

Journal of Informetrics: A Bibliometric Profile

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ABSTRACT

This paper critically analyses 239 scholarly communications published in the inaugural five volumes of *Journal of Informetrics (JOI)* to examine growth of literature, types of communications, authorship pattern, collaboration trend, predominant research domains, etc. Subsequent analysis focuses on prolific contributors, degree of collaboration, and time-lag trend. Findings reveal that - publication output doubles over the study period as article publications increase considerably; though single-authored contributions were significant (30 %), majority of contributions were collaborated by two-authors (36 %), while average authorship accounts for 2.28 per communications. Degree of collaboration (DC) was impressive (0.699) but not overwhelming as research collaborations has emanated from 199 higher learning institutions of 32 countries across the globe. Ranking of prolific contributors has shown Prof. Egghe on the top followed by L Bornmann; R Rousseau and L Leydesdoff. Result also shows upward trend of keyword usage with an average of 4.55 per items, of which *h*-index, citation analysis, bibliometrics, *g*-index, etc, expectedly predominates. Scholarly nature of source journal has been further ascertained from increasing citations and reference usage trend. Moreover, growing hardness of the field has been attributed to *JOI* due to the increasing usage of tables and figures. Study also showed that the journal takes an average of about four month time to publish a manuscript.

Keywords: Bibliometrics, bibliometric analysis, LIS journals, informetrics

1. INTRODUCTION

Informetrics is an active and specialised sub-domain of information science formally introduced by Prof. Otto Nacke, in 1979, but the concept became popularised since the first International Informetrics Conference (1987). The rationale behind the introduction of a new discipline mainly arises from the inability of the existing disciplines like bibliometrics and scientometrics to subsume fairly comprehensive aspects of the mathematical view on problems in the area of information science¹. However, generally 'informetrics' encompasses the study of quantitative aspects of information in any form including records, bibliographies, social groups and scientists. Tague-Sutcliffe² broadened the scope of informetrics by adding two phenomena:

- (a) Definition and measurement of information; and
- (b) Types and characteristics of retrieval performance measures to the earlier concept.

Thus, it could accommodate and utilise many studies on information measurement that hitherto lied outside the purview of bibliometrics and scientometrics. Then, Egghe³ more comprehensively suggested "Informetrics is the generic-term encompassing

all-metrics studies related to information science, including bibliometrics (bibliographies, libraries, ...), scientometrics (science policy, citation analysis, research evaluation, ...), webometrics (metrics of the web, the internet or other social networks such as citation or collaboration networks), ...". So, informetrics is the study of quantitative aspects of information which includes production, dissemination, retrieval, and measurement of information, regardless of its form or origin. However, Bar-Ilan⁴ in her review has shown evolution of 'informetrics' as an emerging sub-domain of information science. Afterwards, Mayr & Umstätter⁵ quantitatively justified the need for a new journal in the field of informetrics.

2. GENESIS OF THE SOURCE JOURNAL

Need for dedicated quality publication outlet for informetric literature was first perceived by Prof. Leo Egghe in 1989 and again during his guest editorship of two special issues (on informetrics) of Elsevier's *Information Processing & Management* journal. One main reason was the steady growth in the field of informetrics as new topics have been emerging every now and then, consequently innovative metric tools, indicators, and indices are being proposed by informetricians to gauge current research. Existing

journals like *Scientometrics*, *JASIST* have somehow cope with the situations either by increasing number of issues per year (both of these journals increased frequencies from 2005 and 1998 respectively) or have forced to expand the scope of the existing publication (in case of *Information Processing and Management*). One feasible alternative might be to publish special issues to showcase the contemporary trends, these are only but temporary measure. The viable solution to report the current research of any fast growing fields (viz., informetrics) is to broaden the reach by creating dedicated specialist journals, which have proven enormous successful earlier. All these have made it reality to emerge *Journal of Informetrics (JOI)*.

