

*Original Research*

## **The State of Art for Library and Information Science Research Trends in the Middle East: An Exploratory Analysis**

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Received: 09 October 2023

Accepted: 16 January 2024

### **Abstract**

This study examines scientific productivity in Middle Eastern (ME) countries within the discipline of Library and Information Science (LIS) for the entire period for which data is available, 1979-2023. The productivity of ME countries in all document types was only 1.49% under the LIS research area. Although academic productivity has increased considerably over the years, the contribution of ME researchers to global LIS discourse remains limited. The five most productive ME countries in LIS are Turkey (23rd), Iran (26th), Israel (31st), Saudi Arabia (42nd), and United Arab Emirates (46th). While Israel ranks the highest for international collaboration, institutions in Iran and Turkey are more likely to cooperate at national levels. Articles in the field of LIS were found to be highly related to computer science (f: 1894), business economics (f: 612), and health-related research fields (f: 206). In addition, knowledge management, social media, academic libraries, information retrieval, Internet, e-government, and bibliometrics were the most intensively studied topics. 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 and Beytü'l-Hikme). 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. Policymakers and those developing higher education policies in the region should emphasize infrastructure development, public awareness, education, research and academic programs, international and regional cooperation, policy, and support for collaboration and sharing.

**Keywords:** Middle East, Library Science, Information Science, Scientific Productivity, Scientific Collaboration.

### Introduction

The library provides access to the last 5,000 years of human history. The oldest libraries in the world, going back to the pre-Mesopotamian library of Ebla located in modern-day Syria (Wellisch, 1981), have been in the Middle East (ME) region. Tablets at the library of the royal palace of Ebla are 5,000 years old, predating the library tradition in Mesopotamia that supported one of the cradles of civilization (Köklü, 2009), and soon after the invention of writing in the region with archaic Sumerian (pre-cuneiform) writing. Libraries collect, store, and make-accessible documents relevant to various institutional functions within a civilization (Baysal, 1987), as such they are facilitators of the flow of knowledge across history (Keseroğlu, 2005). They should not however be understood merely in terms of their physical characteristics as merely buildings but in terms of the various knowledge and archiving cultures, and cultures about institutional functions they have engendered. Libraries have had important functions within various civilizations, specifically in antiquity and the middle-ages (Hamza & Ghoneim, 2000; Yıldız, 1985). If we take the need for information to be basic along with water, air, food, and shelter (Atılğan, 1991), the institution enabling access to that information, whatever form it takes, must thereby be foundational to any community.

As with any institution central to civilization, various theoretical and practical disciplines have developed that seek to study and improve them. In this sense, the study of libraries and related knowledge/information cultures they engender are as ancient as the libraries themselves. The modern field of library and information sciences (LIS) thereby has its equivalent in the premodern and earlier periods albeit under different designations. Due to the centrality of libraries and their related cultures to civilizations and nation-states, LIS discourse (historical and modern) is peculiar in its scope covering the knowledge practices in the various institutions it supports (political, economic, educational, scientific, etc.) (Arafat & Ashoori, 2019). The studies typically constituting LIS, as a modern discourse as well as its historical counterparts, thereby inevitably convey something fundamental about the corresponding civilization or nation-state, beyond specifics of particular libraries. As such, the quality of LIS discourse—whether or not it happens under that name—reflects something of a community's self-understanding of its knowledge practices and institutions, and hence, its civilizational identity and direction.

Moving from antiquity, through the middle-ages and pre-modern to the modern period, and especially in the contemporary context, we find significant changes to the library as an institution as well as the study of libraries and related knowledge cultures in LIS discourses. These changes often correspond to changes in technology, in how information can be collected, accessed, and proliferated, as we see clearly from modern LIS discourse.

What can modern LIS discourse in the Middle East then tell us about the region's self-understanding of its knowledge cultures? The first step to answering this question must be to understand the contours of LIS discourse in ME, by examining the range of works to which this corresponds. 'LIS-ME discourse' refers to the field of Library and Information Science in 17 countries in the Middle East region. It reveals the development and status of LIS in the countries of a particular region. This study is the first that considers the entirety of the available bibliometric data of LIS-ME publications, ranging from 1979-2023 to explore the researchers, institutions, and countries that constitute 'LIS-ME discourse'. Although there are prior bibliometric analyses their scope is limited to being at the country level and with limited

periods. Our study is the first to involve the whole region and a period corresponding to the entirety of available data. Moreover, as the following sections work to reveal, we examine the contribution of LIS-ME research to global LIS research.

It can be stated that the study has an important value in terms of seeing the general scientific productivity via the Web of Science (WoS) and discussing the question of how we can achieve better in the field of LIS in the geography of cities that have hosted the largest libraries in history (such as Alexandria, Ephesus, Bergama, and Beytü'l-Hikme) have important roots for information science and library science. It is hoped our study, by exhibiting active researchers and research centers will be a means for linking between such entities that do not yet know of one another, and where they somewhat, to encourage collaboration through data on research production. This aim is especially relevant since collaboration within and between ME countries appears to be much lower than in other regions.

LIS professionals and practitioners in developing countries take an important role in identifying the problems and deciding which activities at home and what support from abroad would help resolve them there is a good chance that the profession will gain the relevance and respect it has continually sought (Johnson, 2007). Bibliometric methods play a critical role in recognizing the weaknesses and strengths of any field of study and help policymakers set their future directions and make policies. It allows policymakers to review their policies and prioritize their funding allocation (Zeinoun, Akl, Maalouf & Meho, 2020; Erfanmanesh, Didegah & Omidvar, 2010).

Although our study focuses on the scientific productivity of Middle Eastern countries in the field of LIS, many other studies have been conducted on the productivity of countries or regions in the related field. For example, a sizeable literature is available that highlights the bibliometric analysis of research productivity of LIS research in Asian countries (Sun & Yuan, 2020; Sharma, 2018; Shukla & Maurya, 2018b; Jabeen, Imran, Badar, Rafiq, Jabeen & Yun, 2017; Uzun, 2002). The result of these studies showed the relative growth rate of publications and the doubling time of publications in Asian countries. India emerges as a leader in LIS research in terms of some research documents, citable documents, and non-citable documents during the period. The result also revealed that the LIS top papers were distributed into six research topics namely social media information, technology innovations, information technology, electronic health records, impact and citation analysis, and information modeling.

Some studies also examined disciplinary and national affiliations of authors in ten top Information Science journals (Lund, 2020), trends in LIS education (Bronstein, 2007), research productivity of departments, researchers, and scholarly communication of LIS globally (Shukla & Maurya, 2018a; Hosseini and Erfanmanesh, 2015; Erfanmanesh et al., 2010). Shukla and Maurya's (2018a) research result showed that the United States and the United Kingdom have been found as top performers in scholarly communications of LIS in the global scenario. Findings of the study of Hosseini and Erfanmanesh (2015) showed that the co-authorship network of countries in LIS research contains 151 vertices connected through 3121 links (co-authorships). Erfanmanesh et al. (2010) stated that the decrease in the number of LIS publications distinguished during the last three years needs more investigation to find out the reasons. While the scientific community in the present age is facing a dramatic worldwide increase in the number of publications all over the world, the decrease in the number of LIS publications is to some extent unusual.

Bibliometric studies have been conducted in Middle East countries investigating the

productivity and impact of various subject areas, scientists, journals, country collaboration, universities' research productivity, and scientific trends in research performance (Alinezhad Chamazkoti and Mirhaghjoo Langerudi, 2024; Damar, 2022; Ghanadinezhad, Osareh & Ghane 2023; Nadi-Ravandi & Batooli, 2022; Seifi, 2021; Bazm, Bazm & Sardari, 2019; Akyüz & Correia, 2017; Zyoud, Al-Jabi, Sweileh & Awang, 2014; Alijanianzadeh & Saboury, 2014). The general findings of these studies demonstrated that increasing political and financial support for scientific research in the Middle East requires academic and research communities in the region to demonstrate the visibility and impact of their scientific output. The literature also includes studies focusing on productivity in the field of LIS (Damar, Seifi & Alshaheen, 2023; Siddique, Ur Rehman, Shakil Ahmad, Abbas & Ajmal Khan, 2023; Atapour, Hamdipour & Shenavar, 2022; Maurya et al., 2019). While some research has been done on scientific productivity in the LIS research area in Middle Eastern countries with bibliometric methods (Damar et al., 2023; Damar, 2022; Siddique, et al., 2023; Atapour et al., 2022; Safahieh & Khosravi, 2020; Maurya et al., 2019; Zakaria, 2015; Mortezaie & Naghshineh, 2002) comparatively no research has addressed the field of LIS research in Middle Eastern countries from a historical perspective, nor has it provided a comprehensive exploratory analysis covering all Middle Eastern countries. This research is expected to fill this gap.

Throughout history, the location of the Middle East has had a significant impact on the evolution of library science. Although information science and library science have a long-standing relationship in Middle Eastern countries, it is evident that this connection has weakened significantly, and the ancient civilizations that had a significant impact on the transformation of information are unable to have the same effect today. The study compares the Middle East's geography on a global scale with the rest of the world and indicates the position of these nations. It assesses the scientific productivity of 17 countries in the relevant scientific research field using bibliometric techniques and provides recommendations for improvement based on its findings.

By analyzing the data obtained in the study, the study tries to find answers to the following questions:

1. How has the number of publications been distributed over the years and which types of documents have Middle East countries produced more in related fields?
2. How is the scientific productivity of the related literature compared to other countries (based on the h-index and the total number of citations)?
3. Which countries are the pioneers in this region and which countries work collaboratively more in this region?
4. Which universities work collaboratively in this region?
5. Which journals publish most of the Middle East researchers' papers in this research area?
6. What are the most-cited journals, papers, and authors in this field of interest?
7. Who/which are the most prominent and productive authors, countries, and institutions in the field of interest in the Middle East region?
8. What are the trends and patterns in keywords used in the articles based on Middle East countries?

