

# Analyses on the “Six Sigma” Methodological Approaches Tram in Web of Science database during 2007-2018

Prof. Solanke Datta Sopanrao<sup>1</sup>, Dr. Rahul K. Deshmukh<sup>2</sup>

<sup>1</sup>Librarian, Sunderrao Solanke Mahavidyalaya, Majalgaon, Beed, Maharashtra, India

<sup>2</sup>Assistant Librarian, Rajiv Gandhi College of Food Technology Parbhani, Maharashtra, India

## ABSTRACT

The web of Science is a premier research platform, helping to find, analyze, and share information in the sciences, social sciences, arts, and humanities. The present paper discusses the term “Six Sigma” as reflected in web of science during the period during 2007 to 2018. The present paper investigates the highly productive authors, Document Types; it aims to find out the top contributing institutions, the preferred sources for publications, documents by country, Subject area, Source Type, Affiliation.

**Keywords:** Web of Science, Six Sigma

## I. INTRODUCTION

The term "six sigma" comes from statistics and is used in statistical quality control, which evaluates process capability. Originally, it referred to the ability of manufacturing processes to produce a very high proportion of output within specification. Processes that operate with "six sigma quality" over the short term are assumed to produce long-term defect levels below 3.4 defects per million opportunities (DPMO). The 3.4 dpmo is based on a "shift" of +/- 1.5 sigma created by the psychologist Dr Mikel Harry. He created this figure based on the tolerance in the height of a stack of discs. Six Sigma's implicit goal is to improve all processes, but not to the 3.4 DPMO level necessarily. Organizations need to determine an appropriate sigma level for each of their most important processes and strive to achieve these. As a result of this goal, it is incumbent on management of the organization to prioritize areas of improvement.

## II. CONCEPTUAL ANALYSIS

**2.1 Six Sigma** - is a method that provides organizations tools to improve the capability of their business processes. This increase in performance and decrease in process variation lead to defect reduction and improvement in profits, employee morale, and quality of products or services. Six Sigma quality is a term generally used to indicate a process is well controlled

### 2.2 Differing opinions on the definition of Six Sigma:

**Philosophy:** The philosophical perspective views all work as processes that can be defined, measured, analyzed, improved and controlled. Processes require inputs (x) and produce outputs (y). If you control the inputs, you will control the outputs. This is generally expressed as  $y = f(x)$ .

**Set of tools:** The Six Sigma expert uses qualitative and quantitative techniques to drive process improvement. A few such tools include statistical process control (SPC), control charts, failure mode and effects analysis, and process mapping. Six Sigma

professionals do not totally agree as to exactly which tools constitute the set.

**Methodology:** This view of Six Sigma recognizes the underlying and rigorous approach known as DMAIC (define, measure, analyze, improve and control). DMAIC defines the steps a Six Sigma practitioner is expected to follow, starting with identifying the problem and ending with the implementation of long-lasting solutions. While DMAIC is not the only Six Sigma methodology in use, it is certainly the most widely adopted and recognized.

**Metrics:** In simple terms, Six Sigma quality performance means 3.4 defects per million opportunities (accounting for a 1.5-sigma shift in the mean).

### 2.3 Web of Science

Web of Science, provides access to the world's leading citation databases. It searches over 10,000 journals from over 45 different languages across the sciences, social sciences, and arts and humanities with back files to 1900. The citations (or footnotes) allow one to navigate forward, backward, and through journal articles and both journal and book based proceedings. Its Analyze Tool also helps in finding hidden trends and patterns, gain insight into emerging fields of research, identify leading researchers, institutions, and journals, and trace the history of a particular field of study. The access to Web of Science is available on perpetual access basis to members subscribing prior to 2016, and new members were provided access to 20 year backfiles on lease basis

### III. OBJECTIVES OF STUDY

- 3.1 To Study the Document types and number of documents in which 'Six Sigma' have been used.
- 3.2 To find out highly productive authors on Six Sigma.
- 3.3 To classify Document Type by country on Six Sigma
- 3.4 To identify documents on Six Sigma by year of publications.

- 3.5 To provide information writing for Research areas.

### IV. SCOPE & LIMITATION OF STUDY

Document types and number of documents in which 'Six Sigma' have been used hence, the present Study is limited to search results on the Topic of 'Six Sigma' in web of science database during 2007 to 2018. The result indicates that there were total 4027 (3 March 2018) documents on "Six Sigma" in Scopus during the period.