The *JOI* is a scholarly peer-reviewed journal that publishes communications on fundamental quantitative aspects of information science which are likely improve the 'degree-of-hardness' in the field of informetrics and consequently increase the 'exactness' of the scientific speciality. It was launched by Elsevier Science, UK, on 12 January 2007. In the inaugural editorial, Prof. Egghe (Chief-editor) has categorically mentioned the scope of journal is to publish quality refereed articles on fundamental quantitative aspects of information science with good exposition of mathematical treatment. It also focuses on the communications dealing with rudimental theories, models and techniques of mathematics, statistics and operations research which could facilitate logical explanation of certain phenomena, and procedure of information management in libraries and information centres. In pursuance of above philosophy, *JOI* provides a unique channel for exchanging innovative ideas and developments in inter and multi-disciplinary areas like bibliometrics, scientometrics, webometrics, cybermetrics including quantitative linguistics. Primary goal is to identify analogues problems in those fields, and devise general theorem, methodology, and procedure which would be all pervasive.

In the very second year of inception, the *JOI* became the winner of prestigious Association of Learned and Professional Society Publishers (ALPSP) award for the best new journal. Since then it has been included in ISI (Thomson Reuter) and subsequently received first impact factor during 2009. Soon the journal has been included in the UN's information delivery initiatives like HINARI (www.who.int/hinari), AGORA (www.agointernetnetwork), and OARE (www.oaresciences.org) to facilitate free and low cost access to the world's journal literature in developing countries across the globe. Leading secondary services like *Current Abstracts*, *CSA Database*, *Current Contents*, *EBSCOhost*, *LISA*, *PubMed*, *SCOPUS*, *SSCI*, *TOC Premier*, and *WoS* cover this journal and helps to maintain impressive average

impact factor (3.586). The *JOI* being the flagship journal of 'informetrics' literature thus a potential candidate for an in-depth study in anticipation to further supplement some more interesting findings to the existing literature. Details of the journal are available at www.elsevier.com/locate/joi.

3. LITERATURE REVIEW

Bibliometric studies of scholarly LIS journals are well documented and diversified, it was found that half of the total literatures of information science are on bibliometric studies and majority of those were on information use studies generally in the forms of surveys and citations analysis⁶. However, author considered it relevant to mention only those, which are significant in some way or the other. Earliest survey on single journal bibliometric studies was conducted by Tiew⁷ and found 40 studies (out of 102) belongs to individual journal's characteristic studies. Young⁸ reported a study based on *Library Quarterly (LQ)* to identify total publications; rank list of authors; most frequently cited *LQ* authors and article in *WoS*. Again, Verma⁹, *et al.* analysed 131 contributions of *Annals of Library & Information Studies* during 1999-2005 to examine year-wise, institutions-wise, state-wise distribution of contributions, authorship pattern, citation analysis, length of the contributions etc. Singh¹⁰, *et al.* had studied the growth and characteristics of digital library literature based on more than 1000 articles retrieved from LISA plus appearing during 1998 to 2004. Bakri & Willett¹¹ updated the earlier work of Tiew¹², *et al.* to identify significant changes of the scholarly behaviours of the journal. Park¹³ examined authorship characteristics of top 20 LIS journals from the Asian and Pacific region based on the *WoS* data during 1967 to 2005. Mukerjee¹⁴ revisited *JASIST* to show growth of papers, authorship patterns, nature of collaboration, geographical dispersion, nature of cited and citing references, prolific authors and highly cited authors, etc. Halder & Chandra¹⁵ highlighted growth, authorship pattern, subject trends, distribution of references, illustrations and state wise distribution of contributors of articles appeared of *IASLIC Bulletin* during 2003 to 2007. In a review, Zainab¹⁶, *et al.* reported 11 bibliometric studies on LIS journals'. Recently, Thanuskodi¹⁷ studied *Library Philosophy and Practice* for 2005–2009 to report that majority of articles were single-authored and 'computer applications in the LIS' was the predominant area of research. Various authorship elements, viz., most productive author, their affiliation and geographical distributions, etc., of *D-Lib Magazine* was investigated by Park¹⁸. Again, *Journal of Documentation* was revisited by Tsay & Shu¹⁹ to explore various bibliometric characteristics. From study on *Electronic Library* journal, Hussen²⁰, *et al.* showed that majority of the articles were single-authored as the degree of collaboration is very low