### **Materials and Methods**

Our study explores LIS-ME research output and compares it to that of other regions. It assesses the scientific productivity of 17 countries in the relevant scientific research field using

bibliometric techniques and provides recommendations for improvement based on its findings. It does this by examining bibliometric variables to determine the various active individuals/institutions and popular journals that receive the publications, determining temporal patterns of research production, understanding collaborations between individuals/institutions, exhibiting key journals that hold LIS-ME publications and examining their performance, and understanding the popular research topics through keyword analyses. This section details these variables and our overall methodology.

The study consists of the constellation of research and reviews articles in information science and library science research areas, between 1979-2023 in the WoS Core Collection database. The countries we particularly focused on for analysis were as follows; Bahrain, United Arab Emirates, Palestine, Iraq, Iran, Israel, Qatar, Cyprus, Kuwait, Lebanon, Egypt, Syria, Saudi Arabia, Turkey, Oman, Jordan, and Yemen. All articles published between 1974 (1st of January) and today (1st of June, 2023) were included. The general research methodology of the study is shown in Figure 1.

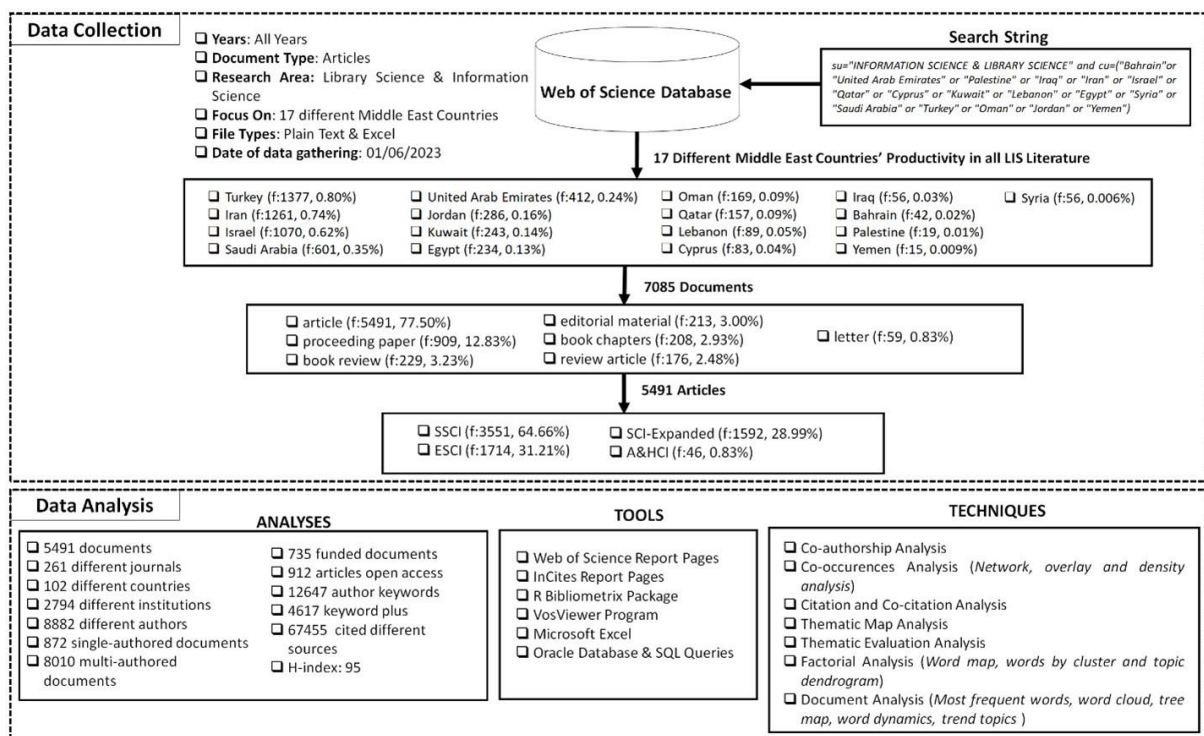


Figure 1: Research Methodology

The search process was carried out on June 1st, 2023. The query returned 7,085 documents. In our study, articles (f: 5,491, 77.50%) were analyzed. The obtained document information has been subjected to various pre-processes. R programming language (Bibliometrix Packages) and VOSviewer package programs are used for analysis. Also, WoS (for bibliometric data) and InCites (benchmarking and analytics) web-based reporting tools are used for analysis. In addition, Hypertext Preprocessor (PHP) was used for preprocessing bibliometric data and database transfer. SQL programming language and Microsoft Excel are also tools used for some queries, calculations, and reporting.

Among 5,491 documents, the number of author's keywords is 12,647, and the keywords plus count are 4,617. Title, author keywords, keywords plus, and abstracts were used in the

content analysis of the articles. For content analysis, various analyses such as co-occurrence network analysis, thematic map analysis, thematic evolution analysis, factor analysis (topic dendrogram, word map, words by cluster), word dynamics, and trending topics were performed. A concept map is a diagram or graphical tool that visually represents the relationships between concepts and ideas (Lucidchart, 2023). Factor analysis is a statistical method applied to the values of an initial set of input variables known to have mutual correlations to find a smaller set of factors that describe the underlying mutual relationships and mutual variability (Nettleton, 2014). For the co-occurrence network analysis and Louvain, a clustering algorithm was used.

## Results

### The position of Middle Eastern countries in the field of LIS with macro overview

The number of documents of all types produced in the field of Information Science and Library Science in all years is 475654, and the number of documents in the type of article is 170,327. In the related field, the top ten most productive countries (for all types) are respectively; the USA (f:226,514, 47.62%), England (f:21,805, 4.58%), Canada (f:15,043, 3.16%), China (f:14,021, 2.94%), Germany (f:10,141, 2.13%), Australia (f:8,603, 1.80%), Spain (f:8,566, 1.80%), India (f:6,154, 1.29%), Brazil (f:5,528, 1.16%), Italy (f:5,224, 1.09%). The top 10 most productive countries in the article document type, which is the main focus of the research, are as follows; USA (f:65,966, 38.72%), England (f:12,878, 7.56%), China (f:9,089, 5.33%), Canada (f:7,879, 4.62%), Spain (f:7,004, 4.11%), Germany (f:5,981, 3.51%), Australia (f:5,595, 3.28%), India (f:4,813, 2.82%), Brazil (f:4,541, 2.66%), Netherlands (f:3,432, 2.01%). Turkey, which ranks first among Middle East nations in general document productivity, is ranked 23rd worldwide, while Iran, which ranks second, is ranked 26th worldwide (Table 1).

Table 1

*Middle East Countries Scientific Productivity for Article Types at LIS Research Area*

Rank	Rank Global	Countries	N	Times Cited	Without self-citations	Average per item	H-Index	%
1	23	Türkiye*	1,377*	12,670	11,870	9.20	49	0.80
2	26	Iran	1,261	13,687	12,880	10.85	51	0.74
3	31	Israel	1,070	21,278	20,560	19.89	67	0.62
4	42	Saudi Arabia	601	7,832	7,588	13.03	45	0.35
5	46	United Arab Emirates	412	6,443	6,337	15.64	43	0.24
6	51	Jordan	286	4,762	4,596	16.65	32	0.16
7	57	Kuwait	243	3,382	3,242	13.92	29	0.14
8	60	Egypt	234	2,301	2,242	9.83	24	0.13
9	69	Oman	169	2,179	2,129	12.89	24	0.09
10	70	Qatar	157	2,035	2,009	12.96	24	0.09
11	83	Lebanon	89	1,635	1,613	18.37	20	0.05
12	86	Cyprus	83	1,444	1,437	17.40	18	0.04
13	97	Iraq	56	340	336	6.07	9	0.03
14	101	Bahrain	42	317	310	7.55	9	0.02

Rank	Rank Global	Countries	N	Times Cited	Without self-citations	Average per item	H-Index	%
15	116	Palestine	19	134	134	7.05	6	0.01
16	120	Yemen	15	120	117	8.00	5	0.009
17	128	Syria	10	17	17	1.7	3	0.006

The findings also showed Middle Eastern countries contributed only 1.49% of the total documents in the LIS field over the period evaluated. Despite an increase in academic productivity over the years, the contribution to the global literature remains very low. Moreover, as demonstrated Turkey, Iran, and Israel have been found as leading countries in all terms amongst Middle East countries whereas the situation of Syria is the worst. It is easy to see that the long years of civil war in Syria are directly reflected in its scientific productivity. Especially between 2017 and 2021, it was observed that no research was produced in the relevant field from the relevant country. In addition, Turkey has been using "Türkiye" instead of Turkey as the country name on international platforms since December 2021 (IletisimGov, 2022). In addition, it has been observed that USA (*f*:548, 9.98%), England (*f*:346, 6.30%), Malaysia (*f*:142, 2.58%), Pakistan (*f*:142, 2.58%), Australia (*f*:117, 2.13%), Canada (*f*:114, 2.07%), China (*f*:109, 1.98%), and India (*f*:108, 1.96%), which are not Middle Eastern countries, have extensive collaboration in the relevant regions.

#### **General distribution of documents published in the field of LIS for ME countries**

The number of documents produced in the field of LIS in all years in all document types is 475,654. The most intensively produced document types in the related field are book review (*f*: 191,363), article (*f*: 170,327), proceeding paper (*f*: 50,414), editorial material (*f*: 34,799), book chapters (*f*: 15,067). Middle Eastern countries produced 1.49% of the total LIS literature, 0.12% in book review document types, 3.22% in article document types, 1.80% in proceeding paper document types, 0.61% in editorial material document types, and 1.38% in book chapters document types. The documents produced most intensively by the Middle East countries are articles (*f*: 5,491, 77.50%), proceeding papers (*f*: 909, 12.83%), book reviews (*f*: 229, 3.23%), editorial material (*f*: 213, 3.00%), book chapters (*f*: 208, 2.93%), review article (*f*: 176, 2.48%), letter (*f*: 59, 0.83%), respectively.

