, the library has served to facilitate the flow of knowledge across history. While the tangible object of the library has transformed throughout the years, from first stone to later clay, bark, leaf, leather, papyrus, parchment, cloth, paper, etc., the abstract object has always been writing (Keseroğlu, 2005). Information is a material that can be processed, and the library has always been a crucial tool for accessing knowledge.

The word *bibliothek*, which is often used in the West to refer to a library, originates from Ancient Greek. The *biblion* means the book and *theke* the hiding place. A modern library service today is expected to provide services for the creation, access, organization, reformulation, interpretation, publication, and transmission of recorded information. In addition, libraries must document various information sources and provide accurate and timely information in a comprehensive manner (Köklü, 2009).

Bibliometrics is an essential tool for tracking scientific productivity and progress in a particular field (Cooper, 2015; Hammarfelt, 2016; Moed et.al., 1985), including Library and Information Science (LIS). Through bibliometric analysis, researchers can perform analyses at many different scales, including those related to new technologies (Damar, 2021), research areas (Kokol et.al., 2021), journals (Martínez-López et.al., 2018; Damar & Özdağoğlu, 2022), and countries (Türkeli et.al., 2018; Srivastav et.al., 2019). Although bibliometric analyses have been carried out on various countries, no studies focused on Middle East geography have been found in the literature.

This review has helped discover institutions and researchers in the Middle East geography who can contribute significantly to a young chapter. Given the unique characteristics of LIS in the Middle East, this review is expected to play an important role in the development of the field and scientific productivity in the region. Furthermore, this work is presented as a qualified contribution as the young chapter members seek to answer the question of how we can do better for the region through the Association for Information Science and Technology (ASIS&T).

THE AIM AND IMPORTANCE OF STUDY AND RESEARCH QUESTIONS
The Association for Information Science and Technology (ASIS&T) is a preeminent professional association that bridges the gap between information science practice and research. ASIS&T consists of eight different regional chapters, with the Middle East chapter being the youngest. The objective of the Middle East chapter is to facilitate

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personal networking and professionalism in the Middle East and other parts of the world. For this purpose, we randomly selected six countries and analyzed their scientific productivity in the LIS research area using bibliometric methods. Despite the long-standing relationship between information science and library science in Middle Eastern countries, it is evident that this connection has significantly weakened, and the ancient civilizations that had a significant impact on the transformation of information are unable to exert the same influence today. Throughout history, the location of the Middle East has played a crucial role in the evolution of library science.

This study compares the Middle East's geography on a global scale with the rest of the world, highlighting the position of these nations. On a micro level, it evaluates the scientific productivity of randomly selected countries in the relevant scientific research field using bibliometric techniques and offers recommendations for improvement based on the findings.

METHODOLOGY

The study analyzed the constellation of research and review articles in the LIS research area between 1979 and 2022 in the WoS Core Collection database. Due to the difficulty of including all Middle Eastern countries in a single analysis, six countries were randomly selected (using the website: https://www.dcode.fr/en).

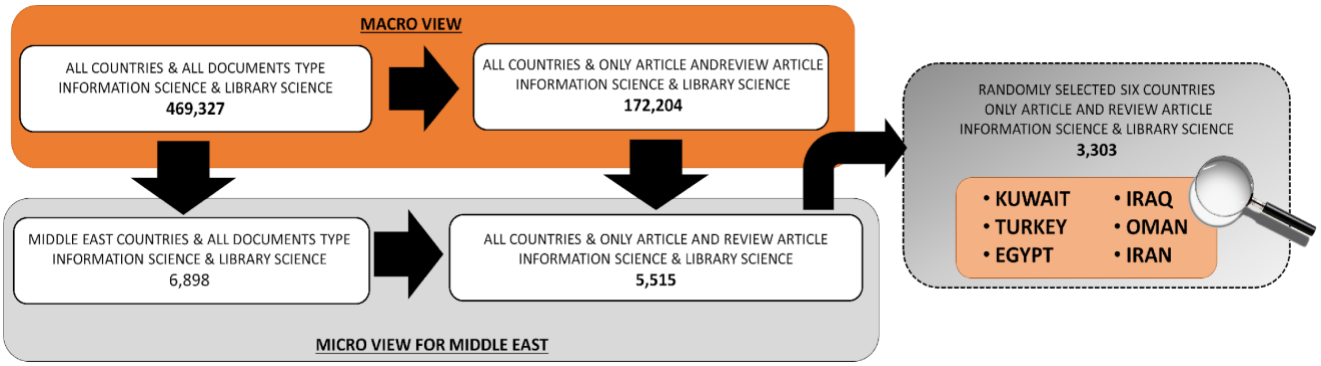

Figure 1. Research Methodology

The countries we focused on for the analysis were Egypt, Iran, Iraq, Kuwait, Oman, and Turkey. The search strategy in WoS used the following query term: "cu= ('Egypt' or 'Iran' or 'Iraq' or 'Kuwait' or 'Oman' or 'Turkey') and su='INFORMATION SCIENCE & LIBRARY SCIENCE' and 2023 (Exclude – Publication Years) and Article or Review Article (Document Types)" in the WoS Information Science and Library Science research category. All articles published between January 1, 1979, and December 2022 were included. The general research methodology of the study is shown in Figure 1.