(0.256); majority of authors were librarians, faculty or researchers affiliated with institutions of higher learning. Thanuskodi²¹ studied *Library Herald* journal to report that majority of contribution was singled authored; journal articles were predominant channel of communication, which received maximum citations. Singh²², *et al.* summarised the publication trends, authorship pattern and geographical dispersions of the contributors of the *DESIDOC Bulletin of Information Technology*. In the same year, Kumar & Moorthy²³ studied *DJLIT* for 2001–2010 to explore growth and authorship pattern, content coverage and subject distribution. Recently, Egghe²⁴ has reported a brief profile with decent overview of *JOI* through short communication but a detail analysis of this esteem journal is still due. Hence a sincere effort has been pursued to study the *Journal of Informetrics (JOI)* quantitatively aiming in view to explore its scholarly profile, like many predecessors.

4. SCOPE AND OBJECTIVES

Present study is confined to the publications appeared in the inaugural five volumes of *Journal of Informetrics* during 2007 to 2011. The study is conducted based on the research communications like articles, editorial notes, short communications and letter to editors, etc. Noteworthy is the fact that so-called less scholarly communications like - short communications; editorial notes; letters to the editor; etc., were unlikely taken into consideration for the study because of rich intellectual contents. But, communications like - conference announcements, list of reviewers, etc., were excluded from the purview of this study. However, present study is conducted towards the following specific objectives:

- To investigate the chronological growth of informetrics literature;
- To study authorship pattern of the published literatures;
- To enumerate ranking of prolific contributors and their affiliated institutions;
- To determine the extent of research collaboration among the contributors and their affiliated institutions and countries;
- To ascertain the scholarly nature of the source journal from the study of various bibliometric like – keyword, tables and charts usage; references appended, citation received, etc;
- To deduce the time lag for publishing and identify the average time lags for this scholarly journal; and
- To ear-mark various issues quantitatively to rationale the significance of this source journal in the field of informetrics.

5. METHODOLOGY

Keeping in view of the aforesaid objectives, primary data for the study has been extracted from the *Science Direct* database of *Elsevier Science*. Which facilitate full-text access to the journal site and offers excellent content with powerful search functionality and timely updates. Methodology employed in the present study is basically bibliometric scrutiny, which is used for data collection and analysis of relevant bibliometric attributes of the communications published in the *JOI*. Complete searching has yielded 239 unique records that are considered reasonable sample for the purpose of this study. Relevant bibliographic elements of specific communications, viz., year and type of publication, contributor/s name, number, affiliations, collaboration types, keywords supplied, number of tables/charts included, number of references appended, number of citations received (by particular item), date of receiving the and date of acceptance of the individual manuscript, etc., are recorded in MS Excel spread sheet and subsequently analysed for making insightful observations and interpretations.

Relevant bibliometric techniques were applied to analyse the retrieved dataset objectively so as to gauge the bibliometric pattern of the *JOI*. Rank lists of prolific contributors and their affiliated institutions have been prepared based on the fractional counting method²⁵ and normal counting method respectively. Research collaboration among the scholars has been estimated in terms degree of collaboration (DC) using Subramanyan's formula²⁶. Different bibliometric elements of *JOI*, viz citation and reference frequency, keyword distributions and table and graph distribution of the journal have been tabulated. Thus a thorough analysis of collected data has been worked out in different dimensions using various mathematical and statistical techniques.

6. ANALYSIS AND FINDINGS

Analysis of collected data has revealed many interesting findings which signify many scholarly attributes of the source journal.

6.1 Year-wise Distribution of Contributions

Table 1 shows chronological distribution of types of items published in the journal during the study period. Total 239 communications was appeared during 2007 to 2011, of which 212 (88.70 %) were scholarly articles and rest of 27 communications belonged to short communications (5.02 %), letter to editors (5.02 %), and editorials in negligible portion (1.24 %). So, research articles were found to be the most predominant form of research communications in *JOI*. It is also evident that, research communications became double during five years period. Table also shows an increasing trend of total communications

Table 1. Year-wise distribution of types of items published in JOI

Items	Year of publication					Total	Percentage
	2007	2008	2009	2010	2011		
Articles	32	32	31	62	55	212	88.7
Short Communication	-	2	2	2	6	12	5.02
Editorials	1	-	1	1	-	3	1.25
Letter to Editor	-	-	2	4	6	12	5.02
Total	33	34	36	69	67	239	100

with corresponding increase of research articles - signifies that growth of total publications in *JOI* followed almost similar trend to that of articles publications over the same period.