In our research, we analyzed documents of the article types. In total, the distribution of 5,491 articles produced in 17 different countries in the Middle East in all years according to WoS Indexes; Social Sciences Citation Index (SSCI) (*f*:3,551, 64.66%), Emerging Sources Citation Index (ESCI) (*f*:1,714, 31.21%), Science Citation Index Expanded (SCI-Expanded) (*f*:1,592, 28.99%), Arts & Humanities Citation Index (A&HCI) (*f*:46, 0.83%). When the number of articles produced according to years is analyzed, it is seen that the average number of publications was 10-20 in the 1980s, 20-40 in the 1990s, 20-100 in the 2000s, and around 500 in recent years. The average years from publication value is 9.11. The most productive year is 2021 with 545 publications and 10,536 citations. The first publication produced from the region in the relevant field was in 1979. In addition, the distribution of documents according to the languages in which they were produced; English (*f*: 5,037, 91.73%), Turkish (*f*: 445, 8.10%), French (*f*: 5, 0.09%), German (*f*: 2, 0.03%), Portuguese (*f*: 1, 0.01%), Spanish (*f*: 1, 0.01%). It was also observed that open-access publishing is at a very low level (16.60%) with

912 articles in Middle Eastern countries in the related field.

### **Institutions, authors, and collaboration patterns for ME countries**

5491 research articles were produced by 8882 researchers (authors of single-authored documents: 872; authors of multi-authored documents: 8010; documents per author 0.618; collaboration index: 2.01) from 2794 different institutions from 102 different countries. The top ten most productive authors and their countries are as follows; Bar Ilan University (Most Productive Author(s) (MPA): Bar-Ilan, Judgit (f:68); Israel), Hacettepe University (MPA: Yılmaz, Bülent (f:35); Turkey), Egyptian Knowledge Bank (MPA: Mansour, Essam (f:22); Egypt Islamic Azad University (MPA: Hariri, Nadjla (f:16); Iran), University of Haifa (MPA: Raban, Daphne (f:16); Israel), University of Tehran (MPA: Kousha, Kayvan (f:14); Iran), Hebrew University of Jerusalem (MPA: Bar-Ilan, Judgit (f:29); Israel), Kuwait University (MPA: Rehman, Sajjad Ur (f: 23); Kuwait), Tel Aviv University (MPA: Ahituv, Niv (10), Te'eni, D (f:10); Israel), Ben Gurion University (MPA: Shapira, Bracha L (f:18), Fink, Lior (f:18); Israel).

The top ten prominent researchers in the field of LIS in the Middle East geography, their institutions, number of citations, h-index value and the number of articles they produced are as follows; Bar-ilan J (Bar Ilan University, Times Cited (TC):2952, Average per item (API):31.74, H-index:29, f:93, 1.69%), Aharony N (Bar Ilan University, TC:959, API:14.53, H-index:19, f:66, 1.20%), Rehman SU (University of the Punjab, TC:287, API:6.83, H-index:9, f:42, 0.76%), Yilmaz B (Gulf University for Science and Technology, TC:121, API:3.18, H-index:7, f:38, 0.69%), Bronstein J (Bar Ilan University, TC:503, API:13.59, H-index:14, f:37, 0.67%), Jamali HR (Charles Sturt University, TC:1168, API:32.44, H-index:17, f:36, 0.65%), Sotudeh H (Shiraz University, TC:249, API:7.32, H-index:9, f:34, 0.61%), Tonta Y (Hacettepe University, TC:216, API:6.55, H-index:9, f:33, 0.60%), Zhitomirsky-geffet M (Bar Ilan University, TC:158, API:5.27, H-index:8, f:30, 0.54%), Al U (Hacettepe University, TC:238, API:8.21, H-index:9, f:29, 0.52%).

The leading institutions (top 50 institutions) and researchers (top 30 researchers) are shown in more detail in Appendix 1 and Appendix 2 respectively. The top Authors' Production over Time can be seen in Figure 2.

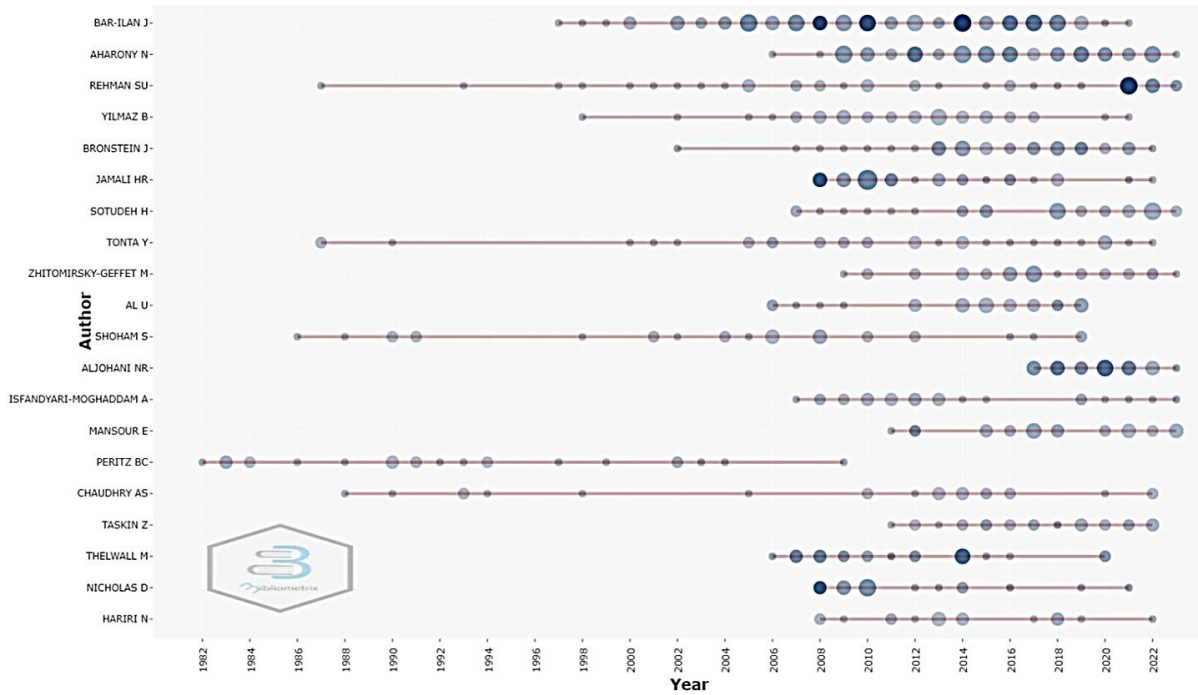


Figure 2: Top Authors' Production over the Time

Furthermore, the collaboration network analysis of researchers (Figure 3. a), institutions (Figure 3. b), and countries (Figure 3. c) can be seen in Figure 3.

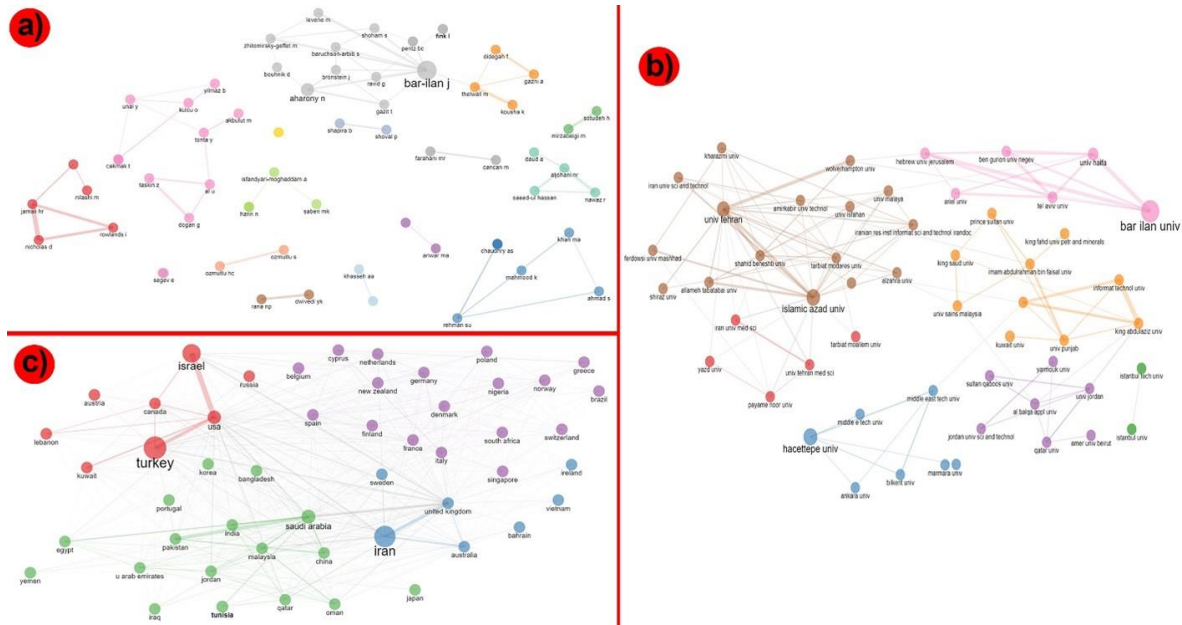


Figure 3: Co-authorship Authors (a), Institutions (b), and Countries (c) Analyses

When researchers and institutions are evaluated below, it is seen that the Middle East countries do not have good and homogeneous cooperation in terms of working together. The most prominent institutions in the field of LIS are from Iran, Turkey, Israel, and Saudi Arabia. Among these countries, it has been observed that researchers in the field of LIS from Iran and Turkey interact less with Middle East geography and mostly work with institutions and

researchers from their own countries. However, it was observed that institutions and researchers from Saudi Arabia collaborated with many Middle Eastern countries such as Oman, Jordan, Kuwait, and Lebanon. As examples; Sultan Qaboos University (Oman), Yarmouk University (Jordan), Kuwait University (Kuwait), American University of Beirut (Lebanon), and Al-Balqa Applied University (Jordan) can be given. In addition, in the field of LIS, institutions from neighboring Malaysia (University of Malaysia) and Pakistan (Punjab University) have entered into cooperation in the field. When the WoS profiles are evaluated, it is seen that prominent researchers in the field of LIS in the Middle East region have been in countries such as the USA and the UK (e.g. University of Bradford, University of California Berkeley) for various periods. Furthermore, some of the researchers are currently working at universities abroad (e.g. Adam Mickiewicz University, and Charles Sturt University).