### V. METHODS AND MATERIALS

The growth of publications on the 'Six Sigma' was derived from the web of Science published by Elsevier. During the period 2007–2018, a total of 6528 records were found by the Title ("Six Sigma") And ( Limit-To ( Pubyear , 2018 ) or Limit-To (Pubyear,2017) or Limit-To (Pubyear, 2016) or Limit-To (Pubyear, 2015 ) or Limit-To ( Pubyear , 2014 ) or Limit-To ( Pubyear , 2013 ) or Limit-To (Pubyear , 2012) or Limit-To (Pubyear, 2011) or Limit-To ( Pubyear , 2010) or Limit-To ( Pubyear , 2010), Limit-To ( Pubyear , 2009), Limit-To (Pubyear, 2008), Limit-To (Pubyear,2007), Necessary data was tabulated into separate sheets in terms of authorship pattern, geographical distribution of contributors, ranking list of Sources and collaborative measures, etc.

### VI. REVIEW OF RELATED LITERATURE

**Susana Portillo., (2016).** This articles "USING LEAN SIX SIGMA IN BUSINESS SURVEYS: PRACTICAL EXAMPLE" in The Lean Six Sigma (LSS) programme has proved a very successful driver of change and business process improvement in the Central Statistics Office (CSO) in Ireland since its introduction in 2010. This paper gives an overview of one of the first Lean Six Sigma projects carried out in the office, which proved extremely successful and



### 9. Research Areas wise Analysis

The author has analysed the compiled data by 25 different types of subjects and presented it in the Table 1

Table 1

Sr No.	Field: Research Areas	Record Count	% of 4027
1	CHEMISTRY	778	19.320 %
2	ENGINEERING	555	13.782 %
3	PHYSICS	497	12.342 %
4	ASTRONOMY ASTROPHYSICS	455	11.299 %
5	BUSINESS ECONOMICS	314	7.797 %
6	ENVIRONMENTAL SCIENCES ECOLOGY	233	5.786 %
7	OPERATIONS RESEARCH MANAGEMENT SCIENCE	187	4.644 %
8	MINERALOGY	150	3.725 %
9	MATERIALS SCIENCE	138	3.427 %
10	CRYSTALLOGRAPHY	122	3.030 %
11	SCIENCE TECHNOLOGY OTHER TOPICS	109	2.707 %
12	BIOCHEMISTRY MOLECULAR BIOLOGY	107	2.657 %
13	GEOCHEMISTRY GEOPHYSICS	103	2.558 %
14	MATHEMATICS	102	2.533 %
15	COMPUTER SCIENCE	100	2.483 %
16	GEOLOGY	94	2.334 %
17	HEALTH CARE SCIENCES SERVICES	79	1.962 %
18	MEDICAL LABORATORY TECHNOLOGY	61	1.515 %
19	RADIOLOGY NUCLEAR MEDICINE MEDICAL IMAGING	58	1.440 %
20	MICROBIOLOGY	56	1.391 %
21	HEMATOLOGY	54	1.341 %
22	AGRICULTURE	53	1.316 %
23	PHARMACOLOGY PHARMACY	53	1.316 %
24	SPECTROSCOPY	49	1.217 %
25	METEOROLOGY ATMOSPHERIC SCIENCES	46	1.142 %
	<b>Total</b>	<b>4027</b>	

The details of the Research area wise analysis of the articles are shown in the Table 1 the tram Six Sigma constituted the highest number of articles use in Chemistry 778 (19.32%). The lowest constituted use in Meteorology Atmospheric Sciences Research Area 46(1.142%) number of articles.

### VIII. RANKING OF CONTRIBUTORS OF AUTHORS

The ranking of contributors of Authors is show in table No.2

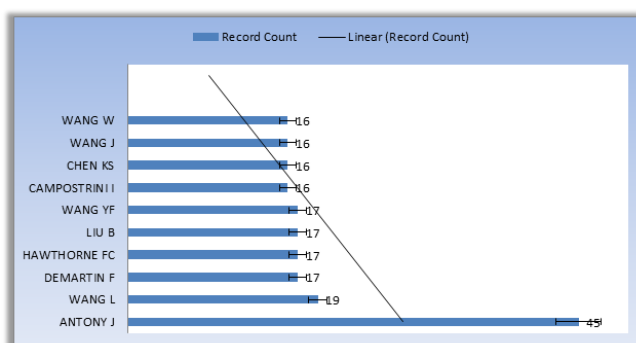


Figure 3. Top Four Authors

It was observed above authors rank table fist Top Four Antony, J. fist rank in web of Science database for 45 data Six Sigma terms. Second rank authorship Wang L he was published 19 data & third ranks on