6.2 Authorship Pattern

Authorship is the important bibliometric measures reflecting contemporary communication patterns, productivity and collaboration among the researchers. Thus, knowledge of authorship could be helpful in assessing research patterns at individual, organisational, and also in disciplinary levels. For authorship study, name and corresponding affiliations of individual contributor were collected from *Science Direct* as primary dataset. In case of contributors having more than one affiliation in the same articles, only the first affiliation was considered. Various facets of authorship, viz., authorship patterns, i.e., categorisation of authors according to authorship values, average authorship per contribution, collaborative research carried out by the community, determination of the degree of collaboration (DC) among the contributors, identification of prolific contributors in the subject speciality are deduced using this dataset.

Table 2 represents the authorship pattern identified in the *JOI* communications during 2007-2011. Analysis shows a total of 545 occurrences of authors in different authorship positions during the period, thus average authorship was found 2.28 for each publication. It was also observed that though single-authored contributions were quite significant (30 %), two-authored contributions (36 %) were found to be most predominant, followed by three authors (19 %), four authors (3 %) and rest of the communications were in collaborations ranging from five to even

nine-authors. Noteworthy is the fact that reported average authorship for the journal *Scientometrics*²⁷ was almost identical (2.29) to the *JOI*.

6.3 Ranking of Prolific Authors

Table 3 enumerates the ranking of contributing authors based on their weighted value of total contributions in *JOI* during the study period. Weighted value of contributors have been calculated using fractional counting method; where total weight (one) of an article is distributed equally among all the (co-authors for multi-authored) contributions irrespective of their position. This could produce more distinctive listing of authors and subsequently removes anonymous ranking²⁸.

Results show a total of 326 unique authors have 545 occurrences in different authorship positions of 239 contributions of *JOI* during the study period. It is also observed that top 10 positions (ranks) were occupied by ten eminent bibliometricians. Editor-in-chief, Leo Egghe (Universiteit Hasselt, Belgium) was found to be the most prolific author followed by Lutz Bornmann (ETH Zurich, Switzerland); Ronald Rousseau (KHBO, K U Leuven, Belgium); Loet Leydesdorff (University of Amsterdam, The Netherlands); Hans-Dieter Daniel (ETH Zurich, Switzerland); Marek Kosmulski (Lublin University of Technology, Poland); Wolfgang Glänzel (K.U. Leuven, Belgium), etc. It is also found from the list that majority of the productive contributors are senior academician of informetrics and allied fields and associated with active institutions of informetric research. Many of them have served as editorial members of the *JOI*. Similar incidents also reported by Young⁸ and Tiew¹², *et al.* in their respective

Table 2. Distribution of JOI communications by authorship

Year	Total communications	Authorship					Total	Average authors
		Solo	Two	Three	Four	> 4		
2007	33	13	9	5	4	2	72	2.18
2008	34	14	13	4	3	-	64	1.88
2009	36	10	13	5	4	4	91	2.52
2010	69	22	29	10	5	3	145	2.1
2011	67	13	22	22	7	3	173	2.58
Total	239	72	86	46	23	12	545	2.28
Percentage		30%	36%	19%	3%	12%	100%	

Table 3. List of top 10 authors (based on weighted value of contributions)