The search process was conducted on December 5, 2022, using the WoS Core Collection database, which returned 3,303 documents. The obtained document information was subjected to various pre-processing steps, and the analysis was performed using the R programming language and Biliometrix Packages. WoS and InCites reporting tools were also used for analysis as well as SQL programming language and Microsoft Excel tools for some calculations and reporting.

FINDINGS

A total of 469,327 documents were produced in the LIS research field across all analyzed years, with 172,204 being article and review types. The top ten most productive countries for article and review types in the field were the USA (*f:*67,154, 39.04%), the United Kingdom (*f:*13,201, 7.68%), China (*f:*8,717, 5.07%), Canada (*f:*8,098, 4.71%), Spain (*f:*6,977, 4.06%), Germany (*f:*5,968, 3.47%), Australia (*f:*5,685, 3.31%), India (*f:*4,723, 2.75%), Brazil (*f:*4,577, 2.66%), and the Netherlands (*f:*3,462, 2.01%).

Turkey ranked first in general document productivity among Middle Eastern nations and 23rd worldwide, while Iran, ranking second in the Middle East, was ranked 26th worldwide. According to the information gathered on December 5, 2022, Middle Eastern nations produced a total of 6,898 documents in the analyzed time period, contributing only 1.47% of all documents produced to the field of Web of Science Information Science and Library Science. This situation indicates that Middle Eastern countries have considerable room for progress in the LIS field.

General Statistics for the Middle East Region

Despite improvements in academic output over the years, the contribution to worldwide literature in the LIS field remains extremely low in Middle Eastern countries, highlighting the need for further development in the field. Among the document types produced most intensively by Middle Eastern researchers are articles (*f:*5,334),

proceeding papers (*f:*902), book reviews (*f:*226), book chapters (*f:*208), editorial material (*f:*209), and review articles (*f:*165). We focused our analysis on documents of the article and review types.

The journals with the most intensive publication activities in the relevant countries were *Turkish Librarianship* (*f:*479), *Scientometrics* (*f:*291), *Journal of Information Science* (*f:*219), *Information Processing Management* (*f:*208), and *Electronic Library* (*f:*153). It is noteworthy that the journal in which the most research from the Middle East region was published is a journal from the same geography (Emerging Sources Citation Index – Turkey).

This situation reveals the importance of similar journals for the region. However, we also observed that the two fields that were most intensely associated with LIS were Computer Science (*f:*1,875) and Business Economics (*f:*610), and this relationship has been increasing with each passing year. This situation represents an important indicator of the significance of computer science for the LIS field and its transformation.

Among the Middle Eastern countries, some of the most productive countries in the article and review document types were Turkey (*f:*1,375), Iran (*f:*1,268), Saudi Arabia (*f:*609), Jordan (*f:*274), Kuwait (*f:*244), Egypt (*f:*232), Oman (*f:*164), Qatar (*f:*155), Lebanon (*f:*86), United Arab Emirates (f:66), Iraq (*f:*48), Palestine (*f:*16), Yemen (*f:*14), and Syria (*f:*9). In addition, we observed that non-Middle Eastern countries such as the USA (*f:* 548), the United Kingdom (*f:* 350), Malaysia (*f:* 138), Pakistan (*f:* 143), Australia (*f:* 118), Canada (*f:* 112), and India (*f:* 102) had extensive collaborations with the relevant regions. As indicated in the methodology section, more specific findings regarding the selected nations will be presented at the micro level.

Iran

Iran produced 1,268 articles in the LIS field of Library across all analyzed years, ranking it 26th in the world. These articles have gained a total of 13,779 citations, with an average of 10.78 citations per item and an h-index score of 52. Both the values of citations and h-index for Iranian researchers were very high. The 1,268 papers were published by a total of 2,096 researchers. It was also observed that Iranian researchers cooperated with researchers from different countries and contributed to the field at different universities abroad. The countries with which Iranian researchers cooperated the most were the United Kingdom (*f:*85, 6.70%), the USA (*f:*52, 4.101%), Malaysia (*f:*46, 3.62%), Australia (*f:*41, 3.23%), and Canada (*f:*28, 2.20%). The country with the most regional cooperation was Turkey (*f:*14, 1.10%) with 14 articles.