### **Documents, references, citations, and journal analyses**

Co-citation analysis of 5,491 research articles published in 261 different journals showed that 179,624 references, 67,455 different sources were cited, and 110,782 different researchers (first author only) were cited. Although academic output has improved over the years, the contribution to the worldwide literature is extremely low, and it reveals the field of LIS in the countries as an open field for development. The journals with the most intensive publication activities in the relevant countries are Turkish Librarianship (f: 476), Scientometrics (f: 293), Information Processing Management (f: 226), Journal of Information Science (f: 224), Electronic Library (f: 152), respectively.

The most intensively published journals are shown in Appendix 3. When the table is evaluated in terms of WoS indexes (WI), it is seen that there are 5 ESCI, 15 SSCI, and 8 SCIE-indexed journals. In first place is the Journal of Turkish Librarianship, which is in the ESCI index from a Middle Eastern country. One out of every ten publications was published in this journal. It was seen that 472 of the 476 articles in the journal were carried out by researchers from Turkey. A co-citation analysis of the cited sources and references can be seen in Figure 4. The top fifteen most cited sources are as follows; Scientometrics (f:3860), MIS Quarterly (f:2558), Computers in Human Behavior (f:1924), Journal of the Association for Information Science and Technology (f:1811), Information Processing & Management (f:1602), International Journal of Information Management (f:1454), Government Information Quarterly (f:1345), Thesis (f:1345), Journal of Knowledge Management (f:1226), Information Management (f:1203).

When the analysis was conducted for institutions, it was seen that there were two institutions (Research Libraries United Kingdom:906, N8 Research Partnership:734, State University System of Florida:575, Egyptian Knowledge Bank:528, University of London:512, Islamic Azad University:463, University of Texas System:436, University of California System:435, University System of Ohio:435, Wuhan University:416) from Egypt and Iran among the top ten most cited institutions. The top ten most cited journals in LIS articles from Middle East countries are; Scientometrics (f:1185), Sustainability (f:988), Lecture Notes In Computer Science (f:560), Information Processing Management (f:543), IEEE Access (f:509), International Journal of Information Management (f:461), Information Management (f:387), Computers In 543), IEEE Access (f:509), International Journal of Information Management (f:461), Information Management (f:387), Computers In Human Behavior (f:374), Journal of Information Science (f:373), Frontiers In Psychology (f:349). When the countries of the

researchers on the cited works are evaluated, no Middle Eastern country (USA: 10593, China: 8008, England: 4196, India: 3618, Australia: 2760, respectively) was found among the first five countries. Turkey ranked 7th with 2,760 references, Iran ranked 10th with 2,210 references, Saudi Arabia ranked 12th with 1,903 references, and Israel ranked 14th with 1,685 references.

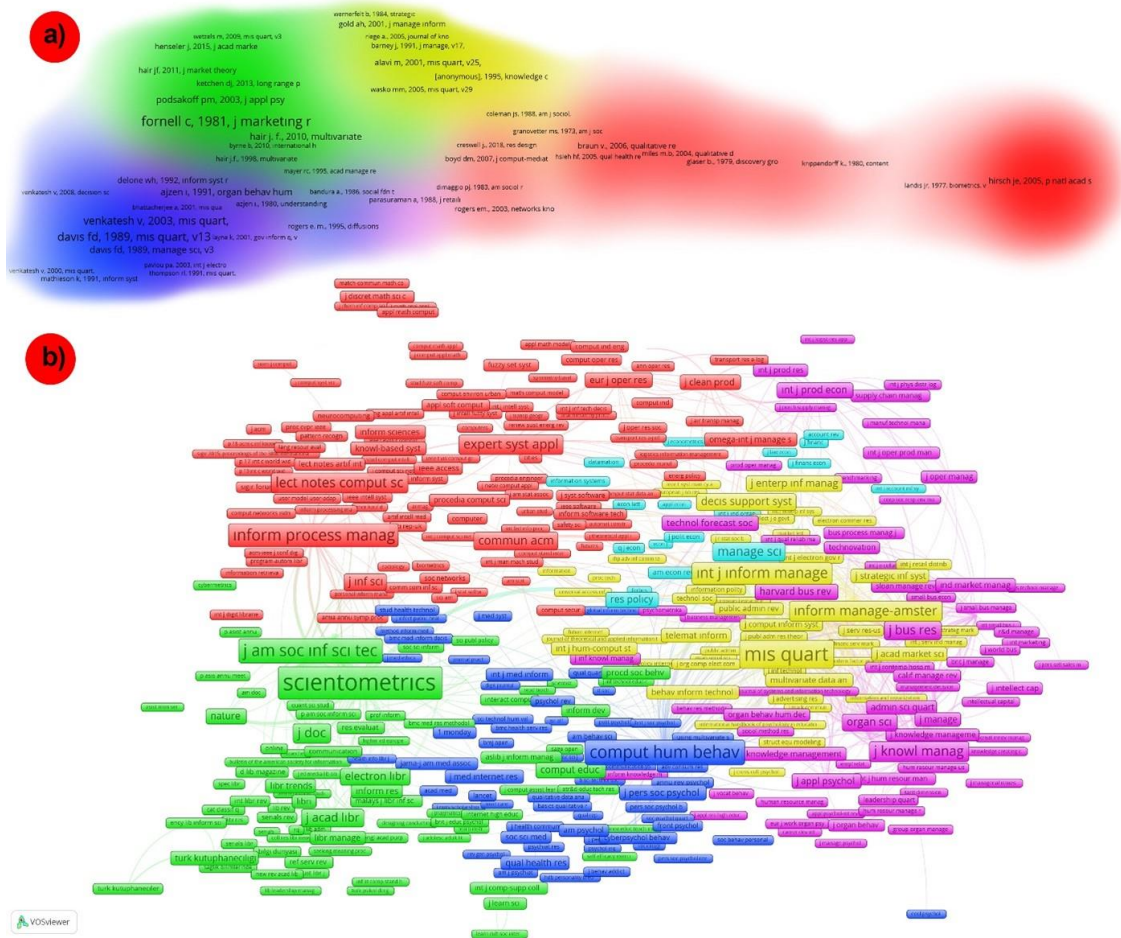


Figure 4: Co-citation Cited References (a), and Cited Sources (b) Analyses

Appendix 4 also provides a list of the most cited articles. Although our main focus is on the scientific productivity in the field of LIS in the Middle East region, it is noteworthy that some of the most cited works are related to the field of Medicine (Dolin et al., 2006; Harrison, Koppel & Bar-Lev, 2007; Karnieli-Miller, Strier & Pessach, 2009). In addition, studies on information technology, information processing, and user experiences such as personal computing acceptance factors in small firms (Igbaria, Zinatelli, Cragg & Cavaye, 1997), user-perceived web quality (Aladwani & Palvia, 2002), adoption of mobile banking (Alalwan, Dwivedi, & Rana, 2017; Hanafizadeh, Behboudi, Koshksaray & Tabar, 2014), psychological origins of perceived usefulness (Karahanna & Straub, 1999), science mapping (Gazni, Sugimoto & Didegah, 2012), stand out as highly cited studies.

**Research area and content analysis**

In the study, the fields that the research in the field of LIS is associated with are computer science (f:1894), business economics (f:612), social sciences other topics (f:190), communication (f:164), public environmental occupational health (f:105), biomedical social

sciences (f:104), education educational research (f:62), geography (f:48), physical geography (f:46), health care sciences services (f:45), medical informatics (f:45), telecommunications (f:45), development studies (f:18), science technology other topics (f:16), arts humanities other topics (f:14), psychology (f:11), public administration (f:10), philosophy (f:9), history (f:8), physics (f:8), art (f:6), engineering (f:6), area studies (f:5), environmental sciences ecology (f:5), government law (f:5), urban studies (f:5), history philosophy of science (f:2), literature (f:2), social issues (f:2), cultural studies (f:1), linguistics (f:1), mathematical methods in social sciences (f:1), operations research management science (f:1), sociology (f:1). The articles were associated with 34 different fields.

Keywords are important words and phrases that express the essence of a research article. A longitudinal study of the emergence of keywords in a particular discipline expresses research trends (Tripathi, Kumar, Sonker & Babbar, 2018). While author keywords are words used by researchers to characterize the essence of a study, keywords plus are words or phrases that frequently appear in the titles of an article's references but not in the title of the article itself. KeyWords Plus is widely used in bibliometric studies for topic mapping (Valderrama-Zurián, García-Zorita, Marugán-Lázaro & Sanz-Casado, 2021). Keywords Plus is as effective as author keywords for bibliometric analysis, which explores the information structure of scientific fields (Zhang, Yu, Zheng, Long, Lu & Duan, 2016).

The most intensively used topics in Figure 5 below are shown with word dynamics analysis through researcher keywords. According to their density, authors' keywords word dynamics are as follows: Iran (f:167), knowledge management (f:166), social media (f:151), academic libraries (f:136), information retrieval (f:121), Turkey (f:120), internet (f:98), e-government (f:86), bibliometrics (f:84), knowledge sharing (f:80), covid-19 (f:71), public libraries (f:70), scientometrics (f:56), citation analysis (f:53), information literacy (f:53), Kuwait (f:53), libraries (f:53), machine learning (f:49), Israel (f:48), social networks (f:48), university libraries (f:48), Saudi Arabia (f:47), Egypt (f:46), Jordan (f:46), Twitter (f:46), data mining (f:45), content analysis (f:42), higher education (f:42), social network analysis (f:42), digital libraries (f:41).