Rank	Author name	Authorship in contributions									Total	Total weight
		Single	Two	Three	Four	Five	Six	Seven	Eight	Nine		
1	Egghe, Leo	8	1	1	0	0	0	0	0	0	10	8.8333
2	Bornmann, Lutz	1	9	6	2	0	1	0	0	0	19	8.1667
3	Rousseau, Ronald	2	6	4	0	0	0	0	0	0	12	6.3333
4	Leydesdorff, Loet	0	9	1	1	0	0	0	0	0	11	5.0833
5	Daniel, Hans-Dieter	0	5	4	1	0	1	0	0	0	11	4.2500
6	Kosmulski, Marek	4	0	0	0	0	0	0	0	0	4	4.0000
7	Glänzel, Wolfgang	2	2	1	1	1	0	0	0	0	7	3.7833
8	Waltman, Ludo	0	5	2	0	2	0	0	0	0	9	3.5667
9	Moed, Henk F.	2	1	1	1	0	0	0	0	0	5	3.0833
10	van Eck, Nees Jan	0	4	2	0	2	0	0	0	0	8	3.0667
Total	326 unique authors	72	172	138	92	35	12	7	8	9	545	239.00

studies. This observation is clearly in concurrence with the declared objective of the journal.

6.4 Research Collaboration

Collaboration is an intense form of interaction fostering effective communication as well as sharing of competence and other resources in search of new knowledge. Research collaboration is very much common and highly practiced especially in multidisciplinary domains. Literature shows that research collaboration is discipline dependent and generally higher in the experimental fields of science and technology but lower in the fields of humanities. Here, degree of collaboration (DC) - a proxy measure for research collaboration among the contributors was derived by using Subramanyam²⁶ formula, as the ratio of the number of collaborative contributions to the total number of research contributors published in the discipline during a certain period of time. Mathematically it can be expressed as,

$$DC = \frac{N_m}{N_m + N_s} \text{ or, } (DC)_{JOI} = \frac{167}{167 + 72} = 0.699$$

Where, N_m refers to the collaborative communications and N_s denote the number of single-authored communications published in a particular communication channel during certain period of time.

Table 4 reveals the collaboration scenario of the contributors of *JOI* during 2007-2011. Out of total 239

communications, about 70 % were collaborated by multiple-authors ranging from two to nine co-authors and rests were non-collaborative. Table also shows the degree of collaboration of *JOI* varied inconsistently from 0.588 to 0.806 during the study period. Average degree of collaboration was impressive (0.699) but not overwhelming. Gradual increase (8 % to 23 %) of multi-authored communications over the years of *JOI* clearly indicates prevalence of team or group research amongst the informetrics community. Similar observation has also found in different fields of basic and applied sciences.

6.5 Geographical Diffusion of Contributors

Table 5 shows the geographical diffusion of contributing authors of *JOI* during the study period. Country names of the contributors have been identified from the corresponding affiliations as found in respective publications of the journal. Tabulated data shows that contributors from 32 countries of 6 regions (continents) across the globe were associated in producing 239 communications of *JOI*. Out of which European countries contribute most, followed by North America, and Asia. A rank list of contributing countries has been prepared on the basis of affiliations of the contributions from various countries, applying normal counting method. USA produces highest portion of authors (13 %) by affiliating 69 occurrences, followed by Spain (11.38 %), The Netherland (11 %), China (10.9 %), Belgium (8.62 %), UK (6.42 %), etc. It has

Table 4. Collaboration trend (Degree of Collaboration (DC)) among the contributors

Year	Non-collaborative (N_s)	Percentage	Collaborative (N_m)	Percentage	DC
2007	13	5.44	20	8.37	0.606
2008	14	5.86	20	8.37	0.588
2009	10	4.18	26	10.88	0.722
2010	22	9.21	47	19.67	0.681
2011	13	5.44	54	22.58	0.806
Total	72	30.13	167	69.87	0.699

Table 5. Geographical diversity of contributing authors of the *JOI*

Rank	Country name	Regions	Frequency of author occurrence	Percentage	Cumulative percentage (%)
1	USA	North America	69	12.66	12.66
2	Spain	Europe	62	11.38	24.04
3	The Netherland	Europe	60	11.01	35.05
4	China (with PRC)	Asia	55	10.09	45.14
5	Belgium	Europe	47	8.62	53.73
6	UK	Europe	35	6.42	60.18
7	Switzerland	Europe	32	5.87	66.05
8	Canada	North America	26	4.77	70.83
9	Italy	Europe	25	4.59	75.41
10	Germany	Europe	22	4.04	79.45
	Another 22 countries		112	20.05	100
Total	32 countries		545	100	100

also found that top five countries were producing about 54% of the total authors, indicating a high concentration of informetrics researchers.

