

ONLY THE MALAYSIAN JOURNAL OF COMPUTER SCIENCE WAS REVIEWED IN THIS STUDY.

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ABSTRACT

Measures employed in the research are emphasized, and a review of single-journal studies is conducted. 272 articles published in the Malaysian Journal of Computer Science are analyzed using the following quantitative measures: (1) the observed and predicted authorship productivity assessed using the Authorship Productivity Test, and (2) the article productivity of the journal from 1985 to 2007. Lotka's Law of Author Productivity, identifying and listing core authors; (3) the authorship, co-authorship pattern by authors' country of origin and institutional affiliations; (4) the subject areas of research; (5) the citation analysis of resources cited, including the age and half-life of citations; (6) the journals cited, tested for zonal distribution using Bradford's law of journal scattering; (7) the extent of web citations; and (8) the citations retrieved from the web

INTRODUCTION

The current body of literature includes reports from about 189 individual journal papers. Tiew [1] gathered 102 articles spanning literature published up to the year 1997 in the first publication to systematically track down and evaluate this research. Literature was organized into four types: (a) bibliometric content analysis of a single journal (one item), a citation analysis of a single journal (45 items), and a study of a single journal's citations (45 items) make up the bulk of the bibliographic literature on single-journal bibliometrics (6 items). The majority of the publications, as determined by Tiew, were authored by researchers in the United States (49%), India (20%), and Europe and elsewhere (31%). Nearly half (41%) of the articles were from STM journals, followed by those from the library and information sciences (40%), and finally those from the arts, humanities, and social sciences (19%). More than eight in ten (84% to be exact) of the articles were written in English.

Anyi, Zainab, and Anuar [2] conducted a more current evaluation of bibliometrics research on individual journals, surveying 82 literatures published between 1997 and 2008. The following were shown by the 82 individual-journal bibliometric analyses. To begin, bibliometric studies on individual scientific and technological (S&T) journals have remained high (36%), and when added to those conducted on S&T medical journals (23%), the total rises to 59%. Journals in the discipline of library and information science (LIS) had a 26% increase in bibliometric research, while those in the arts, humanities, and social sciences saw a 15% decrease. Only 62 of the 82 research used a different article, since many publications, particularly those dealing with library and information science, were cited several times.

Many articles published before and after 1998 cite back to JASIST, JDoc, and Scientometrics, demonstrating the journals' lasting impact and significance in keeping bibliometricians interested. Second, most of the publications we looked at were from Asian and African countries (41.4%), then the United States (30.4%), Europe (18.2%), and finally Britain (10.0%).

India accounted for a disproportionate share of single journal bibliometricists (28.0%) because of the country's large population of people interested in this field. These indicators help draw attention to the journal's preferred authorship number, the size of the research group in a field, and the percentage of foreign versus local contributions, all of which speak to the journal's international prestige as a medium through which to disseminate research [3, 6, 19, 20, 21, 22, 23, 24]. Another common method of evaluation is content analysis, which involves the study of the topics covered in a journal's articles through the application of various classification schemes, keyword analysis, keyword co-occurrence network, article title analysis, word frequency in title, research methodology, models, theories, and frameworks [6, 11, 17, 25, 26, 27, 28, 29, 30, 31]. Several papers looked at the specifics of the magazine itself to draw conclusions about its quality. Article page count, frequency of publication, analysis of acknowledgements and funding, appendices and abstracts, acceptance rate, analysis of indexation and abstraction status, publication language, gender and qualifications of editors and reviewers, editors' and reviewers' academic ranks, reviewers' publication output, and editorial policies are all factors that are taken into account [9, 21, 24, 32, 33]. Single-journal studies also frequently employ citation analysis, which involves examining factors like the number and distribution of citations cited per article or volume over a number of years, the authorship pattern of citations, the most cited author, the types of literature cited, the

age of cited literature, the half-life of cited literature, a ranked list of core journals cited, and the reliability of Bradford's law of literature dispersion [34].

