# A bibliometric profile of *Current Science* between 1961 and 2015

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*A bibliometric analysis of 31,403 publications in Current Science between 1961 and 2015 revealed an unstable trend; the highest citations per publication appeared during 2003–2005. The impact factor of Current Science had an overall increasing trend and placed the journal in the quartile Q2 within 'Multidisciplinary sciences' category. The h-index of Current Science was 82 and 24 authors had more than one H-Classic articles. The most productive country was India and Current Science was dominated by contributions from Indian institutions. Analysis of author keywords showed 11 main research themes for the journal. These findings will help the readers to get a quick and intuitive overview of Current Science.*

**Keywords:** Bibliometrics, citation impact, *Current Science*, research theme, scientific journals evaluation.

CURRENT SCIENCE is an international peer-reviewed multidisciplinary scientific journal established in 1932 and every fortnight published by the Current Science Association in collaboration with the Indian Academy of Sciences, Bengaluru, India. It publishes full-length research articles, shorter research communications, review articles, scientific correspondence, commentaries, etc.[1]. *Current Science* is now a leading interdisciplinary science journal with an impact factor (IF) of 0.967, according to the 2016 release of *Journal Citation Reports* (*JCR*)[2].

In this article, we employ the bibliometric method to analyse the performance of *Current Science*. Previously, several articles reported the use of bibliometric method to examine the performance and developments of other journals. For example, Dutt *et al.*[3] provided an overview of articles published in the international journal *Scientometrics*. Garg *et al.*[4] profiled the *Journal of Intellectual Property Rights*. Other studies focused on a comparative approach to analyse two or more journals[5,6]. In general, these studies present an overview of the evolution of the publication years, document types, IFs, number of citations, most cited papers, influential authors, institutions and countries, etc. In further studies, visualization tools were employed to provide a visual map of the bibliometric results[7]. Interestingly, almost all the above studies were published in the journals which they analysed.

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To the best of our knowledge, such analysis has been performed on *Current Science*, although the journal has attracted some attention recently[8–10]. Therefore, in this article, we present a bibliometric profile of *Current Science*. For this, we posed the following five questions:

1. What are the dynamics and trends of *Current Science* publications?
2. How did *Current Science* IFs develop over time?
3. What is the *h*-index of *Current Science*, and how are the *H*-Classic articles distributed?
4. What are the major institutions and countries according to number of publications, and the cooperation patterns among them?
5. Which are the main research themes?

## Methodology

The data used here are from the Web of Science (WoS) online database of Thomson Reuters. The search was conducted on 8 November 2016, using the search terms *Current Science* in the publication name between 1961 and 2015. The rational for choosing the above-mentioned time period was because WoS includes *Current Science* data starting from 1961, and we wanted to display a panorama of the journal. A total of 34,042 publications were retrieved with 17 different publication types. Compared with the source breakdown by the journal's webpage, WoS omits some types of publications. The publications breakdown by WoS was as follows: articles (33.2%), letters (25.1%), notes (24.9%), editorial materials (6.9%), reviews (2.2%) and others (7.7%). Among all the document types, articles, letters, notes, editorial materials and reviews constituted the most important channel of communication. Hence we analysed these five document types[11].