6.6 Institutional Affiliation of Contributors

Table 6 depicts the distribution of affiliations of the *JOI* contributors among various institutions

across globe. Enumerated data shows that 545 contributors *JOI* were affiliated to 199 institutions from 32 countries. A rank list of affiliated institutions of the contributors has been prepared based on the aggregated value of the contributions from respective institutions. It is observed from the Table that Swiss Federal Institute of Technology (ETH) – Switzerland has

Table 6. Institutions affiliations of the *JOI* contributors

Rank	Institute Name - Country	Type	Frequency	Percentage	Total (%)
1	Swiss Federal Institute of Technology, (ETH) - Switzerland	UNIV	32	5.87	5.87
2	Leiden University, CWTS – The Netherlands	UNIV	29	5.32	5.32
3	Institute of Scientific & Technical Information of China – China	RI	16	2.94	2.94
4	University of Amsterdam – The Netherland	UNIV	13	2.39	2.39
5	KHBO (Catholic College Bruges-Ostend) (K.U.Leuven) - Belgium	UNIV	11	2.02	2.02
6	K.U. Leuven, ECOOM and Dept. OF MSI - Belgium	UNIV	10	1.83	1.83
7	Max Planck Society - Germany	R I	9	1.65	4.95
	Universiteit Hasselt (UHasselt) - Belgium	UNIV			
	University of Granada - Spain	UNIV			
8	Politecnico di Torino (Polytechnic of Turin) - Italy	UNIV	8	1.47	4.41
	University of Quebec (Université du Québec à Montréal) - Canada	UNIV			
	University of Wolverhampton - UK	UNIV			
9	Harvard-Smithsonian Center for Astrophysics - USA	RI	7	1.28	3.84
	Indiana University, School of LIS - US	UNIV			
	University of Rome - Italy	UNIV			
10	Dalian University of Technology, WISE Lab - China	UNIV	6	1.10	8.80
	Loughborough University - UK	UNIV			
	Lublin University of Technology – Poland	UNIV			
	National Taiwan Universit – Taiwan (ROC)	UNIV			
	SCImago Research Group (SRG) – Spain	RG			
	Royal School of Library and Information Science – Denmark	UNIV			
	Universidad Carlos III - Spain	UNIV			
	University of Wisconsin-Milwaukee – USA	UNIV			
Another 176 institutions having contributions ranging from 5 to 1 papers each					
Total 199 institutions from 32 countries			545	99.98	

appeared on the top; followed by Leiden University, CWTS – The Netherlands; Institute of Scientific & Technical Information of China (ISTIC) – China; University of Amsterdam – The Netherlands; KHBO (Catholic College Bruges-Ostend) (K.U. Leuven) - Belgium. It is also evident from the table that top 10 institutions have contributed about (43%) of the total contributions during the study period. Results also showed that majority of contributors were affiliated to the universities and research institutes of developed countries. Active participation of institutions across geographical boundaries implies the recognition and reputation this journal among world informetrics community. Noteworthy is the fact that, majority of the affiliated institutions found in the study was also in the list of similar study made on the journal *Scientometrics*²⁷.

6.7 Composition of Editorial Board

Since inception, *JOI* has been endowed with an eminent panel of informetricians of international repute to monitor editorial works. Inaugural editorial board consists of as many as 33 eminent scholastics of 17 different countries across the globe, which included USA (11), Belgium (3), The Netherlands (3), UK (2), Sweden (2). Many of them (including Prof. Egghe) have contributed good number of papers having mathematical treatment on the policy implications for research evaluations in the fields of information science. So, the journal has got tremendous support and acceptance from the world academia.

6.8 Variations of Bibliometric Elements

Table 7 shows year-wise distribution of various bibliometric elements of *JOI*, that are discussed in details in the subsequent paragraphs.