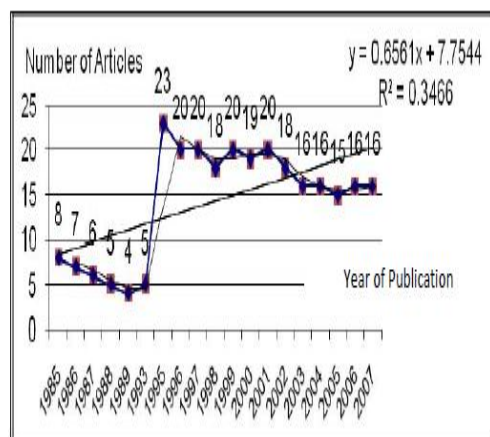
2. METHODOLOGY

A single Asian publication in the area of computer science, the Malaysian Journal of Computer Science, is the focus of this study's use of a subset of bibliometric tools (MJCS). There are two main reasons why this publication was chosen. The first distinguishing feature is that it is Malaysia's only peer-reviewed publication dedicated to the intersection of computing and IT. Existing for more than a decade. The journal's continued success shows that researchers in Malaysia and the Asia Pacific region value it as a platform to disseminate their discoveries. Scopus and the Science Citation Index have included MJCS since 2007; INSPEC has included it since 1998; and the journal has a long history of being indexed. The primary goal of this paper is to bibliometrically profile MJCS by analyzing its publication output between 1985 and 2007 using a variety of bibliometric measures, including but not limited to: (a) identifying and ranking the productive authors; (b) testing the author's productivity using Latke's law of authorship distribution; and (c) identifying the core authors and the distribution of their output. This analysis is based on a random sample of 272 papers from the years 1985 through 2007 that appeared in the journal MJCS. Two databases, EJUM (Electronic Journal University of Malaya; full-text available from 1996 to 2008) (accessible at <http://ejum.fsktm.um.edu.my>) and Mayas (Malaysian Academic Information System), allow access to this journal. Accessible at <http://myais.fsktm.um.edu.my>, this database is an abstracting and indexing system (AIS) that covers the years 1985 through 2008. Since MJCS is only just now being covered by Scopus and SCI, starting with its 2007 issues, no citation information is now available save what was collected from Google Scholar.

3. RESULTS

Article Productivity of MJCS: 1985-2007

Tables of contents from 1996–2007 of EJUM and 1985–1995 of Mayas are mined for this section's data. Over the course of those 19 years, a total of 272 articles were published (1985 to 2007). With a high of 23 articles in 1995 and a low of 4 articles in 1989, the number of articles peaked in the middle. Trend lines pointed to an ongoing drop in annual article production, with an average of less than 10 articles produced between 1985 and 1989. (Figure 1). Not a single issue was released between 1990 and 1992, and the same was true in 1994. Since 1995, when there were a record-breaking twenty-three pieces published, the average number of articles published year has been between fifteen and twenty. Publication output is predicted to continue rising along the trend line ($y = 0.6561x + 7.7544$, $R^2 = 0.3466$), which shows a stable relationship between the two variables. Although the journal's 1985 mission statement read "(a) to assist the academic staff from the University of Malaya and other local Universities in publishing research results and studies in computer science; (b) to provide a medium for discussion and information dissemination on computer applications and advancement of computer science and technology in Malaysia; and (c) to facilitate the development of computer science and technology in Malaysia," the journal's 1995 resurgence may be attributable to a shift away from a national editorial policy.



The Productivity of Articles, 1985–2007 (Figure 1)

The goals of MJCS were revised in 1995 to read: "(a) to foster sharing of information and expertise in research activity, new inventions/developments of computer science and on the application of information technology." toward organizing an information-rich society; and (b) to help academics at universities, businesses, industries, government agencies, and other organizations publish their findings in computer science and IT for scholarly consumption [44]. Moreover, the MJCS switched from an annual to a biannual publishing schedule beginning in 1995. The indexing of MJCS by Inspect, Scopus, and the ISI may account for the rise in overall publication counts. When the Brazilian publication Revista Brasileira de Psiquitria was added to

Medline (2003) and the ISI (2005), Keeling and Goncalves [24] saw a rise in submissions. Higher amounts of R & D investment on information, computer, and communication technologies (ICCT) following 1994 may also account for the unexpected uptick in 1995's article output [45]. As a proportion of overall R&D spending, ICCT funding jumped from 0.6% in 1992 to 9.7% in 1994. The result was a 1.7-fold increase in Malaysian researchers' contributions to the area of computer science between 1994 and now. According to MASTIC (2004), the most articles were published between 1996 and 2000, while Malaysia was implementing its seventh Malaysia Plan.