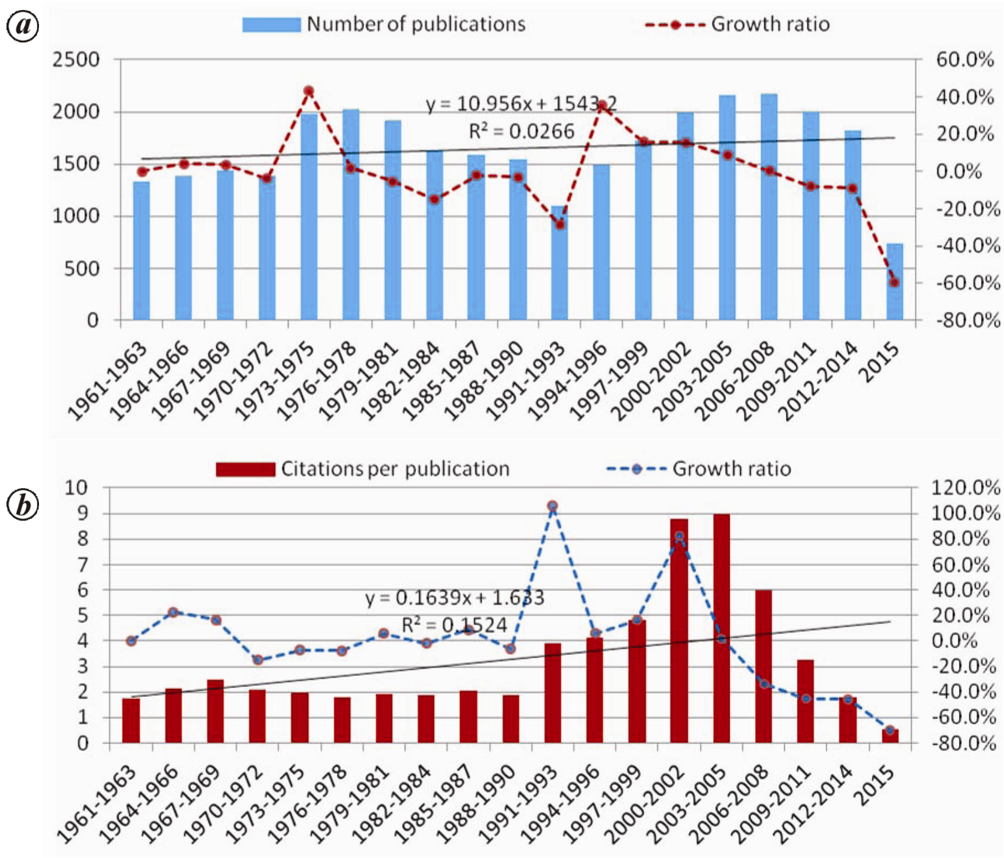


**Figure 1.** ***a***, Trend of number of publications. ***b***, Citations per publication.

Bibliometric analysis and mapping methods were employed to explore the bibliometric characteristics of *Current Science*. Bibliometric analysis can be defined as the statistical method of determining the quantitative features of bibliographic information, literature, articles and journals. Bibliometric mapping is usually used to display a structural overview of an academic field or a journal. Some widespread mapping techniques have been designed and developed as computer programs, e.g. VOSviewer and Citespace[12,13]. In this article, VOSviewer was used for creating, visualizing and exploring bibliometric maps. In addition, other tools such as Excel were also used for basic statistical analysis and visualization of the bibliometric results.

## Results and discussion

### *Dynamics and trends of publications*

Figure 1 *a* shows the dynamics of the publications in *Current Science* in three-year blocks. There is an unstable trend from 1961 to 2015, in the range 1099 (during 1991–1993) to 2169 (during 2006–2008); the pattern in the number of publications from 1961 to 2015 is also quite erratic. Figure 1 *a* also shows the growth ratio of the publications; we must highlight the two peaks during 1973–1975 and 1994–1996. After 1996, a steady decline can be observed. A correlation approximated by a slow growth line following the equation $y = 10.956x + 1543.2$ with $R^2 = 0.0266$, was found through the number of publications from 1961 to 2015 (Figure 1 *a*).

Figure 1 *b* shows the trends of citations per publication in three-year blocks. The citations per publication from 1961 to 1990 are steady, fluctuating around 2 which is a small number. From 1991, the number of citations per publication increased exponentially, before reaching a peak of 8.98 citations during 2003–2005. After 2005, there has been a steady decline in the number of citations per publication. Figure 1 *b* also shows the growth ratio of citations per publication. There are two peaks – 1991–1993 and 2000–2002. After 2002, there is a steady decline.