6.8.1 Distributions of Keywords

Scholarly journals invariably append number of keywords to reflect the thought content of the research pursued. Keywords are often regarded as the best indicator of scope and subject coverage of research addressed, naturally most of the indexing services incorporate these words. Present study reveals that a total of 1088 keywords were appended

with 239 communications of *JOI*. Third column of Table 7 shows an upward trend of keyword usage with the average of 4.55 keywords per item over the years. Table 8 is the truncated enumeration of keywords with their frequency of occurrences in the records analysed. It reflects total of 690 unique keywords. Most frequently used keyword found in the study is ‘*h-index*’ (40 times) followed by ‘*citation analysis*’ (23 times), ‘*Bibliometrics*’ (22 times) and ‘*g-index*’ (18 times) whereas some 562 keywords were used once. Review of the enumerated keyword revealed that topics related to informetrics allied sub-domains were predominately appeared in this scholarly communications which seems to be in agreement with Prof. Egghe’s intention that the journal (*JOI*) would grow in the line with the mutual growth of informetrics and related areas.

Table 8. Frequency distribution of keywords appended in *JOI*

Keyword	Frequency	Percentage	Cumulative (%)
<i>h-index</i>	40	3.68	3.68
Citation analysis	22	2.00	5.68
Bibliometrics	21	1.93	7.61
<i>g-index</i>	19	1.75	9.36
Citation /s	16	1.47	10.83
Hirsch index	14	1.29	12.11
Impact factor	10	0.92	13.03
Peer review	10	0.92	13.95
Ranking	10	0.92	14.87
Research evaluation	10	0.92	15.79
Another	680	84.21	100
Total = 690	1088	100	100

6.8.2 Distributions of Tables and Figures

Scientific communications have been often characterised by the use of tables and graphs to supplement the summarise data. Moreover, scientific credibility of scholarly communications frequently perceived with the increasing demonstration of tables and graphs, as researchers use graphs and tables to convince their peers about the clarity of findings. Fourth Column of Table 7 shows that 239

Table 7. Year-wise distribution of various bibliometric elements of *JOI*

Year (Vol)	Total communications	Keywords used	Tables and figures	References appended	Citations received	Impact factor
2007 (V1)	33	142	229	750	595	NA
2008 (V2)	34	160	221	1523	335	2.513
2009 (V3)	36	180	257	1459	313	3.379
2010 (V4)	69	298	506	2119	188	3.119
2011 (V5)	67	308	544	2173	27	4.229
Total	239	1088	1757	8024	1458	
Average/item		4.55	7.35	34	6.10	3.944

communications of the *JOI* have appended a total of 1757 tables and figures with an average of 7.35 per item. Results also showed increasing trend of appending tables and figures, indicating increase of 'hardness' of the research communications as suggested by Smith²⁹, *et al.*, 'harder' the discipline uses greater number of graphs and figures. So, the result here seems to comply with the basic objectives of the *JOI* that the journal (*JOI*) aims to contribute to increase the 'degree of hardness' of the field of informetrics.

6.8.3 Variations of Reference Appended

Table 7 (Fifth Column) shows the year-wise variations of total references appended with the individual communications of the *JOI*. It reflects that 8024 references were included with 239 *JOI* communications during the study period. Therefore, on an average about 34 references were appended in each item which varied from 23 to 45 during the study period. Highest number of reference (622) used by the review article of Bar Ilan (2008), followed by Zhan, Thijs & Glanzel article (111) in 2011. Out of total 239 communications only one item (Guest editorial of Rousseau & Wolfram in vol. 2) does not contain any references. Results also revealed that total number of references in the journal has been increasing over time, which suggests the journal is becoming more scholarly.

6.8.4 Citations Received

Table 7 (Sixth Column) shows year-wise variations of total citations received by communications of the *JOI* based on Scopus. Results shows that 239 published communications of the *JOI* had received a total of 1458 citations from various literatures up to 20th February 2012. So, published communications of the *JOI* received an average of 6.10 citations per item which likely to increase in course of time as suggested by Moed & Leeuwen³⁰. Naturally, relatively older communications have received higher citations as total citations decreased gradually over the years. Highest citation received by an article (68) was identified by the Schubert & Glänzel (2007) article whereas as many as 98 articles have not received a single citation. Majority of these (89) are in their early stage of citations and published during 2010(35) to 2011(54).

