International Journal of Research in Library Science (IJRLS)

ISSN: 2455-104X

DOI: 10.26761/IJRLS.6.2.2020.1361

Volume 6, Issue 2 (July-December) 2020, 222-228, Paper ID: IJRLS-1361

Received: 19 Dec. 2020 ; Accepted: 26 Dec. 2020 ; Published: 29 December. 2020

A Scientometric Study on Journal of Surface Science Reports

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ABSTRACT

Through reviewing the different features of the Journal of Surface Science Reports, this paper aims to illustrate the quantitative evaluation of the status of the Journal. A total of 90 papers were published by researchers in different countries in the Journal of 'Surface Science Reports' between 2010 and 2019.

KEYWORDS: Scientometric, Science, Surface Science, Degree of collaboration.

INTRODUCTION

Surface Science Reports is a peer - reviewed scientific journal published by North-Holland that covers the physics and chemistry of surfaces. It was established in 1981. It is the review journal corresponding to the journals Surface Science and Surface Science Letters (https://en.wikipedia.org/wiki/Surface_Science_Reports). The inception of modern surface science, as well as the appearance of the term "surface science" in common use, dates back to the early 1960s, although there were many previous studies of surface phenomena, and many basic theoretical concepts had already been developed. The breakthrough in the field resulted from a combination of factors, including progress in vacuum technology, the development of surface analytical techniques and the appearance of high-speed digital computers. Since then, surface science has undergone great development, which still continues.

The main distinctive feature of modern surface science is that it deals with crystal surfaces, which are well-defined from the viewpoint of their structure and composition. In other words, these surfaces are either clean adsorbate-free on the atomic level, or in the case of adsorbate-covered surfaces, contain adsorbate species added intentionally in amounts controlled also on the atomic level. Thus, surface science experiments are typically conducted in ultra-high Vacuum, as it is the only possible environment where such surfaces can be prepared and maintained (Oura K.et.al 2003).

REVIEW OF LITERATURE:

Tupe S.K & Khaparde V.S ,(2016) A Scientometric review of 4813 references appended to 217 papers submitted by the authors to DOAJ in Information Technology and Libraries is discussed in the present report. During the 2005-2014 period, the study explores Authorship Pattern, Relative Growth Rate and Doubling Time of Papers, Year Wise Degree of Collaboration, the trend of single authorship is seen to increase. The study showed that most of the papers were contributed by single authors (57.14 percent) of publications. With 178 (82.03 percent) publications of total production, the USA is the top producing country. For the last five years the average relative growth rate decreased from 2010 to 2014 to 2014 (0.13). Although the Doubling Time for various years [Dt(p)] increased steadily from (1.00) in 2006 to (7.70) in 2014. For the first five years (i.e. from 2005 to 2009), the mean doubling time is just (1.69), which has risen to (5.69) over the last five years (2010 to 2014). Print references used the highest references, i.e. 3154, while web references were 1659 references.

Alhamdi, Khaparde & Kanekar,(2014) The current research deals with a Scientometric analysis of 56 articles published between 2004 and 2013 in the Library and Information Science & Technical Abstract (LISTA) on Internet use in the subject of library & information science. The research focused on different aspects: such as types of papers, growth rate (GR) and doubling time (DT) of publications and citations, year-wise, pattern of authorship, institutions involved, the journal's most prolific authors. The research showed that many writers contributed most of the articles (71.4 percent) of the papers. With 8 publications (14.3 percent of the total production, the USA is the top producing country. The papers were all written in English. For the first five years (i.e. 2004 to 2008), the mean doubling time is just (1.05), which has risen to (6.07) over the last five years (2009 to 2013). In the article, a maximum of 35 (62.5%) out of 56 of the writers do not mention their email address.