Notably, the interaction of Iran within the Middle East region is quite low. In total, 597 different institutions cooperated in the production of the related articles, with Islamic Azad University (*f:*212, 16.71%), the University of Tehran (*f:*186, 14.66%), Ferdowsi University Mashhad (*f:*80, 6.30%), Shiraz University (*f:*68, 5.36%), and Kharazmi University (*f:*65, 5.12%) being the top five institutions in terms of publications. Iranian researchers produced documents addressing fourteen distinct domains, with the top five fields being Computer Science (*f:*394, 31.07%), Business Economics (*f:*107, 8.43%), Geography (*f:*14,1.10%), Physical Geography (*f:*14, 1.10%), and Communication (*f:*12, 0.946%). The output in computer science by Iranian researchers was observed to be considerable.

Kuwait

The number of articles produced by researchers representing Kuwaiti institutions in the LIS field across all analyzed years was 244. The times cited value for these 244 articles was 3,251, with an h-index value of 28 and an average number of citations per item of 13.32. Related articles emerged with the contribution of 406 different researchers, including prominent researchers such as Rehman Sajjad Ur (*f:*25, Jiangxi University of Science & Technology), Chaudhry Abdus Sattar (*f:*16, Kuwait University), Al-Daihani Sultan M. (*f:*15, Kuwait University), Al-Qallaf Charlene L. (*f:*14, Kuwait University), and Alansari Husain (*f:*12, Kuwait University). The top five countries with which researchers collaborated the most were the USA (*f:*38, 15.574%), the United Kingdom (*f:*10, 4.10%) Malaysia (*f:*8, 3.28%), Turkey (*f:*7, 2.87%), and Pakistan (*f:*6, 2.46%).

Within the Middle East, Kuwait maintained collaborations with academics from Saudi Arabia, Turkey, Egypt, Jordan, and the United Arab Emirates. The most productive institutions were Kuwait University (*f:*174, 71.31%), the Public Authority for Applied Education Training (PAAET) (*f:*21, 8.60%), the American University of the Middle East (*f:*11, 4.51%), and Gulf University of Science Technology (*f:*14, 5.74%). Furthermore, the most collaborative foreign institution with researchers from Kuwaiti institutions was Nanyang-Technological University (*f:*12, 4.92%). Kuwait University has been an important factor in Kuwait's progress in the LIS field.

Egypt

A total of 232 articles in the LIS field were produced by 419 different researchers in Egypt during the analyzed years. The prominent researchers in this field were Mansour Essam (*f:*16, Egyptian Knowledge Bank), Shehata Ahmed Maher Khafaga (*f:*8, Egyptian Knowledge Bank), Mansour Essam (*f:*6, Egyptian Knowledge Bank), Basta Altaf H. (*f:*6, Egyptian Knowledge Bank), and Elsayed Amany (*f:*6, Egyptian Knowledge Bank). In the Middle East region, the countries with which Egypt has had the most bilateral cooperation are Saudi Arabia (*f:*32, 13.79%), the

United Arab Emirates (*f:*12, 5.17%), Oman (*f:*6, 2.59%), Kuwait (*f:*4, 1.724%), Iraq (*f:*1, 0.43%), and Jordan (*f:*1, 0.43%).

In addition to these nations, researchers from Egypt have also worked closely with researchers in the field from the USA (*f:*20, 8.62%), the United Kingdom (*f:*18, 7.76%), China (*f:*9, 3.88%), Germany (*f:*8, 3.45%). The most productive institutions have been the Egyptian Knowledge Bank (*f:*207, 89.22%), Cairo University (*f:*27, 11.64%), South Valley University Egypt (*f:*23, 9.91%), Minia University (*f:*22, 9.48%), and American University Cairo (*f:*20, 8.62%). Furthermore, the two other research fields with which the LIS field has most intensely been associated were Computer Science (*f:*76, 32.76%) and Business Economics (*f:*29, 12.50%).

Oman

The data shows that 164 articles in the LIS field were produced by 411 different researchers in Oman from 283 different institutions in 60 different countries. The relevant articles have a citation value of 2.081, an average citation value of 12.69, and an h-index value of 24. The most prominent institutions in Oman have been Sultan Qaboos University (*f:*91), Asharqiyah University (*f:*11), Sohar University (*f:*11), the Egyptian Knowledge Bank (*f:*6), and the University of Huddersfield (*f:*6). In addition, Omani researchers have cooperated with researchers from 60 different countries during the production of the relevant publications, with the most intensive cooperation from the Middle East region being with Egypt (*f:*6, 3.66%), the United Arab Emirates (*f:*6, 3.66%), Saudi Arabia (*f:*5, 3.05%), Turkey (*f:*4, 2.44%), Iran (*f:*2, 1.22%), Kuwait (*f:*2, 1.22%), and Palestine (*f:*2, 1.22%).