Authorship Productivity Pattern

Between 1985 and 2007, MJCS published 272 publications written by a total of 424 writers. Table 1 displays the article output of 424 writers, revealing that over 80% have contributed no more than one article. Between 1985 and 2005, just 26% of writers (91) published more than two pieces. Only 13 writers (2.9% of the total) have contributed 5 or more papers since 2007.

Table 1: Observed and Expected Author Productivity Distribution (n=2.85)

Number of Articles, x	Number of Authors (observed), y	Observed Percentage (%)	Number of Authors (expected), n=2.85	Expected Percentage (%)
1	333	78.50	333	81.24
2	46	10.80	46	11.22
3	18	4.20	14	3.52
4	14	3.30	6	1.55
5	4	0.90	3	0.82
6	3	0.70	2	0.49
7	2	0.50	1	0.31
8	1	0.20	1	0.21
9	1	0.20	1	0.15
10	0	0	0	0
11	0	0	0	0
12	1	0.20	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	1	0.20	0	0
Total	424	100		

According to Lotka's rule [47], the rate at which writers publish in a particular topic is proportional to the product of the number of contributors (x) and the number of authors (y) times a constant (c). Based on Lotka's findings, the value of n is 2. Exponent n is often set to 2, as was also agreed upon by Benito et al. [48] and Sen. According to the research by Chef Azlan and Mohd. Faris [49], the number of scientific publications produced each year is often considered to be high in comparison to other disciplines of knowledge, suggesting that Lotka's conclusions may hold true in the scientific community. When the proportion of writers having two or more publications was compared to the percentage predicted by Lotka's Law, the results showed that the actual percentage was lower. This implies that most writers only submitted a single article, but a select few contributed two or more. In this analysis, n equals 2.85. The n = 2.85 number was found to have excellent agreement between observed and computed results (Table 1). This suggests that Lotka's rule holds true for the study of computer science, but with a somewhat larger n. These findings corroborate those of a prior research by Liu [50], who found that compared to the expectations of Lotka's Law, a smaller percentage of writers had two or more publications published in JASIST (area of information science). It seems that the authorship distribution pattern may vary somewhat across disciplines, since both Ullah, Butt, and Haroon [18] and Patra and Chand [51] showed that Lotka's Law (n=2) does not apply in their study areas (medical).

Author's Gender

There were significantly fewer female writers than male authors in MJCS. Article biographies were mined for information on the authors' sex. Among the total of 424 writers, 323 (76.18%) were male and 80 (18.87%) were female. Twenty-one of the writers' sex statuses were unknown. This finding may be indicative of women's computer science and IT journal publication volume in Malaysia. Both Prozesky [55] and Sarkar [56] found that male writers tended to predominate in academic publications.

Authorship Pattern

The majority of the 272 papers in MJCS were co-authored by two writers. About 38.6% (105) were co-authored, followed by 23.5% (64), single-authored, 23.2% (63), three-authored, 11.4% (31), four-authored, and 2.9% (8) were co-authored by five different people. Works. Despite having 7 contributors, just one work (0.4%) has a total of 7 authors. Table 3 shows that the number of publications written by many authors has been raising steadily since 1995. In 1999, there were five articles written by

the authors, and in 2007, there were seven. The findings point to a trend in which papers written by several writers have increased while those written by a single author have decreased during the last few years. This reflected a trend toward more inter-institutional collaboration in the study of computing and information sciences. Al-Ghandi et al. [57] also found that two writers were more likely to share authorship than three or more authors in their quantitative study of authorship in JASIS, thus these results are consistent with one another. Researchers in the field of computer science and information technology in Malaysia tend to work in pairs, as noted by Gu and Zainab [58]. Two- and three-author contributions rated best in terms of authorship pattern in medical sciences, according to a bibliometric analysis of the Journal of Ayub Medical College conducted by Ullah, Butt, and Haroon [18]. Narang [15] added that, unlike mathematics, scientific fields often have bigger research teams, with some co-authored papers including more than four authors.