ABOUT THE JOURNAL

Surface Science Reports contains invited review papers on experimental and theoretical studies in the physics, chemistry and pioneering applications of surfaces, interfaces and nanostructures. It covers topics which contribute to a better understanding of basic phenomena occurring on surfaces and interfaces, but also the application of this knowledge to the development of materials, processes and devices. "Surfaces" is defined in this journal to include all interfaces between solids, liquids, polymers, biomaterials, nanostructures, soft matter, gases and/or vacuum. The journal also contains reviews of experimental techniques and methods used to characterize surfaces and surface processes, e.g. those based upon the interactions of photons, electrons and ions with surfaces.(https://www.sciencedirect.com/journal/surface-science-reports/about/aims-and-scope)

DEFINITIONAL ANALYSIS:

Scientometric

“The quantitative methods of the research on the development of science as an informational process” (Nalimov & Mulcjenko, 1971, p. 2).This field concentrates specifically on science (and the social sciences and humanities).

Surface Science

Surface science is the study of physical and chemical processes, including solid-liquid interfaces, solid-gas interfaces, solid-vacuum interfaces, and liquid-gas interfaces, occurring at the interface of two phases. The fields of surface chemistry and physics of the surface are included. Some related functional applications are known as

engineering of surfaces. The research covers topics such as heterogeneous catalysis, the manufacture of semiconductor components, fuel cells, self-assembled monolayers, and adhesives. Surface science is closely connected to the science of interfaces and colloids..For both, interfacial chemistry and physics are frequent topics. The techniques are distinct. In addition, interface and colloidal science studies macroscopic phenomena that occur due to interface peculiarities in heterogeneous systems.

an Information Process. Washington DC: Foreign Technology Division.

SCOPE & LIMITATION OF THE STUDY:

The present study is based on the Scientometric evaluation of publications in Surface Science Reports Journals 2010 – 2019.

Data collection

Data collected from the Journal of Surface Science Reports the period of 2010-2019 i.e. 10 years. A total number of 90 publications were received. The data was download and analyzed by using the Excel sheet.. The data is used to find the measures of DC, RGR and Doubling Time, Types of Document, Types of Keyword, Geographical Distribution in the journal of Surface Science Reports.

Objectives of the study

- To find out Geographical distribution of research output
- To find out the channels of communications used by the scientists
- To find out the high frequency keywords appeared in the channels of communication.
- To find out the Relative Growth Rate (RGR) and Doubling Time (DT) of publications.
- To measure the DC of Surface Science Reports.

Data analysis

❖ **Geographical distribution of research output**

Table No.1
Geographical distribution of research output

Sr. No	Country	Publications	%
1	France	59	19.60
2	USA	54	17.94
3	China	37	12.29
4	United States	24	7.97
5	Germany	21	6.98
6	Italy	15	4.98
7	United Kingdom	14	4.65
8	Switzerland	12	3.99
9	Spain	9	2.99
10	Czech Republic	7	2.33
11	Japan	7	2.33
12	Russia	6	1.99

13	Australia	5	1.66
14	the Netherlands	5	1.66
15	Poland	4	1.33
16	Hungary	3	1.00
17	Saudi Arabia	3	1.00
18	Austria	2	0.66
19	Finland	2	0.66
20	India	2	0.66
21	Luxembourg	2	0.66
22	Bulgaria	1	0.33
23	Egypt	1	0.33
24	Israel	1	0.33
25	Lebanon	1	0.33
26	Morocco	1	0.33
27	Slovenia	1	0.33
28	Sweden	1	0.33
29	Turkey	1	0.33
Total		**301**	**100.00**