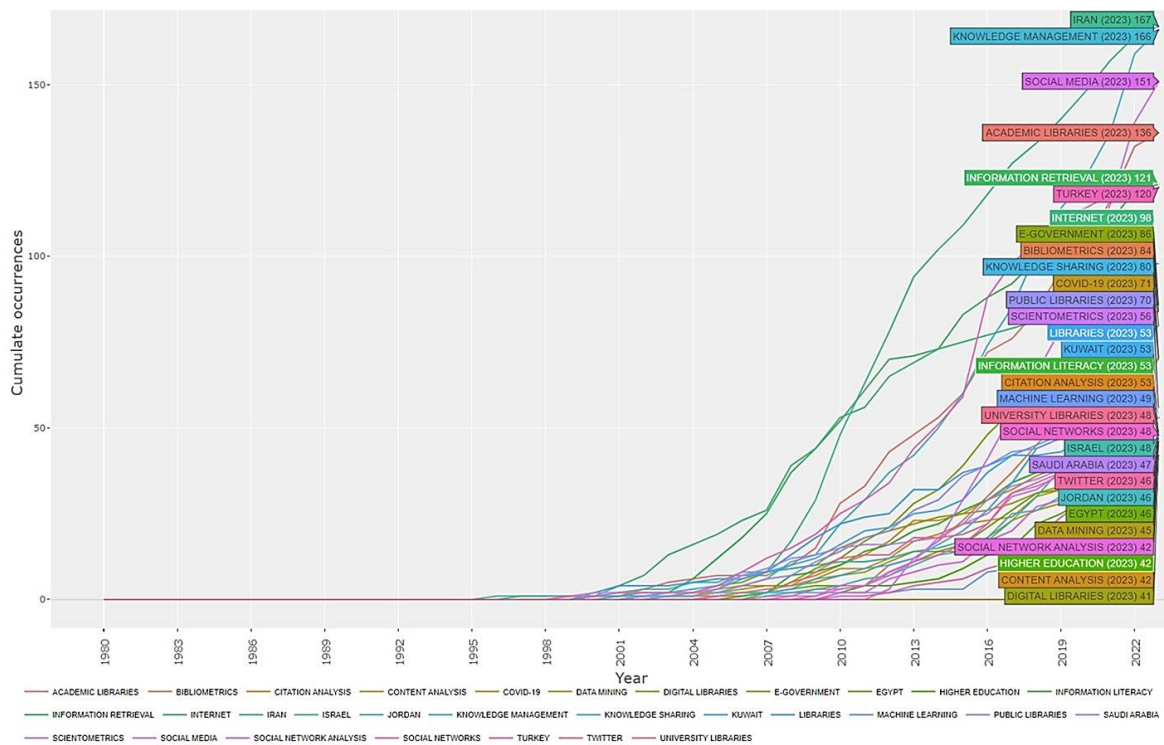


Figure 5: Authors' Keywords Word Dynamics

The trend topic analysis conducted on the article titles is shown in Figure 6, and the prominent topics over the years (1979-1990 / 1991-2000 / 2001-2010 / 2011-2020 / 2021-2023) are shown with a Sankey diagram in Figure 7. A Sankey diagram is a visualization used to depict a flow from one set of values to another. Sankey diagrams visualize flows over a network. It is very useful for visualizing change over multiple time intervals (Cuba, 2015). In the content analysis according to different parameters (abstract, title, keyword plus, author's keywords) in health studies in the field of LIS in Middle Eastern countries; health information seeking, online health information, health information, health information, health care topics attracted attention (Ayal & Seidman, 2009; Khajouei, Zahiri Esfahani & Jahani, 2017; Harrison et al., 2007). It can be seen in Figure 6 and Figure 7 that the field of LIS has become much related to the field of computer science, especially in recent years. In the '90s and early 2000s, the topics of information structure, library networks, gulf region, research sharing, interlibrary loans, web searching, search engines, national libraries, school libraries and topic identification came to the fore. In the 2010s, it was observed that there was more productivity, and accordingly more topics were studied. In the relevant period, information systems, information management, information access, information retrieval, information search, library services, academic libraries, cloud computing, qualitative studies, information security, knowledge management, technology acceptance, bibliometric analysis, co-word analysis, sentiment analysis, knowledge organization have been intensive topics of study. In the relevant period, it was observed that web search maintained its popularity as in previous years (Figure 6).

Concepts on data technology or data analysis such as machine learning, big data, cloud computing, data mining, deep learning, classification, sentiment analyses, artificial intelligence, natural language processing, etc. are heavily covered in the articles. In addition, statistical methods such as bibliometrics, scientometrics, webometrics, and altmetrics have become prominent in the field of LIS, and analyses such as clustering, citation analysis, and social

network analysis have been used in the field.

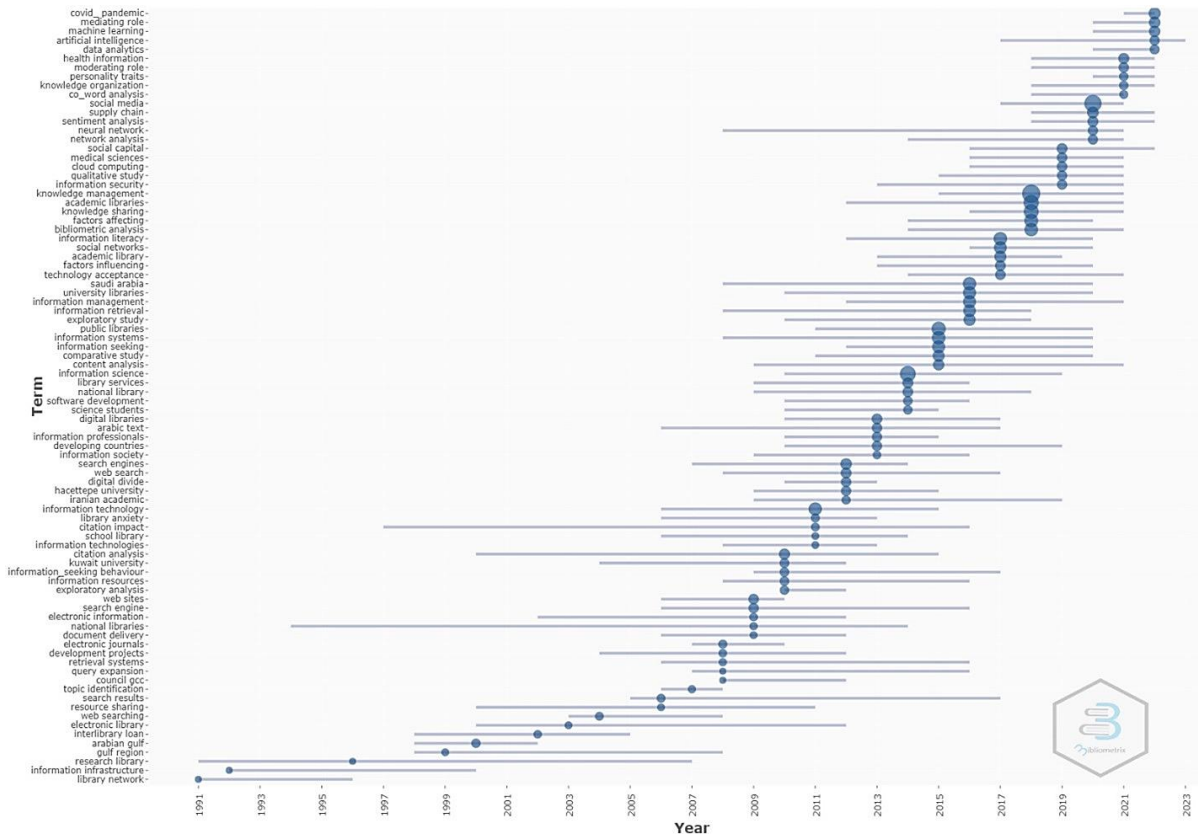


Figure 6: Article Titles Trend Topics Analyses

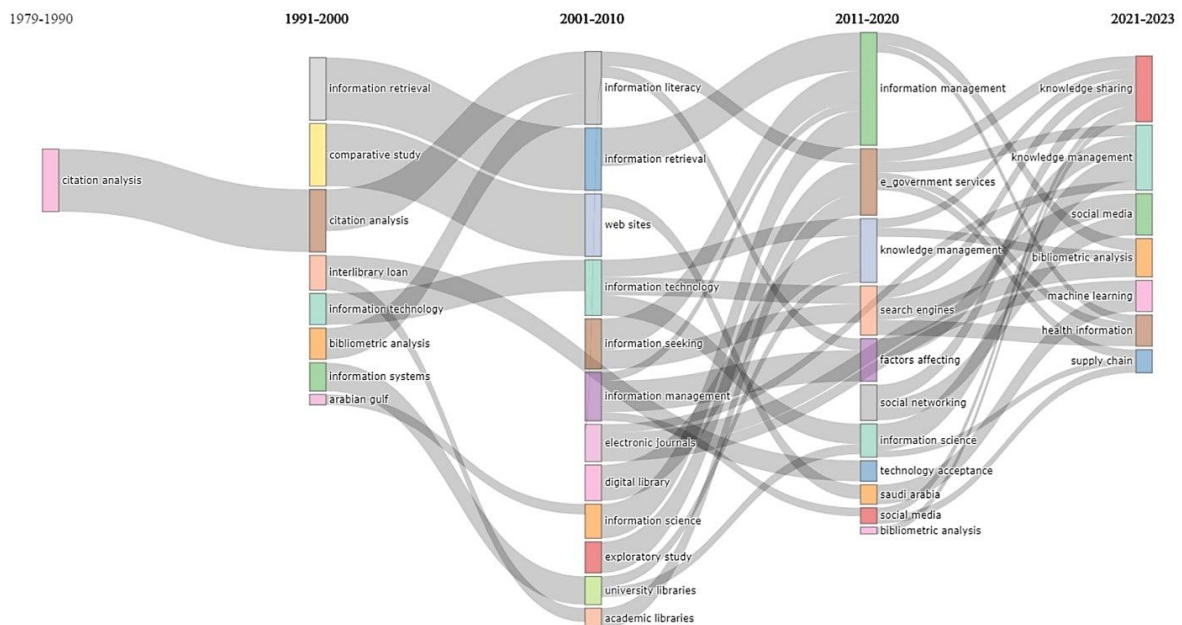


Figure 7: Title-Based Bigrams Thematic Evaluation

As a data source, it has been observed that intensive studies have been carried out on social media and social network platforms such as Facebook and Twitter, especially after 2010. It has been observed that social network analysis is carried out not only on social media tools such as

Facebook or Twitter but also on bibliometric data sources such as WoS and Scopus. In addition, it was observed that topics such as e-government, children's librarianship, library network, electronic library, interlibrary loan, innovation, public libraries, university libraries, academic libraries, digital libraries, librarianship, library professionals, library services, libraries, service quality, universities, library management, document delivery, organizational culture, organizational learning, electronic resources, electronic journals, electronic media, library users, open access, museum, which cluster more intensively around library science, and the structural status and diversity of libraries were covered in the analyzed tools.