Country Affiliation of Authors

There were 63.43 percent Malaysian writers, 6.25 percent British authors, 4.40 percent Bangladeshi authors, 3.70 percent Japanese authors, and 22.21 percent authors from other countries (Table 4).

Table 2: Authors by Country Affiliations

Region	Country Affiliation	Number	Percent (%)
Africa	Morocco(9), Algeria (6), Tunisia (4), Egypt (2)	21	4.86%
Australasia	Australia (13), New Zealand (2)	15	3.47%
East Asia	Japan (16), Taiwan(10), Korea (8), China (2), Macau (1)	37	8.56%
Europe	United Kingdom (27), France(3), Ireland (1), Norway (1)	32	7.41%
Middle East	Iran (4), Jordan (3), Saudi Arabia (2), Kuwait (1)	10	2.31%
North America	United States (3)	3	0.69%
South Asia	Bangladesh (19), India (5), Pakistan (5), Sri Lanka (1)	30	6.94%
Southeast Asia	Malaysia (274), Brunei (9)	283	65.51%
Unknown	Unknown (1)	1	0.23%
Grand Total		432	100.00%

When looking at the top contributors to the Malaysian Journal of library & Information Science, Tiew, Abrizah, and Kaur [53] found that they were spread throughout four different countries: Malaysia, India, Bangladesh, and the United Kingdom. Researchers Narang [15] found that the vast majority of The writers of the Indian Journal of Pure and Applied Mathematics were split roughly in half: those originally from India and those from elsewhere in the world. In the case of Journal of Documentation, Naqvi [61] discovered that over half (51.39%) of the authors reside in the United Kingdom. Therefore, inclusion in a prestigious database should result in more submissions from throughout the globe. The magazine would publish fewer pieces from the native country if more submissions and acceptances came from foreign authors. Table 4 displays the geographic distribution of submissions to MJCS, revealing that authors from the Asia-Pacific region submit the most articles. An emphasis is placed on international cooperation in

Table 3: Country and Cross-country Collaboration

Types of Contributions	No. of	Percent	Cumulative	Cumulative
	Articles	%	No. of Articles	Percent
Malaysian	182	66.9	182	66.9
International (non collaboration with other countries)	46	16.9	228	83.8
Malaysian collaboration with international authors	31	11.4	259	95.2
International (Collaboration between different countries)	12	4.4	271	99.6
Unknown	1	0.4	272	100.0
Total	272	100.00		

Subject Areas of Research

Table 7 displays the distribution of the 272 publications in this research according to the ACM Computing Classification System, 1998 (<http://www.acm.org/class/1998>).

Table 4: Broad Subject Areas Covered by Articles Published in MJCS

Subjects	No. Of Articles	Cumulative no. of Articles	Percent (%)	Cumulative Percent (%)
Computing Methodologies	85	85	31.25	31.25
Software	69	154	25.37	56.62
Computer Systems	64	218	23.53	80.15
Organization				
Information Systems	31	249	11.40	91.54
Theory of Computation	14	263	5.15	96.69
Hardware	7	270	2.57	99.26
Computer Applications	1	271	0.37	99.63
Data	1	272	0.37	100.00

The specified keywords for each article were also examined. One of the most helpful ways to get a feel for the ideas presented in papers, the approaches used, and the topics explored are via keyword analysis [66, 67]. The term "neural network" appeared on the list 12 times, making it the most often used term. Evaluation of performance (8 times), software engineering (6 times), and performance evaluation (5 times). There were 8 keywords that occurred 4 times, 16 keywords that occurred 3 times, 62 keywords that occurred 2 times, and 741 keywords that occurred only once. The extent and major substance or topics of MJCS research activities may be gleaned through a keyword analysis of published articles. The results showed that many keywords were used to categorize papers, suggesting that MJCS covers a broad variety of study areas. Future writers might utilize keyword analysis to identify under-explored regions and develop plans to fill them. Examining the vocabulary used in titles of articles is another way to evaluate how well a publication defines its scope. According to the results of this research, articles should have a maximum of 18 words in the title. Article titles, on average, have 9.22 words. In a study of the characteristics of article titles in six computer science journals, Anthony [68] discovered that the average title length varies from 8.0 to 9.9 words, which is consistent with the range indicated above.