Liu B., Hawthorne FC, Demartin F,. he was published 17 data

### IX. GEOGRAPHICAL DISTRIBUTION OF CONTRIBUTORS OF ARTICLES

Geographical distribution of contributors of articles is shown in Figure 3

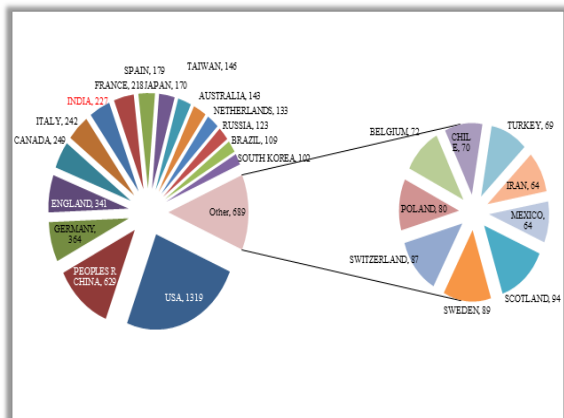


Figure 4. Geographical Distribution of contributors of articles

From the figure it is found that there are a total of 4027 contributors from the analysis it has been observed that the highest numbers of contributors are from United States with 1319 articles and the percentage is (32.75%) as well as the India number is of 227 ( 5.63%) article.

### X. TOTAL PUBLICATION OUTLET

Publication outlet means a form in which the articles, Abstract and books are published. Publication outlet by College Librarian to publish the total 4027 publications which is presented in Table 2

Table 2

Document Types	Record Count	% of 4027
ARTICLE	3684	91.482 %
MEETING ABSTRACT	150	3.725 %
REVIEW	128	3.179 %
PROCEEDINGS	98	2.434 %

PAPER		
EDITORIAL MATERIAL	43	1.068 %
LETTER	11	0.273 %
BOOK REVIEW	9	0.223 %
Total	4027	100 %

It can be observed from Table 2 Revels that out of the total publications the highest percentage i. e. 3684 (91.482%) of publications were articles; followed by 150 (3.72 %) Publications were published in Meeting Abstract from. While, 128 (3.725%) Publication was published in Review writing. 98 (2.434%) publication were published in Proceedings Paper.

### 13. Languages Outlet

Publication Language outlet means a form in which the articles Publication different Languages outlet by Authors to publish the total 4027 publications which is presented in Table 3

Table 3

Languages	Record Count	% of 4027
ENGLISH	3940	97.840 %
CHINESE	38	0.944 %
SPANISH	16	0.397 %
PORTUGUESE	9	0.223 %
GERMAN	8	0.199 %
CROATIAN	4	0.099 %
Total	4015	100

It can be observed from Table 3. that out of the 4027 publication, 3940 (97.840%) publications were in English Language. While 38 (0.944%) publications were in Chinese. Six sigma tram gives the first preference to the English Language.

### XI. SOURCE TITLES OF ARTICLES

Affiliation trends distribution of articles is shown in table4

Table 4.Source Titles

Source Titles	Record Count	% of 4027
---------------	--------------	-----------

ASTROPHYSICAL JOURNAL	120	2.980 %
MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY	98	2.434 %
CHINESE JOURNAL OF STRUCTURAL CHEMISTRY	85	2.111 %
ASTRONOMY ASTROPHYSICS	73	1.813 %
TOTAL QUALITY MANAGEMENT BUSINESS EXCELLENCE	71	1.763 %
PHYSICAL REVIEW D	54	1.341 %
CANADIAN MINERALOGIST	47	1.167 %
QUALITY AND RELIABILITY ENGINEERING INTERNATIONAL	47	1.167 %
JOURNAL OF CHEMICAL PHYSICS	46	1.142 %
INTERNATIONAL JOURNAL OF LEAN SIX SIGMA	43	1.068 %
INORGANIC CHEMISTRY	38	0.944 %
MINERALOGICAL MAGAZINE	37	0.919 %
TRANSFUSION	36	0.894 %
JOURNAL OF HIGH ENERGY PHYSICS	35	0.869 %
JOURNAL OF PHYSICAL CHEMISTRY A	32	0.795 %
PRODUCTION PLANNING CONTROL	31	0.770 %
AMERICAN MINERALOGIST	30	0.745 %
ENVIRONMENTAL SCIENCE TECHNOLOGY	29	0.720 %
QUALITY ENGINEERING	29	0.720 %
INTERNATIONAL JOURNAL OF PRODUCTION RESEARCH	28	0.695 %
CHEMOSPHERE	25	0.621 %
SCIENCE OF THE TOTAL ENVIRONMENT	24	0.596 %
DALTON TRANSACTIONS	21	0.521 %
PLOS ONE	21	0.521 %
ASTROPHYSICAL JOURNAL LETTERS	20	0.497 %
<b>Total</b>	<b>4027</b>	<b>100</b>

The details of the Source Titles wise analysis of the articles are shown in the Table No.5 the title of Astrophysical Journal constituted the highest number of articles 120. The Monthly Notices of the Royal constituted 98 numbers of Title.