### *Impact factor analysis*

The IF released by *JCR* is one of the most important and objective indicators to critically determine the influence of a journal. Figure 2 shows the IF for *Current Science* between 1997 and 2015. As we can observe, it has an overall increasing trend which can be approximated following the equation $y = 0.0289x + 0.4358$, with $R^2 = 0.912$, from

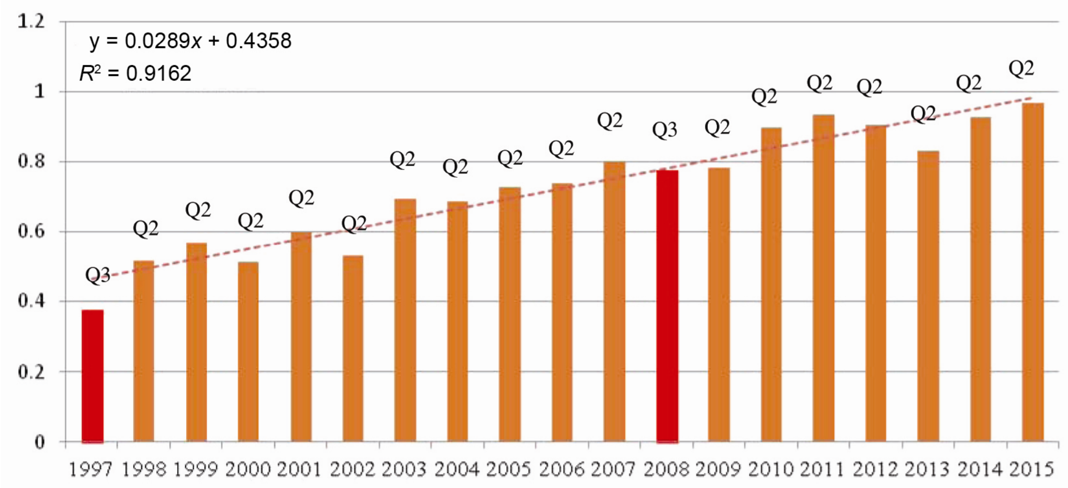


**Figure 2.** Dynamics of impact factor.

0.376 in 1997 to 0.967 in 2015. According to *JCR*, *Current Science* is usually classified as a Q2 journal in 'Multidisciplinary sciences' category, except a retrogression in 1961 and 2008 in quartile Q3.

## *h-index*

In August 2005, a new research performance indicator called *h*-index was proposed by Hirsch[14], to measure scientific performance of researchers. The original definition of the *h*-index was: 'A scientist has index *h* if *h* of his or her $N_p$ papers have at least *h* citations each and the other $(N_p - h)$ papers have $\leq h$ citations each.'[14]

The index has attracted the attention of many scholars. According to Costas and Bordons[15], *h*-index is an objective indicator and therefore may play an important role when making decisions about promotions, fund allocation and awarding prizes. Vanclay[16] noted its robustness and pointed out that it is insensitive to sets of lowly cited papers. Although generally the *h*-index is used to measure the scientific performance of a single researcher through his/her publications, it has also been applied to measure performance of a broader range of subjects, such as journals, organizations or countries[17].

Thus, the *h*-index is employed here to measure the performance of *Current Science*. During the period 1961–2015, *Current Science* had an *h*-index of 82. On comparison with other journals in the 'Multidisciplinary sciences' category, such as *Nature* (*h*-index = 1186), *Science* (*h*-index = 1,159), *Nature Communications* (*h*-index = 146), *Chinese Science Bulletin* (*h*-index = 67), *Journal of the Indian Institute of Science* (*h*-index = 16), *Current Science* can be regarded as a upper middle impact journal.

*H*-Classic articles, which are composed of *h* highly cited papers with more than *h* citations, were introduced by Martínez *et al.*[18]. *Current Science* displays a good number of *H*-Classic articles in the earlier years (57 between 1999 and 2005) in accordance with the general rule of citation behaviour. With reference to author distribution of the *H*-Classic articles, 24 authors have more than one *H*-Classic article. Among them, five authors have published three *H*-Classic articles each – Shukla (2000, 2004 and 2011), Moulik (1996, 2001 and 2002), Banerjee (1999, 2002 and 2004), Bandyopadhyay (1999, 2002 and 2004) and Das (2003, 1999 and 2003). With respect to geographic distribution of *H*-Classic articles, we must highlight the important countries like India and USA, which have published 73 and 8 *H*-Classic articles respectively. Table 1 shows the 10 ten *H*-Classic articles in *Current Science* along with the number of citations.