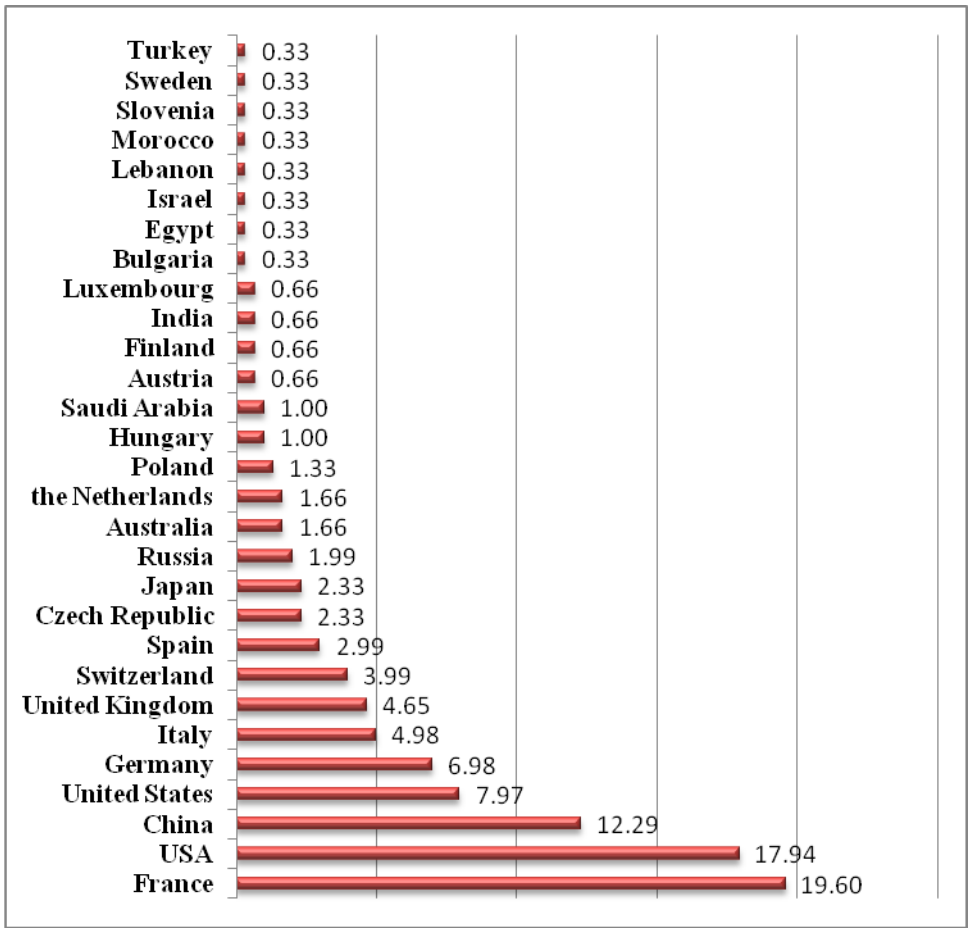

Figure No.1 Geographical distribution of research output

Table No.1 and Figure No.1 shows that information about the Geographical distribution of publications. It is observed that France 59 with (19.60%) occurred the top position followed by USA 54 (17.94 %), China 37 (12.29 %), United States 24 (7.97 %), Germany 21(6.98 %), Italy 15 (4.98 %), United Kingdom 14 (4.65 %), Switzerland 12 (3.99 %), Spain 9 (2.99 %) respectively.

❖ **The channels of communications used by the scientists**

Table No.2
The channels of communications used by the scientists

Sr.No	Channels of Communications	No. of Publication	%
1	Review article	88	97.78
2	Erratum	2	2.22
Total		**90**	**100**