6.8.5 Time-lag in Publications

Scholarly journals are often criticised for lengthy time lag in publishing the manuscripts, as lower time-lag is always encouraging for the researchers to pursue their research communications. Communications with lengthy time-gap often failed to produce impact actually intended by the researchers. Here, time lag refers to the time spent between the date of official acceptance of a manuscript and

its actual publication in the journal. Here, time lag of all individual articles of *JOI* have been counted separately in days and grouped them into various time-slots. Subsequently, the number of articles (frequency) belong to each group is tabulated and statistical mean value of time lag has been calculated, as shown in the Table 9. Result shows an average of about three month has been consumed by the journal to publish the accepted manuscript. Table also shows that, time lag of majority (181) of articles was varying from 3 to 6 months and there is hardly any consistency what so ever. However, implementation of web-based manuscript submission system through Elsevier Editorial System (ESS) would be a great help to ensure timely publication of the accepted manuscripts.

Table 9. Time-lag frequency distribution

Time lag (Duration)	Frequency
Up to 1 month (30 days)	7
Up to 2 months (from 31 to 60 days)	14
Up to 3 months (from 61 to 90 days)	43
Up to 4 months (from 91 to 120 days)	64
Up to 5 months (from 121 to 150 days)	36
Up to 6 months (from 151 to 180 days)	38
Up to 7 months (from 181 to 210 days)	13
Up to 8 months (from 211 to 240 days)	5
More than 8 months (>240 days)	4
Total	224[#]

(# Only research articles and short communications are considered)

7. CONCLUSIONS

Analysis presented in this study has permitted some inferences of broad generality on the bibliometric profiles of the *JOI* which illuminates scholarly nature and impact of the journal to the larger community. It also portrays the state-of-the-art of informetrics field and depicts the cognitive structure of the discipline as well.

However, steady increase in number of contributions and maintenance of exceptionally high 'impact factor' over the years, signifies persistence growth of literature with substantial exposure. Moreover, diversity of authorship across the disciplines and countries gives international flavor to the source journal. As desired by Prof. Egghe, many of the editorial board members have contributed good number of papers to the journal. An increasing trend of collaboration among the researchers has been observed in this scientific specialty. Furthermore, Informetrics being trans-disciplinary domain objectively accommodate expositions not only from immediate field but also from broader disciplines - thus produces substantial multi-authored (70 %) communications as reflected from the study as well. The degree of collaboration (DC) was estimated to 0.699, of which double and triple-authored contributions were significant.

Contributors from higher learning Institutions of European Union country clearly predominates in the informetric research. Diversity of contributors and prevalence of collaborative contributions from Europe, America (N) and Asian regions indicates - intellectual perception from various origin have been intermingled into this scholarly communications. Furthermore, being the flagship journal, *JOI* has maintained careful balance among the frontier research areas and often publishes landmark studies on informetrics and allied sub-domains. Little surprisingly, topics like *h*-index, citations analysis, bibliometrics, *g*-index, impact factor, and peer review have dominated in the research communications. *JOI* seems to be credited with high citations as average citations per item accounts to 6.10 within a limited period, which likely to be increasing over time. Perceptible increase of reference usage indicates the journal is becoming more scholarly. Subjective 'hardness' of the journal is ascertained from increasing usage of tables and figures in the journal communications. Findings also reflect that *JOI* suffers from time-lag of about four months in publishing the manuscripts. The editorial board has already implemented web based manuscript submission *JOI* handling system through ESS and Article Based Publishing (from 2012) to ensure better production coordination so as to avoid delays in publishing what so ever.

In summary, it may be concluded that the journal has achieved most of its objectives in terms of authoritativeness (rigorous reviewing with dynamic editorial procedure), visibility (coverage in leading I&A services), acceptance (growing citations, high average impact factor) scholarliness (double blind review, in-depth focus of research, timeliness of publication, etc.) and internationality (authorship, editorship, and reviewer). Expectedly, many of these resembles with Egghe's observation²⁴. There are, of course, still many unexplored areas for further studies particularly in sustainability and quality assessments like-(Web) citation mapping, web-log analysis, tracking of collaboration-network, etc.

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