## *Most productive countries (territories) and institutions*

*Current Science* includes publications from 102 countries (territories) and 5323 institutions as of 2015. Table 2 shows the most productive countries and institutions. The most productive countries are India, followed by USA, England and Germany. It is interesting to note that *Current Science* is dominated by Indian authors (74.6%). When integrated with the top 10 countries, the total publications is more than 80.3%. It is also interesting to note that other Asian countries (Japan, China, Sri Lanka, Taiwan, Malaysia, South Korea) are noteworthy contributors to the journal.

Table 2 also shows the top 10 most prolific institutions from a total of 5323 by the number of publications. Among them, Indian Institute of Science (IISc; *n* = 1211, 3.9%) is the most productive institution with 1211 publications, followed by Indian Agricultural Research Institute (IARI; *n* = 629, 1.8%) and Banaras Hindu University (*n* = 552, 1.8%), We must highlight that the 10 most prolific institutions are all located in India, i.e. *Current Science* is dominated by Indian institutions.

**Table 1.** *H*-Classic articles published by *Current Science* (top 10)

| Rank | Authors | Year, volume (issue), page | Document type | Citations |
|---|---|---|---|---|
| 1 | Pandey, A., Selvakumar, P., Soccol, C. R. and Nigam, P. | 1999, **77**(1), 149–162 | Review | 408 |
| 2 | Kishor, P. B. K. *et al.* | 2005, **88**(3), 424–438 | Review | 371 |
| 3 | Singh, K. R. P. | 1967, **36**(19), 506 | Article | 367 |
| 4 | Sairam, R. K. and Tyagi, A | 2004, **86**(3), 407–421 | Review | 360 |
| 5 | Rajeevan, M., Bhate, J., Kale, J. A. and Lal, B. | 2006, **91**(3), 296–306 | Article | 344 |
| 6 | Sastry, M. *et al.* | 2003, **85**(2), 162–170 | Article | 331 |
| 7 | Matysik, J., Alia, Bhalu, B. and Mohanty, P. | 2002, **82**(5), 525–532 | Review | 315 |
| 8 | Mandal, B. K. *et al.* | 1996, **70**(11), 976–986 | Article | 289 |
| 9 | Arora, A., Sairam, R K. and Srivastava, G. C. | 2002, **82**(10), 1227–1238 | Review | 272 |
| 10 | Nandy, A. | 1994, **66**(4), 309–914 | Note | 262 |

**Table 2.** Most productive countries and institutions which have published in *Current Science*

| Country | Number of publications | Percentage | Institutions | Number of publications | Percentage | Citations | Citations per publication |
|---|---|---|---|---|---|---|---|
| India | 23,435 | 74.6 | Indian Institute of Science | 1,211 | 3.9 | 6,990 | 5.77 |
| USA | 808 | 2.6 | Indian Agricultural Research Institute | 564 | 1.8 | 3,353 | 5.95 |
| England | 235 | 0.7 | Banaras Hindu University | 552 | 1.8 | 2,300 | 4.17 |
| Germany | 170 | 0.5 | University of Delhi | 480 | 1.5 | 2,744 | 5.72 |
| Japan | 136 | 0.4 | Andhra University | 386 | 1.2 | 882 | 2.28 |
| China | 124 | 0.4 | Bhabha Atomic Research Centre | 352 | 1.1 | 1,726 | 4.9 |
| Australia | 108 | 0.3 | University of Madras | 331 | 1.1 | 1,190 | 3.6 |
| France | 80 | 0.3 | Osmania University | 323 | 1.0 | 1,375 | 4.26 |
| Canada | 64 | 0.2 | National Institute of Oceanography India | 314 | 1.0 | 2,709 | 8.63 |
| Sri Lanka | 58 | 0.2 | National Geophysical Research Institute | 310 | 1.0 | 6,990 | 5.77 |
| Others | 929 | 3.0 | Others | 25,351 | 80.7 | 89,941 | 3.55 |
| Total | 26,147 | 83.3 | Total | 30,538 | 97.3 | 113,210 | 3.7 |

Note: 6392 publications (20.355%) do not contain data in the field of ‘country’ and 7060 records (22.482%) do not contain data in the field of ‘institution’.