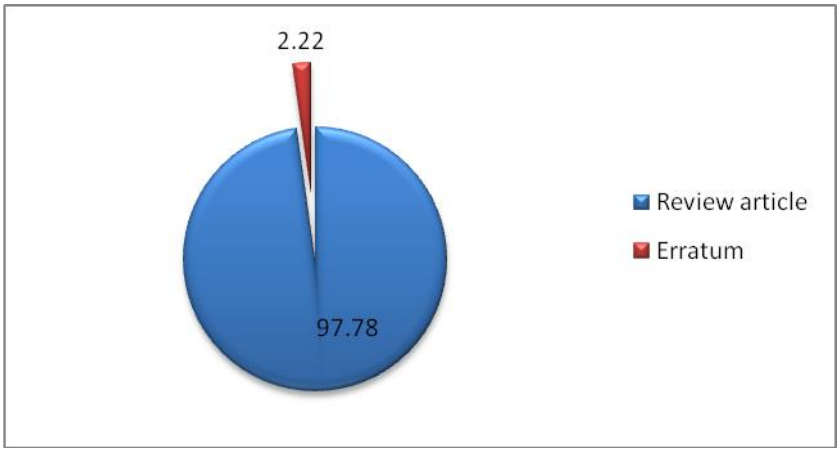

Figure No.2 channels of communications used by the scientists

It can be observed from Table no. 2 and Figure No.2 that, 97.78% of the Publication was published in Reviews article and the Erratum (2.22%) were analyzed.

❖ **The high frequency keywords appeared in the channels of communication**

Table No.3
The high frequency keywords appeared in the channels of communication

Sr. No	Keywords	Frequency	%	Rank
1	Adsorption	9	1.71	1
2	Scanning tunneling microscopy (STM)	6	1.14	2
3	Self-assembly	6	1.14	2
4	Graphene	5	0.95	3
5	Metal surfaces	4	0.76	4
6	Surface	4	0.76	4
7	Three Times Keyword 3X8	24	4.57	5
8	Two Times Keyword 2X36	72	13.71	6
9	One Times Keyword 1X395	395	75.24	7
Total		**525**	**100**	

It can be observed from Table No. 3 that, the high frequency keywords were Adsorption 9 (1.71 %), Scanning tunneling microscopy (STM) and Self-assembly 6 (1.14%), Graphene 5(0.95%), Metal surfaces and Surface 4 (0.76%), Three times keywords with 24 (4.57%),Two times keywords with 72 (13.71%) publications and 395 (75.24%) Keywords with single publication.

❖ **Relative Growth Rate (RGR) and Doubling Time (DT) of publications**

Table No.4

Relative Growth Rate (RGR) and Doubling Time (DT) of publications

Year	No. of Pub	Cumulative Frequency	W1	W2	RGR	Mean[R(A)]	DT(A)	Mean DT(A)
2010	10	10		2.30				
2011	8	18	2.30	2.89	0.59		1.17	
2012	9	27	2.89	3.30	0.41	0.314	1.69	1.55
2013	10	37	3.30	3.61	0.31		2.24	
2014	11	48	3.61	3.87	0.26		2.67	
2015	10	58	3.87	4.06	0.19		3.65	
2016	10	68	4.06	4.22	0.16		4.33	
2017	7	75	4.22	4.32	0.1	0.126	6.93	6.22
2018	9	84	4.32	4.43	0.11		6.30	
2019	6	90	4.43	4.50	0.07		9.90	

From the Table No.04 & Figure no.4 It noticed that the mean relative growth for the first five years 2010 to 2014 is (0.314), and the mean relative growth rate for the last five years 2015 to 2019 reduced to (0.126). While the Doubling time for different years [Dt(p)]gradually increased from (9.90) in 2019. The mean doubling time for the first five years (i.e. 2010 to 2014) is only (1.55) which is increased to (6.22) during the last five years (2015 to 2019). Thus as the rate of growth of publications was decreased, the corresponding Doubling Time was increased.