Other prominent topics in the field of LIS in terms of Information Science are information retrieval, information literacy, information technology, information management, information services, information systems, information behavior, and information seeking. These terms have been fed from different sources such as patents, articles, electronic books, citations, journals, blogs, websites, Wiki, Facebook, Twitter, and Google Scholar.

In the studies, it has been observed that academic staff, researchers, organizational performance, research trends, research impact, productivity, collaboration strategies, collaboration patterns, and the scientific productivity of researchers have been assessed. Additionally, ethical concerns were also analyzed in the studies, as indicated by the titles of academic writing, Beall's list, plagiarism, ethics, document retrieval, and peer review. Researchers have conducted evaluations on gender, diversity, women, leadership, culture, subject headings, and scientific productivity and performance in different research fields.

### Discussion

According to Lund (2020), authorship among selected top Information Science journals skews heavily towards countries with large economies. Countries outside of Europe, China, and the United States are underrepresented. Maurya et.al. (2019) stated that the research performance of Middle Eastern countries in the field of LIS is low and stated that the low research performance in the field should be further questioned. The findings of our study support this assessment. The Middle East's contribution to the field of Library Science and Information Science is for only 1.49 percent of all documents produced. Although academic productivity has increased over the years, the contribution to the global literature is very low and it has emerged as an open field for Information Science & Library Science in related countries. In light of the findings, it is necessary to pursue higher education policies for the relevant field in the Middle East geography. Teaching linked areas as a program in higher education institutions enables monitoring and coordinating the scientific productivity in the pertinent countries and strategically conducting policies not only in the relevant field but also in other fields. As a result, countries' or even regions' scientific development may be significantly impacted by the growth of the relevant field. The role of the librarian has evolved with the advent of technology in the 21st century. The libraries attached to universities, research organizations, and research and development wings of industrial establishments play a key role in supporting research programs (Atılgan, 1991).

Middle Eastern countries do not have an international field journal in the field of LIS indexed in SSCI or SCI-Expanded indexes. Only one journal from Turkey was found to be indexed in ESCI. However, it is seen that Turkey stands out with its productivity in these journals in the field of LIS. In addition, it was seen that the relevant journal publishes the publications of researchers from Turkey to a great extent. This or similar LIS journals should

contribute more to the development of Library Science and Information Science in their regions. Lund (2020) states that there are numerous opportunities for expanding the promotion of these journals to a more diverse group of authors, however this lack of diversity also likely demonstrates a more fundamental problem within the discipline of lack of support for developing nations and collaboration and outreach by researchers in more privileged positions.

Middle East LIS educational differences in terms of research productivity can be attributed to many reasons. The Middle East has always been the scene of widespread political conflict and contest (Lu & Thies, 2013; Williams, 2011). Political instability and regional struggles may account for low research output in Yemen, Lebanon, Palestine, Syria, Iraq, etc. Saric, Utzinger & Bonfoh (2018) mention these factors as the geopolitics of a given country. The fact that Syria's productivity in the relevant field is quite low, especially after 2010, can be attributed to the impact of the war that has been going on for years. Countries in the region have been affected by the impact of the Arab Spring in many ways, including in terms of scientific productivity, and this impact has been negative (Ibrahim, 2018; Abdelghaffar & Hassan, 2016; Maamari & Zein, 2014; Mansour, 2012). Considering the direct positive impact of LIS on other sciences and the general productivity of the academy, it is necessary to pay special attention to the field of LIS, especially in post-war Syrian countries. In this way, productivity in the field of LIS will be enhanced and controlled positive progress will be achieved in other fields under higher education policies.

According to Guzeller and Celiker (2019), bibliometric is an extremely relevant technique that supports to map of the conceptual, intellectual, and collaboration structure, leading authors, countries, and institutions, and influential articles. As a result of the analysis, no researcher or institution is leading the field in Middle Eastern countries. In the Gulf countries, with the effect of the common language Arabic, it has been observed that researchers have entered into more intensive cross-country cooperation.

Maurya et.al. (2019) stated that in the documents in the field of LIS based on Scopus data sources, Turkey, Iran, Israel, Egypt, and Saudi Arabia are in the top five, and the most cited countries are Israel, Turkey, Iran, Egypt, and Saudi Arabia. In our study on WoS indexes, the top five countries producing the most articles in the field of LIS are as follows; Turkey, Iran, Israel, Saudi Arabia, United Arab Emirates. Egypt is ranked 8th. The top five countries with the highest number of citations were Israel, Iran, Turkey, Saudi Arabia, and the United Arab Emirates. In the journals indexed in WoS indexes, Egypt has been in a different position in Scopus journals. Additionally, countries such as Iran and Turkey, which are in first place in the field, have been seen to work more intensively with institutions and researchers in their own countries. In the average per article values, Israel and Lebanon are in the first two places. Israel, on the other hand, has emerged as the most extroverted institution open to international cooperation among all Middle Eastern countries. However, it has been observed that researchers in Israel cooperate with institutions in leading countries in the field rather than cooperating with regional countries.

In the analysis of institutions, it is observed that there is a lack of data science research centers in Middle Eastern countries, which have many successful examples abroad and are supported by leading researchers in the field of LIS or Information Science. It has been observed that the development of the field is generally supported by universities and academic staff employed in these universities. However, countries or institutions that are prominent in the field increase their reputation in the field with successful research centers. Examples of these centers

include the Science and Technology Policy Research Center (SPRU, 2023), the Institute of Scientific and Technical Information of China (ISTIC, 2023), the Centre for Science and Technology Studies (CWTS, 2023), Institute for System Analysis and Computer Science "Antonio Ruberti" (IASI, 2023), Institute of Scientific and Technical Information of China (ISTIC, 2023), United Kingdom Research and Innovation (UKRI, 2023).

However, it has been observed that the two fields that are most intensely associated with Information Science and Library Science are computer science and business economics, and it has been seen that this relationship is increasing with each passing year. This situation can be expressed as an important indicator of the importance of computer science for the related field and the transformation of the field. It was also observed that open-access publishing is at a very low level (16.60%) with 912 articles in Middle Eastern countries in the relevant field. This is where the need for Middle Eastern countries to pay special attention to open access policies emerges. Open access is critical for researchers and institutions to come to the forefront of their research fields, for their works to become more recognized in the field, and to receive abundant citations.

Siddique et.al. (2023), in a bibliometric study of the LIS field in the Arab world, noted that policymakers can more easily focus on factors that require more attention. This is of course also true for ME countries. There is a common culture among ME countries. However, for this common culture to progress more effectively and for cooperation to increase, efforts should be made for joint scientific productivity. Karayalçın (1957) identified the preparation of a collective catalog of foreign works as the first step towards cooperation between libraries. Such a catalog can only be useful within a well-thought-out, well-planned, and sanctioned system of cooperation. Of course, such work is also valuable for the productivity of Middle Eastern countries in the field of LIS. With the idea of regional peace and enhancing joint scientific cooperation, the countries of the region should support research-oriented scientific centers and the cooperation of researchers in institutions through research centers.

Today, the duties expected of librarians are different. Protecting books is no longer considered a feat. The librarian should know very well the needs of the society he/she serves and should keep the resources that will meet these needs in his/her library. By providing auxiliary tools and equipment to these resources, they should serve in a way that will meet the needs of society and increase their educational and cultural levels (Atılğan, 1991). The fact that keywords such as information infrastructure, information technology, information systems, information science, knowledge management, knowledge sharing, university collaboration, research trends, academic performance, etc. have become prominent in recent years shows the transformation of the LIS field for the Middle East countries.

Siddique et.al. (2023) stated in their Arab world bibliometric study that academic libraries, social media, bibliometrics, information-seeking behavior, information literacy, and information management are the topics that researchers have studied intensively in Arab countries. In our study, the topics of information infrastructure, the Gulf region, information retrieval, library networks, library services, and citation analyses were intensively studied in ME countries, especially in the nineties and twenties. In recent years, the pandemic, machine learning, artificial intelligence, data analytics, knowledge organizations, social media, e-government services, sentiment analyses, national networks, social capital, and cloud computing have been intensively studied in the field.

Studies in the field of LIS in Middle Eastern countries are more focused on comparing the

scientific progress in different fields in the countries with other countries and making a general assessment of the situation. At this point, of course, the words bibliometric and scientometrics, which are also prominent in our study, are important tools. Citation analyses, scientific cooperation, cooperation in certain fields, and scientific productivity have been prominent topics. In addition, the prominence of concepts such as knowledge management, information management, social media, and social media analysis also supports this situation.

### **Strengths and limitations**

Middle East is a term that became popular only in the late 19th and 20th centuries, its definition as with those similar terms referring to various regions is politically motivated. Thus, the definitions of 'middle-east' have proved controversial, accused of being Eurocentric and fulfilling the goals of forces involved in colonizing the respective areas. Older terms such as the 'ancient near east' or 'the Near East', the latter corresponding to the Ottoman empire at the peak of its rule and the former including further parts of the ancient Greek and Egyptian worlds to the west and south respectively, are still used in historical disciplines. This paper nevertheless tentatively adopts the modern definition of 'middle-east' for practical purposes while preferring instead 'the ancient near east' for contextualizing ancient library systems in the region since such systems adhere to the various worldviews at the civilizational level to which this region-grouping term refers.