### *Co-authorship collaboration between countries and institutions*

Figure 3 *a* and *b* present the co-authorship collaboration among countries and institutions respectively. In Figure 3 *a*, each node represents a country and the thickness of the line represents the frequency of co-authorship collaboration among the countries. The collaboration groups have been integrated in Figure 3 *a* through colour-coding, using the cluster method for grouping documents together based on their similarities. It is easy to observe, that India is by far the most active of the co-authorship collaboration countries (seen from the size of the circle). This phenomenon is probably due to the large number of publications from India. The lines with different thicknesses between India and other countries show that India collaborates most intensively with USA, England, Germany, Japan, Australia and France. Interestingly, although China is shown to be a highly productive country in *Current Science*, the collaboration ratio between India and China is much lower than other highly productive countries.

In addition, USA is also quite active in co-authorship collaboration and shows the high collaboration ratio with India, England, Iceland and France. England, the third most productive country, collaborates most intensively with Commonwealth of Nations like India, Austria. Figure 3 *a* also shows the collaboration groups. As can be seen, countries are placed together due to having similar collaboration patterns. India, Israel, Canada, South Africa, etc. are placed in the same cluster, i.e. these countries have a similar collaboration patterns. USA, Japan, Australia, France, Iran, etc. are placed in a common cluster. England, Norway and Scotland are in a common cluster, while Germany, China and The Netherlands are placed in another cluster.

The co-authorship collaborations among the core institutions (publishing more than 20 papers) were also analysed by VOSviewer. Similar to the case of co-authorship collaboration among countries, Figure 3 *b* includes the institutions, the lines representing collaboration and the major cooperation groups. The figure shows the 178 most active co-authorship collaboration institutions (also seen from the size of the circle). Interestingly, IISc collaborates intensively with Jawaharlal Nehru Centre for Advanced Scientific Research and the Ashoka Trust for Research in Ecology and the Environment collaborates intensively with Indian Agricultural Research Institute (IARI). Birbal Sahni Institute of Palaeosciences collaborates intensively with University of Lucknow. Interesting