Turkey

Turkish researchers produced 1,375 articles in the LIS field, with a times-cited value of 12,406, an average citations per item value of 9.02, and an h-index value of 49. Relevant articles were published in 154 different journals with the contribution of 2,021 researchers from 851 different institutions across 78 different countries. However, it was found that the vast majority of studies related to Turkey in the data analyzed were conducted with institutions from the same country. Hacettepe University (*f:*258, 18.76%), Middle East Technical University (*f:*106, 7.71%), Istanbul University (*f:*78, 5.67%), Ankara University (*f:*64, 4.66%), and Istanbul Technical University (*f:*63, 4.58%) were the top five prominent institutions. Notably, Turkish researchers have had little collaboration with other researchers from the Middle East.

The top five countries with which Turkey has had the most intensive cooperation are the USA (*f*: 108, 7.86%), the United Kingdom (*f*: 46, 3.35%), China (*f*: 20, 1.46%), Canada (*f*: 19, 1.38%), and Spain (*f*: 17, 1.24%). In the Middle East region, the countries with which Turkey has cooperated the most are Iran (*f:*14, 1.02%), Kuwait (*f:*7, 0.51%), Saudi Arabia (*f:*7, 0.51%), Cyprus (*f:*5, 0.36%), Iraq (*f:*4, 0.29%), Oman (*f:*4, 0.29%), the United Arab Emirates (*f:*4, 0.29%), Lebanon (*f:*3, 0.22%), Jordan (*f:*2, 0.15%), and Qatar (*f:*2, 0.15%). The overall number of articles in the Turkey-targeted journal was 34.55%, which bodes well for the growth of LIS in the region. However, the volume of papers published by Turkish scholars prompted us to consider the international recognition and quality of the journal's endeavors.

Iraq

The 48 articles in the LIS field produced by Iraqi researchers were created by 133 different researchers from 92 different institutions across 20 different countries. The articles have been cited a total of 323 times, with an average citations per item value of 6.73 and an h-index value of 9. Institutions that stand out in the related publications are the University of Kufa (*f:*5, 10.42%), the University of Mosul (*f:*5,10.42%), Salahaddin University (*f:*4,8.33%), and the University of Raparin (*f:*4,8.33%). Iraqi researchers collaborated with nineteen different countries in the production of the relevant documents, with the most intensive cooperation coming from Malaysia (*f:*6,12.50%), China (*f:*5,10.42%), and Turkey (*f:*4, 8.33%). Within the Middle East, Iraqi researchers cooperated most with Iran (*f:*3,6.25%), United Arab Emirates (*f:*3,6.25%), Saudi Arabia (*f:*2, 4.17%), Bahrain (*f:*1,2.08%), Egypt (*f:*1,2.08%), and Jordan (*f:*1,2.08%).

DISCUSSION & CONCLUSION

Middle Eastern countries contributed only 1.47% of the total documents in the LIS field over the time period evaluated. Despite an increase in academic productivity over the years, the contribution to the global literature remains very low, presenting an opportunity for LIS in the region. In light of these findings, higher education policies should be pursued to enhance the relevant field in the Middle East region. Establishing programs in linked areas across higher education institutions will facilitate the monitoring and coordination of scientific productivity in the pertinent countries and can help guide strategic policies not only in the relevant field but also in related areas. This has the potential to significantly impact countries' or even the region's scientific development through the growth of the LIS field.

The role of the librarian in the 21st century is evolving with technological advancements. Libraries attached to universities, research organizations, and industrial establishments' research and development wings play a key role

in supporting research programs (Atılgan, 1991). It can be stated that this study is critical to assess the general situation of the field in the region where cities have hosted the largest libraries in history, such as Alexandria, Ephesus, and Bergama. The Middle East has important roots for library and information science and it is important to discuss the question of how the region can perform better. Additionally, the study identified institutions and researchers in the Middle East geography that can primarily communicate for a young chapter.

Considering the characteristics of the LIS field in Middle Eastern countries, their development can make an important contribution to the field and common scientific productivity in the region. This study also provides a significant opportunity for determining where to begin in the Middle East region of the relevant chapter. The construction of a structure in the LIS field in which countries can be more integrated and grouped within the framework of an organic bond should be studied immediately, and several studies should be undertaken on this topic.

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