❖ **To measure the DC of Surface Science Reports**

Table No.5

The DC of Surface Science Reports

Year	Single authored	Multiple authored	Total	DC
2010	2	8	10	0.80
2011	3	5	8	0.63
2012	2	7	9	0.78
2013	2	8	10	0.80
2014	4	7	11	0.64
2015	2	8	10	0.80
2016	2	8	10	0.80
2017	2	5	7	0.71
2018	0	9	9	1.00
2019	2	4	6	0.67
Total	**21**	**69**	**90**	**0.77**

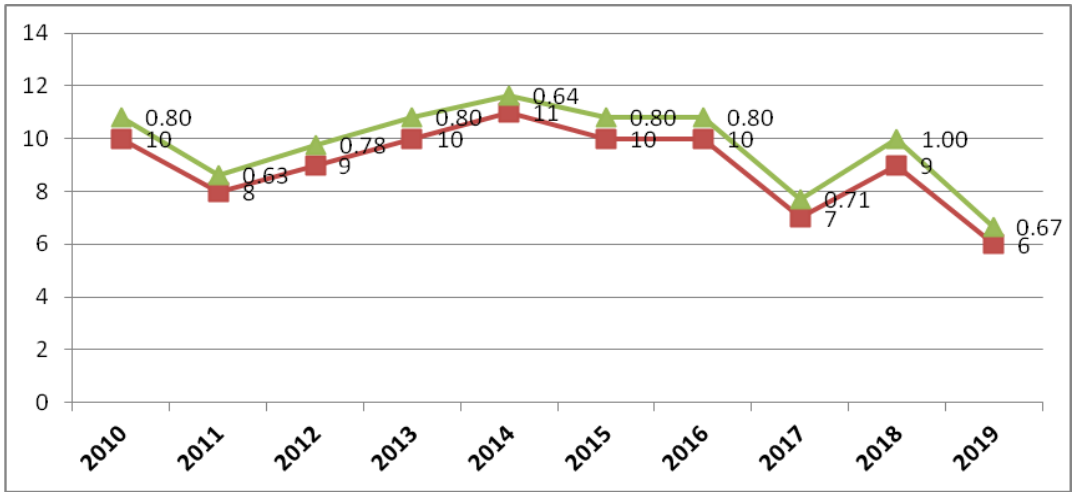

Figure No.3 Degree of Collaboration

Table No.5 and Figure no.5 shows that in the 10 years period, the multi authorship publications are higher and predominant than single authored. The multi authored publications are highest in the year 2018 with degree of collaboration (DC) was 1.00. It is seen that the multi authorship trend in increasing.

FINDINGS & CONCLUSION

- Geographical distribution of publications in this table observed that France 59 with (19.60%) occurred the top position.
- High frequency keywords were Adsorption 9 with (1.71 %).
- Relative growth for the first five years 2010 to 2014 is (0.314), While the Doubling time for different years [Dt(p)]gradually increased from (9.90) in 2019.
- The Degree of collaboration multi authorship publications are higher and predominant than single authored.

REFERENCES:

[1] Alhamdi, F.A., Khaparde,V S .,& Kenekar,B.V.(2014). Journal of Documentation : A Bibliometric study (2001-2010). *Excel's International Journal of Social Science & Humanities*,1(2).57-70

[2] https://www.sciencedirect.com/journal/surface-science-reports/about/aims-and-scope

[3] Nalimov, V., & Mulcjenko, B. (1971). Measurement of Science: Study of the Development of Science as an Information Process. Washington DC: Foreign Technology Division.

[4] Oura K, Lifshits V.G , Saranin A.A , Zotov A.V and Katayama M (2003). Surface Science : an introduction. Library of congress Cataloging in publication. Published by springer-verlag Berlin Heidelberg, New York.(ISBN : 978-3662-05179-5 eBook).

[5] Surface science reports (2020). https://en.wikipedia.org/wiki/Surface_Science_Reports accessed on 30 Nov.2020.

[6] Surface Science Reports (2020).https://en.wikipedia.org/wiki/Surface_Science_Reports accessed on 19 Dec.2020.

[7] Tupe, S. K. , & Khaparde V. S (2016) . Scientometric study on journal of information technology & libraries on DOAJ *"Knowledge Librarian" An International Peer Reviewed Bilingual E-Journal of Library and Information Science*,3(3) ,10-26