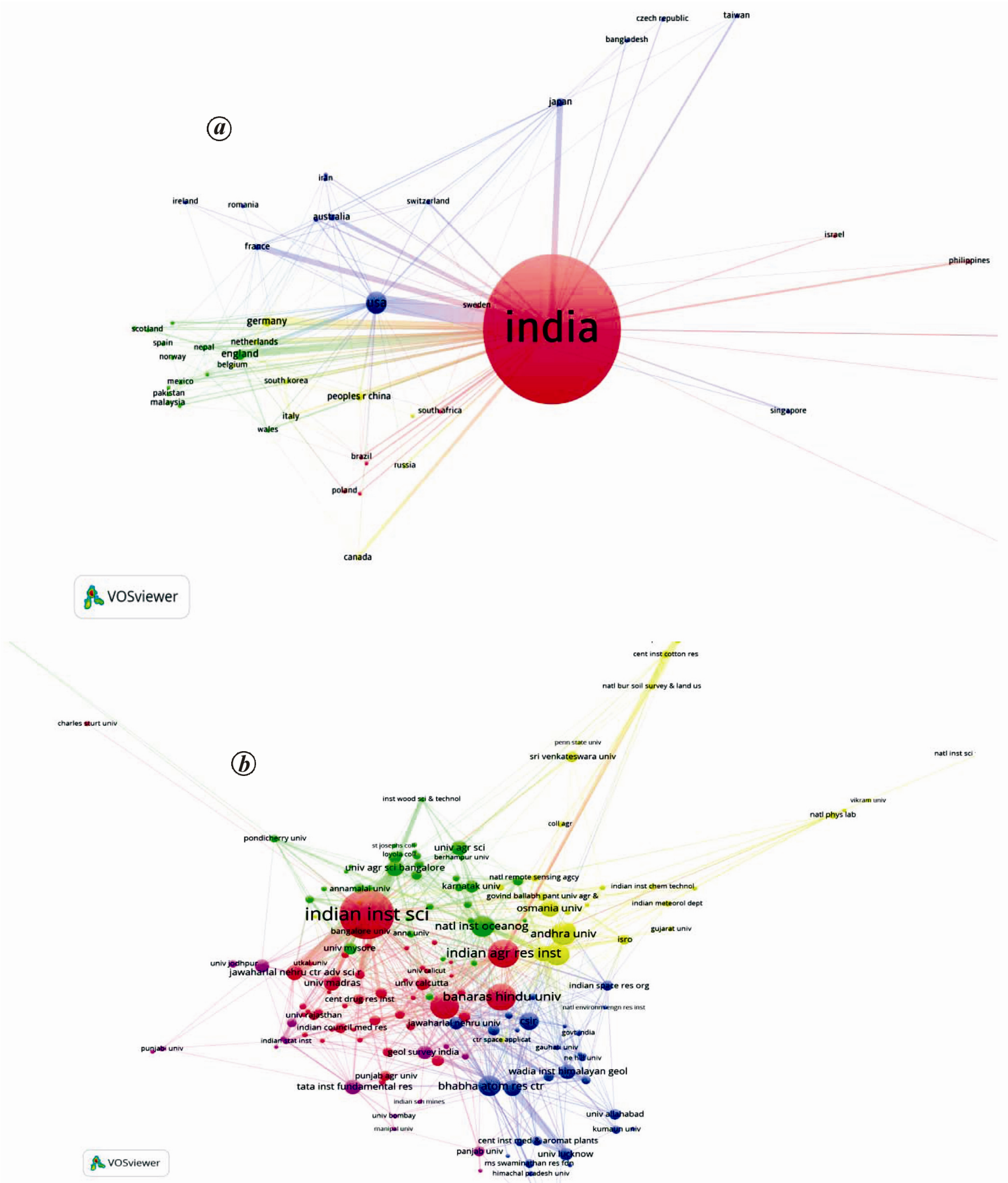


**Figure 3.** Co-authorship collaboration among countries (***a***) and institutions (***b***). Each node represents a country (***a***) or institution (***b***) and thickness of the line represents the frequency of co-authorship collaboration among the countries (***a***) or institutions (***b***). In (***a***) the minimum number of co-authorship countries of 5 is a set of 102 countries, and 55 countries meet the threshold. The largest set of connected countries is created as shown in (***a***). In (***b***), the minimum number of co-authorship institutions of 20 is a set of 5426 institutions, and 178 institutions meet the threshold. The largest set of connected countries is created as shown in (***b***).