WoS as a bibliometric data source was selected in this research. However, there are journals indexed by different bibliometric databases (e.g. Scopus) that are not indexed by WoS. However, the WoS was considered a good entry point both in terms of its quality and the density of the journals it indexes. Another limitation was the exclusion of material published in non-English languages. In addition, in some cases, the most recent publications of some researchers and the names of the institutions in their profiles differed. In addition, the researchers' institutions were based on the universities listed in their WoS profiles. The way researchers update their profile information poses a constraint for us.

### **Conclusion**

In the study, bibliometric analyzes were carried out for 17 different countries expressed as Middle East countries by the United Nations with the data obtained from Web of Science bibliometric data source. Since 1980, the scientific productivity in the field of LIS has been evaluated and the results have been revealed by the field experts with the questions of what can be done to achieve better in the field in the Middle East geography and what are the successful examples in the world. It has also been observed that social unrest and the state of war in the Middle East have affected scientific productivity in the field. The results of the studies revealed that the characteristics of the LIS field in Middle Eastern countries, and their development can make an important contribution to the field and common scientific productivity in the region. In the field of library science and information science, the construction of a structure 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.

In the institutional analysis, such a research center was not found in the region. For the scientific research growth of Middle East countries, a serious initiative should be taken by the respective governments. With the development of scientific research in other domains, the LIS research domain should also be promoted by the governments. Regional scientific growth

cannot be represented by a few countries rather every country should take the positive initiative to boost the scientific as well as LIS research. Policymakers and those developing higher education policies in the region should emphasize infrastructure development, public awareness, education, research, and academic programs, international and regional cooperation, policy and support for collaboration and sharing, digitalization and technology adoption, and meeting user needs. In this way, we will be able to promote the development of library science in Middle Eastern countries and contribute to the advancement of library science.

Turkey, Iran, Israel, and Saudi Arabia have emerged as regional powers as well as pioneers in the field of LIS. Although Egypt has historically important libraries in the field of LIS and has a great cultural heritage, its contribution to the global literature in the field of LIS is below expectations. In particular, scientific cooperation within the Arabic-speaking Gulf countries is at a good level. Higher education institutions have a strategic value in terms of international relations between countries and are soft power. Stronger and more homogeneous cooperation in higher education in and around the region is seen as highly valuable for regional development, peace, and social cohesion. At this point, stronger LIS in the region can make significant contributions to scientific productivity, scientific cooperation, and monitoring and control functions.

It is recommended that existing journals in the field of LIS should become more internationalized and publish special issues with regional topics in the field of LIS. In addition, the Middle East geography does not have a journal in the field of LIS indexed by SSCI or SCI-Expanded indexes. Considering the contribution of the regions in the global literature and the importance of the field, it is considered very valuable for the development of the field.

### Acknowledgment

No grant from any public, commercial, or non-profit funding agency was offered for the conduct of this research. The authors would like to thank the very useful feedback given by Emile Levine, United Nations Industrial Development Organization in Vienna.

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### Appendix 1

#### The 50 Most Prolific Institutions in LIS Research Area from the Middle East Region

Rank	Affiliations	Most Productive Authors (f)	Country	Times Cited	Average per item	H-Index	N	%
1	Bar Ilan University	Bar-Ilan, Judgit (68)	Israel	5835	17.79	37	328	5.97
2	Hacettepe University	Yilmaz, Bulent (35)	Turkey	1519	6.05	20	251	4.57
3	Egyptian Knowledge Bank	Mansour, Essam (22)	Egypt	2182	10.34	24	211	3.84
4	Islamic Azad University	Hariri, Nadjla (16)	Iran	1938	9.32	20	208	3.78
5	University of Haifa	Raban, Daphne (16)	Israel	3717	19.98	30	186	3.38
6	University of Tehran	Kousha, Kayvan (14)	Iran	2626	14.19	25	185	3.36
7	Hebrew University of Jerusalem	Bar-Ilan, Judgit (29)	Israel	3083	17.62	32	175	3.18
8	Kuwait University	Rehman, Sajjad Ur (23)	Kuwait	2445	14.05	22	174	3.16
9	Tel Aviv University	Ahituv, Niv (10), Te'eni, D (10)	Israel	4779	29.50	36	162	2.95
10	Ben Gurion University	Shapira, Bracha L (18), Fink, Lior (18)	Israel	2457	17.55	25	140	2.55
11	King Abdulaziz University	Aljohani, Naif R. (25)	Saudi Arabia	2334	18.38	27	127	2.31
12	Middle East Technical University	Ozkan, Sevgi (13)	Turkey	1427	13.59	21	105	1.91
13	King Saud University	Alzahrani, Ahmed	Saudi	1339	14.88	21	90	1.63

Rank	Affiliations	Most Productive Authors (f)	Country	Times Cited	Average per item	H-Index	N	%
		Ibrahim (10)	Arabia					
14	Sultan Qaboos University	Al-Aufi, Ali Saif (11)	Oman	1213	13.63	16	89	1.62
15	King Fahd University of Petroleum Minerals	Ashoor, Mona S. (11)	Saudi Arabia	784	9.22	14	85	1.54
16	Qatar University	Abu-Shanab, Emad (12)	Qatar	1241	14.60	19	85	1.54
17	Ferdowsi University Mashhad		Iran				77	1.40
18	Istanbul University	Davarpanah, Mohammad (10)	Turkey	552	7.17	12	74	1.34
19	University of Jordan	Al-Fadel, Maha (7), Dahabiyeh, Laila (7)	Jordan	703	9.63	14	73	1.32
20	Shiraz University	Sotudeh, Hajar (34)	Iran	505	7.01	14	72	1.31
21	Shahid Beheshti University	Keshavarz, Hamid (9)	Iran	758	11.31	14	67	1.22
22	Kharazmi University	Jamali, Hamid R. (29)	Iran	1272	19.27	17	66	1.20
23	Ankara University	Atilgan, Dogan (10)	Turkey	145	2.23	6	65	1.18
24	Imam Abdulrahman Bin Faisal University	Ilhaq, Humera (13)	Saudi Arabia	436	6.81	13	64	1.16
25	Rluk Research Libraries UK	Jamali, Hamid R. (9), Nicholas, David (9)	United Kingdom	751	11.73	17	64	1.16

## Appendix 1

Continue...

Rank	Affiliations	Most Productive Authors (f)	Country	Times Cited	Average per item	H-Index	N	%
26	Istanbul Technical University	Yuret, Tolga (10)	Turkey	891	14.14	17	63	1.14
27	Qatar Foundation	Jansen, Bernard J. (7)	Qatar	769	13.98	14	55	1.00
28	University of London	Jamali, Hamid R. (14), Nicholas, David (14)	United Kingdom	1475	26.82	20	55	1.00
29	Ihsan Dogramaci Bilkent University	Can, Fazli (10)	Turkey	733	14.10	14	52	0.94
30	N8 Research Partnership	Mansourian, Yazdan (5)	United Kingdom	860	17.20	15	50	0.91
31	University of Isfahan	Asemi, Asefeh (7)	Iran	414	8.28	12	50	0.91
32	Iran University Science Technology	Farahani, Mohammad Reza (11)	Iran	519	11.04	15	47	0.85
33	Tarbiat Modares University	Hassanzadeh, Mohammad (8)	Iran	477	10.15	12	47	0.85
34	Shahid Chamran University of Ahvaz	Osareh, Farideh (15)	Iran	609	13.53	12	45	0.82
35	Allameh Tabataba I University	Hanafizadeh, Payam (15)	Iran	822	18.68	12	44	0.80
36	Marmara University	Şentürk, Burçak (4),	Turkey	295	6.86	8	43	0.78

Rank	Affiliations	Most Productive Authors (f)	Country	Times Cited	Average per item	H-Index	N	%
		Erunsal, Ismail E. (4)						
37	Payame Noor University	Khasseh, Ali Akbar (16)	Iran	254	5.91	9	43	0.78
38	American University of Beirut	Azad, Bijan (8)	Lebanon	1071	26.12	15	41	0.74
39	Tehran University of Medical Sciences	Sheikhshoaei, Fatemeh (5)	Iran	343	8.37	10	41	0.74
40	Jordan University of Science Technology	Al-Khatib, Aceil (9)	Jordan	704	17.60	14	40	0.72
41	Yarmouk University	Abu-Shanab, Emad (8)	Jordan	533	13.33	14	40	0.72
42	Ankara Yildirim Beyazit University	Akbulut, Müge (11)	Turkey	229	6.03	6	38	0.69
43	Ariel University	Lev-On, Azi (8)	Israel	601	15.82	12	38	0.69
44	University of Punjab	Ilhaq, Humera (15)	Pakistan	309	8.13	12	38	0.69
45	Iran University of Medical Sciences	Panahi, Sirous (8)	Iran	262	7.08	9	37	0.67
46	Al Balqa Applied University	Alalwan, Ali (7)	Jordan	1583	45.23	13	35	0.63
47	Iranian Research Institute for Information Science and Technology (IRANDOC)	Nazari, Maryam (5), Alidousti, Sirous (5)	Iran	260	7.43	7	35	0.63
48	Anadolu University	Kurulgan, Mesut (6)	Turkey	470	13.82	9	34	0.61
49	Brunel University	Weerakkody, Vishanth (9)	United Kingdom	1168	34.35	21	34	0.61
50	Technion Israel Institute of Technology	Gordon, Avishag (4)	Israel	568	16.71	13	34	0.61