## XII. CONCLUSION

- ✓ During 2007 to 2018. The result indicates that there were total 4027 documents on “Six Sigma” in web of Science during the period. The most productive year was 2016 as total productivity in this year was 426 articles.
- ✓ The highest number of articles use in **CHEMISTRY** 778 (19.320%) subject.
- ✓ Contributors are from India with 227 articles and the percentage is (5.637 %)

### An Epilogue

The data suggest that there was a significant research activity in the field of “Six Sigma” during the study period. The contribution of documents on Six Sigma indicates that healthy pattern of progress in this field.

## XIII. REFERENCES

- [1]. Deshmukh Rahul K., Taksande Pratibha G.,(2015), Dr. B.A.M.U. Salgnit Mahavidhyalayin Granthpalanche Sahitya Nirmiti (Marathi), International Multilingual Research Journal Printing area, Issue-12,Vol-01,Dec.2015
- [2]. Deshmukh Rahul K., Taksande Pratibha G.,(2015), Mahavidhyalayin Granthpalanche samajik Darja (Marathi), Granthparivar, January 2015
- [3]. Deshmukh Rahul K., Taksande Pratibha G., A Study of college Librarian Contribution in his Publication. (Marathi Language Article), The Rubrics Journal of Interdisciplinary Studies, August 2015,1,(3), 121-127
- [4]. Deshmukh Rahul K., Veer D.K, (2014), Mahavidhyalayin Granthpalanche Prakashnathil Yogdan (Marathi), Conference: Institute of English Language, Literature & Research, Jalgaon.

- [5]. Deshmukh Rahul K., Pratibha Gautam Taksande (2018) Impact of Correlation on Research Productivity, IJSRCSEIT, Volume 3, Issue 1, January-February.
- [6]. Rahul K. Deshmukh, Shivshankar Ghumre "BIBLIOMETRICS, ANALYSES ON THE SIX SIGMA METHODOLOGICAL APPROACHES TO SCOPES DATABASE DURING 2007-2018" *International Journal for Science and Advance Research In Technology*, 4(3)
- [7]. Khiste G.P., Deshmukh R.K. & Kale V.A. (2017) Mapping of Literature on Bibliometric by J-Gate Database, In *Re-Envisaging Knowledge Resource Centers: Roles and Responsibilities*, New Delhi: Ess Ess Pub, 391-402.
- [8]. Khiste Gajanan., Maske D.B., Deshmukh Rahul K., (2018) Big Data Output in J-gate during 2013 to 2017: A Bibliometrics Analysis, IJSRCSEIT, Volume 3, Issue 1, January-February.
- [9]. Khiste G.P., Maske D.B.& Deshmukh R.K. (2018) Knowledge Management Output in Scopus during 2007 to 2016, *Asian Journal of Research in Social Sciences and Humanities*,8(1),10-19.
- [10]. Kale Vilas A., Deshmukh Rahul K. & Khiste Gajanan P. (2017) A Bibliometric Survey of the Literature Published by Web of Science on 'Consortia' From 1989-2016. *New Man International Journal of Multidisciplinary Studies*, 4(10), 75-82
- [11]. Maske Dnyaneshwar B, Deshmukh Rahul K & Khiste Gajanan P.(2018) Mapping of Publication Productivity of 'Information Literacy' in J-Gate Database, *Knowledge Librarian*, Special Issue, 480-486.
- [12]. Veer D.K. & Khiste Gajanan., Deshmukh Rahul (2018) Publication Productivity of 'Information Literacy' in Scopus during 2007 to 2016, *Asian Journal of Research in Social Sciences and Humanities*,8(2),171-183
- [13]. Deshmukh Rahul k. & Kale V.A., Analysis of "Democracy" Term in JGate, *Current Global Reviewer,Latur:Declaration By the publisher*,1-6.
- [14]. Khiste G.P., Awate A.V., Deshmukh R.K., Mapping of the literature on "Information Literacy" by using Science Direct during 2008-2017, *Current Global Reviewer, Latur :Declaration By the publisher*,7-13.
- [15]. Khiste G.P, Deshmukh R.K, Awate A. A., LITERATURE AUDIT OF 'DIGITAL LIBRARY': AN OVERVIEW, *Vidyawarta, Beed*, 403-411