3. Citation Analysis

From volume 1 through volume 20 in MJCS (1985–2007), a total of 272 articles had a total of 4634 citations.

An average of 243.89 citations each year is found. The average number of citations per volume is 17, with a range of 8-25 citations. To a large extent, the quantity of citations cited in MJCS is comparable to that of other science-related subjects. It suggests that citation style varies by field of study. Journal of Natural Rubber Research, published in the area of science and technology, had an average of 16.2 citations per article ([69] according to the citation analysis) while Journal of Ayub Medical College had an average of 17.43 citations per article ([18]). The average number of citations per article in the Journal of the Indian Society for Cotton Improvement was 10.76 [16], while the average number of citations per paper in the Indian Journal of Pure and Applied Mathematics was roughly 11 [15]. The amount of citations seems to be greater in the more subjective disciplines. Based on bibliometric analysis, the average number of citations in Family Business Review is 25.6 [33]. Naqvi [61] reports that each paper in the Journal of Documentation typically cites 21 other works. The results of these analyses demonstrate that scientific and technological papers cite their sources less often than their counterparts in the humanities and social sciences. It may also indicate that fewer literatures are available as references if the magazine is more specialized.

4. Conclusion

A variety of perspectives on MJCS are presented in this single journal article [68]. When the bibliometrics of a single publication are examined, a picture emerges that goes beyond first impressions. It served as an indication of the journal's professionalism, maturity, and quality. This article sheds light on the research focus of The ability of journals to spread information and the impact this has on which journals authors choose to publish in and how they use that knowledge in their own work. It is a useful indicator of the journal's standing in its area and a mirror of the research activity in that subject. Examining a single journal is a great way to get a sense of its quality in terms of indexation and influence, as well as how it facilitates collaborative efforts amongst faculty members at the same university or across departments at various institutions across the country or the world.

According to Nebelong-Bonnevie and Frandsen [83], a comprehensive look at a single journal's features may be gained via single journal research. With MJCS, we aimed to achieve this. Bibliometric measures are the standard technique for evaluating individual journals; therefore we employed a few of them to investigate the Malaysian Journal of Computer Science (MJCS). In conclusion, the analysis of the articles published in and citations received by MJCS suggests that (a) a ratio of 60:40 (Foreign: Malaysian) articles should ideally be maintained to infer its international characteristics; (b) joint authored articles should be encouraged, particularly across universities in Malaysia and abroad; (c) include thorough and quality review articles to help boost future citations to the journal; and (d) perhaps increase the frequency of issues to stimulate more submissions.

This research also showed that several bibliometric metrics may be utilized to get a better grasp on the profile or personality of a journal, which in turn reflects the traits of the literature and the patterns of communication in the subjects they stand for. The

statistics come only from the bibliographic records of items that have appeared in the diary, with author and title details to boot. These bibliometric indicators have been emphasized in single-journal studies as important for characterizing a journal's overall content.

a) Article output, measured by the total number of articles published throughout time, broken down by volume, issue, and year. This allows us to deduce the publishing pattern over time and the impact it has had as a medium for the dissemination of research findings among specialists in the subject.

b) Author attributes, such as the author's gender, occupation, academic rank and title, and regional/national associations through the names and kinds of institutions where the author has worked (whether academic or professional). This helps in painting a picture of the writers, their affiliations, and the level of cooperation that exists amongst them.

c) Author's productivity - Rank list of core and active writers; authorship productivity pattern may be checked using laws of authorship distribution, such as Lotka's law. This aids in determining the most influential writers and providing an approximation of whether or not the distribution of author output differs between disciplines.

Journal internationalization and co-authorship patterns by country and institution are also considered [84]. d) Co-authorship pattern - Types of co-authored works; degree of cooperation; local and foreign collaboration activities among authors. This is useful for drawing attention to the ideal number of authors, the size of a field's research team, and the proportion of international to domestic contributions.

e) Content analysis: article topics, keywords, co-occurrence networks, article titles, punctuation, word frequency, and preposition usage [85]; article length, journal circulation, frequency, research methodologies, models, theories, and frameworks, acknowledgments, funding sources, editorial board characteristics, and editorial stances.

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