### Appendix 2

#### The 30 Most Prolific Authors in LIS Research Area from the Middle East Region

Rank	Authors	Institutions	Times cited	Average per item	H-index	N	% 5.491
1	Bar-ilan J	Bar Ilan University	2952	31.74	29	93	1.69
2	Aharony N	Bar Ilan University	959	14.53	19	66	1.20
3	Rehman SU	University of the Punjab	287	6.83	9	42	0.76
4	Yilmaz B	Gulf University for Science and Technology	121	3.18	7	38	0.69
5	Bronstein J	Bar Ilan University	503	13.59	14	37	0.67
6	Jamali HR	Charles Sturt University	1168	32.44	17	36	0.65
7	Sotudeh H	Shiraz University	249	7.32	9	34	0.61
8	Tonta Y	Hacettepe University	216	6.55	9	33	0.60
9	Zhitomirsky-geffet M	Bar Ilan University	158	5.27	8	30	0.54
10	Al U	Hacettepe University	238	8.21	9	29	0.52
11	Shoham S	Bar Ilan University	236	8.14	10	29	0.52
12	Aljohani NR	King Abdulaziz University	347	13.35	11	26	0.47
13	Isfandyari-moghaddam A	Islamic Azad University	172	6.88	8	25	0.45
14	Mansour E	South Valley University	223	8.92	7	25	0.45
15	Peritz BC	Hebrew University of Jerusalem	460	19.17	11	24	0.43
16	Chaudhry AS	Kuwait University	90	3.91	6	23	0.41

Rank	Authors	Institutions	Times cited	Average per item	H-index	N	% 5.491
17	Taskin Z	Adam Mickiewicz University	160	6.96	7	23	0.41
18	Thelwall M	University of Wolverhampton	1167	50.74	18	23	0.41
19	Nicholas D	Tomsk State University	867	41.29	16	21	0.38
20	Hariri N	Islamic Azad University	89	4.68	6	19	0.34
21	Cakmak T	Hacettepe University	44	2.44	3	18	0.32
22	Dogan G	Hacettepe University	81	4.50	5	18	0.32
23	Fink L	Ben Gurion University	502	27.89	9	18	0.32
24	Gazni A	Regional Information Center for Science and Technology	549	30.50	9	18	0.32
25	Khurshid Z	King Fahd University of Petroleum & Minerals	66	3.67	4	18	0.32
26	Kulcu O	Hacettepe University	52	2.89	3	18	0.32
27	Rana NP	Qatar University	1329	78.83	12	18	0.32
28	Shapira B	Ben Gurion University	226	12.56	9	18	0.32
29	Daud A	Abu Dhabi School of Management	163	9.59	7	17	0.31
30	Osareh F	Shahid Chamran University of Ahvaz	338	19.88	6	17	0.31

### Appendix 3

#### Top 25 Journals in LIS Research Area for Middle East Region

Rank	Publication Titles	Research Domain	Publisher name	WI	IF	TC	ACPI	H-index	N	%
1	Turkish Librarianship	ISLS	Turkish Librarians Assoc	ESCI	-	524	1.10	8	476	8.66
2	Scientometrics	CSIA; ISLS	Springer	SSCI; SCIE	3.801	5296	18.08	36	293	5.33
3	Information Processing Management	CSIA; ISLS	Elsevier Sci Ltd	SSCI; SCIE	7.466	4682	20.72	37	226	4.11
4	Journal of Information Science	CSIA; ISLS	Sage Publications Ltd	SSCI; SCIE	2.462	2779	12.41	26	224	4.07
5	Electronic Library	ISLS	Emerald Group Publishing Ltd	SSCI	1.675	1145	7.53	18	152	2.76
6	Journal of Enterprise Information Management	ISLS; M	Emerald Group Publishing Ltd	SSCI	5.661	2906	19.90	29	146	2.65
7	Journal of Information Optimization Sciences	ISLS	Taylor & Francis Ltd	ESCI	-	607	4.22	14	144	2.62

Rank	Publication Titles	Research Domain	Publisher name	WI	IF	TC	ACPI	H-index	N	%
8	Journal of Information Knowledge Management	ISLS	World Scientific Publ Co Pte Ltd	ESCI	-	541	3.78	10	143	2.60
9	Online Information Review	CSIS; ISLS	Emerald Group Publishing Ltd	SSCI; SCIE	2.901	1283	9.43	18	136	2.47
10	Journal of The American Society for Information Science and Technology	CSIS; ISLS	Wiley-Blackwell	SSCI; SCIE	2.452	3241	30.87	32	105	1.91
11	Qualitative Health Research	ISLS; SSB; SSI	Sage Publications Inc	SSCI	4.233	2281	21.93	25	104	1.89
12	International Journal of Information Management	ISLS	Elsevier Sci Ltd	SSCI	18.958	5002	51.04	39	98	1.78
13	Journal of Librarianship and Information Science	ISLS	Sage Publications Ltd	SSCI	1.82	576	6.47	12	89	1.62
14	Telematics and Informatics	ISLS	Elsevier	SSCI	9.14	2707	31.85	28	85	1.54
15	Information Development	ISLS	Sage Publications Ltd	SSCI	2.079	667	8.34	14	80	1.45
16	Journal of Knowledge Management	ISLS; M	Emerald Group Publishing Ltd	SSCI	8.689	2168	27.10	26	80	1.45
17	Vine Journal of Information and Knowledge Management Systems	ISLS; M	Emerald Group Publishing Ltd	ESCI	-	539	6.74	12	80	1.45
18	Information Management	CSIS; ISLS; M	Elsevier	SSCI; SCIE	10.328	4059	52.71	30	77	1.40
19	Global Knowledge Memory and Communication	ISLS	Emerald Group Publishing Ltd	ESCI	-	206	3.03	8	68	1.23
20	Library Hi Tech	ISLS	Emerald Group Publishing Ltd	SSCI	1.623	332	4.88	9	68	1.23

Rank	Publication Titles	Research Domain	Publisher name	WI	IF	TC	ACPI	H-index	N	%
21	Journal of Academic Librarianship	ISLS	Elsevier Science Inc	SSCI	1.953	610	9.24	14	66	1.20
22	LIBRI	ISLS	Walter De Gruyter GmbH	SSCI	0.667	618	9.51	9	65	1.18
23	ASLIB Journal of Information Management	CSIS; ISLS	Emerald Group Publishing Ltd	SSCI; SCIE	1.935	585	9.14	13	64	1.16
24	ASLIB Proceedings	CSIS; ISLS	Emerald Group Publishing Ltd	SSCI; SCIE	-	878	16.26	14	54	0.98
25	Malaysian Journal of Library Information Science	ISLS	Univ Malaya, Fac Computer Science & Information Tech	SSCI	1.475	274	5.17	10	53	0.96

Average Citation per item: ACPI; Times Cited: TC; WoS Index: WI; Information Science & Library Science: LIS; Computer Science, Interdisciplinary Applications: CSIA; Management: M; Computer Science, Information Systems: CSIS; Social Sciences, Biomedical: SSB; Social Sciences, Interdisciplinary: SSI.

#### Appendix 4

##### Most Cited Articles in LIS Research Area for Middle East Region

Rank	Titles	Journal	5YIF	Year	Authors	Times Cited
1	Personal computing acceptance factors in small firms: A structural equation model	MIS Quarterly	12.413	1997	Igbaria, M; Zinatelli, N; (...); Cavaye, ALM	739
2	Developing and validating an instrument for measuring user-perceived web quality	Information & Management	11.370	2002	Aladwani, AM and Palvia, PC	575
3	Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust	International Journal of Information Management	16.580	2017	Alalwan, AA; Dwivedi, YK and Rana, NP	524
4	The psychological origins of perceived usefulness and ease-of-use	Information & Management	11.370	1999	Karahanna, E and Straub, DW	505
5	The Contradictory Influence of Social Media Affordances on Online Communal Knowledge Sharing	Journal of Computer-Mediated Communication	10.170	2013	Majchrzak, A; Faraj, S; (...); Azad, B	459
6	Which h-index? - A comparison of WoS, Scopus and Google Scholar	Scientometrics	4.133	2008	Bar-Ilan, J	448
7	HL7 Clinical Document Architecture, Release 2	Journal of The American Medical	7.041	2006	Dolin, RH; Alschuler, L; (...); Shabo, A	440

Rank	Titles	Journal	5YIF	Year	Authors	Times Cited
		Informatics Association				
8	Unintended consequences of information technologies in health care - An interactive sociotechnical analysis	Journal of The American Medical Informatics Association	7.041	2007	Harrison, MI; Koppel, R and Bar-Lev, S	394
9	Information overload and the message dynamics of online interaction spaces: A theoretical model and empirical exploration	Information Systems Research	7.833	2004	Jones, Q; Ravid, G and Rafaeli, S	378
10	Information technology (IT) in Saudi Arabia: Culture and the acceptance and use of IT	Information & Management	11.370	2007	Al-Gahtani, SS; Hubona, GS and Wang, J	335
11	Conceptual approaches for defining data, information, and knowledge	Journal of The American Society for Information Science And Technology	2.762	2007	Zins, C	309
12	The Google generation: the information behaviour of the researcher of the future	ASLIB Proceedings	0.800	2008	Rowlands, I; Nicholas, D; (...); Tenopir, C	308
13	Power Relations in Qualitative Research	Qualitative Health Research	5.762	2009	Karnieli-Miller, O; Strier, R and Pessach, L	279
14	The impact of preprocessing on text classification	Information Processing & Management	7.036	2014	Uysal, AK and Gunal, S	274
15	Memes in a Digital World: Reconciling with a Conceptual Troublemaker	Journal of Computer-Mediated Communication	10.170	2013	Shifman, L	274
16	Mobile-banking adoption by Iranian bank clients	Telematics and Informatics	8.456	2014	Hanafizadeh, P; Behboudi, M; (...); Tabar, MJS	271
17	Approaches to and Outcomes of Dyadic Interview Analysis	Qualitative Health Research	5.762	2010	Eisikovits, Z and Koren, C	265
18	Knowledge networks in new product development projects: A transactive memory perspective	Information & Management	11.370	2005	Akgun, AE; Byrne, J; (...); Imamoglu, SZ	230
19	A feature selection model based on genetic rank aggregation for text sentiment classification	Journal of Information Science	3.168	2017	Onan, A and Korukoglu, S	226
20	Mapping World Scientific Collaboration: Authors,	Journal of The American	2.762	2012	Gazni, A; Sugimoto, CR and	224

Rank	Titles	Journal	5YIF	Year	Authors	Times Cited
	Institutions, and Countries	Society for Information Science and Technology			Didegah, F	

*Five-Year Impact Factor: 5YIF*