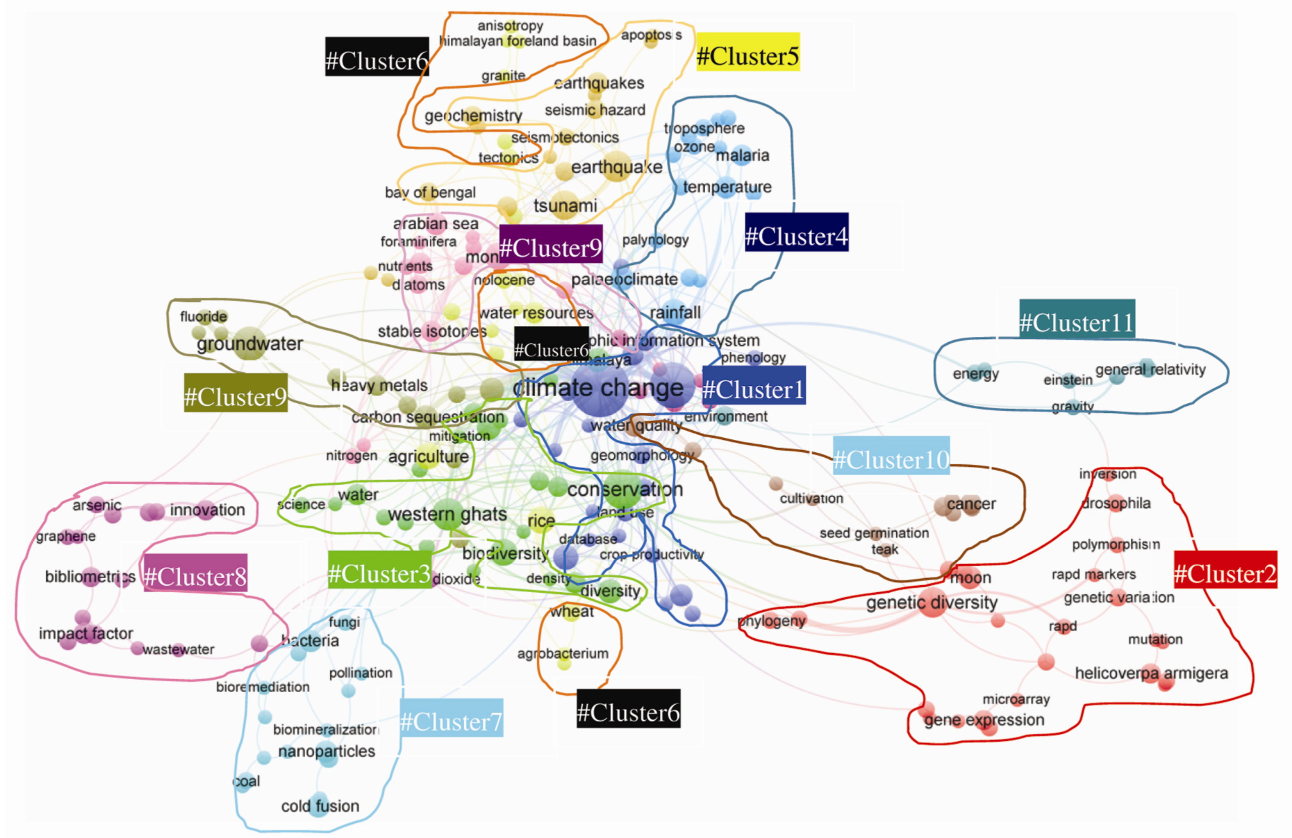


**Figure 4.** Mapping of research themes in *Current Science* based on the cluster method using VOSviewer. Each cluster is labelled with a circle in a different colour. A minimum number of occurrences of 5 is a set of 11,551 author keywords, and 219 author keywords meet the threshold. Among these 219 author keywords, ten ('high education', '*Escherichia coli*', 'sugarcane', 'behavior', 'gold', 'mapping', 'endophytic fungi', 'somatic embryo gene', 'benthic foraminifer', 'sex ratio') are not connected to each other. The largest set of connected terms (209) has been created as shown in the figure.

also is the fact that some institutes like Physical Research Laboratory and University of Delhi have extensive cooperation with other institutes, but none of them is outstanding. The clustering analysis shows five major cooperation groups, indicating that these are very similar to each other in the co-authorship collaboration network. The major cooperation groups are represented by IISc and IARI (red), National Institute of Oceanography India and University of Agricultural Sciences (green), Andhra University and Osmania University (yellow), Tata Institute of Fundamental Research and Tata Institute of Fundamental Research (purple), and Bhabha Atomic Research Centre and Wadia Institute of Himalayan Geology (blue).

## *Research theme analysis*

Scholars usually consider author keywords co-occurrence cluster analysis as one of the main means for identifying research themes and understanding the direction within a given field. The scientific landscape of research themes in *Current Science* is presented in Figure 4, based on author keywords co-occurrence network. On the basis of the mapping and clustering approach provided by VOSviewer, 11 clusters emerged in the scientific landscape. Each cluster marks the closely related and frequently used author keywords, separated by colour and representing the following themes.

#Cluster 1: Climate Change and Geographic Information System containing author keywords such as 'climate change', 'remote sense' 'phenology', 'geographic information system', 'land use', 'glacier', etc.

#Cluster 2: Gene Research is characterized by 'genetic variation', 'gene expression', 'genetic diversity', 'microarray', 'molecular markers', etc. which are all connected to gene research theme.

#Cluster 3: Ecological Study of Western Ghats is represented by author keywords such as 'Western Ghats', 'biodiversity', 'biogeography', 'biomass', 'carbon sequestration', 'deforestation', 'density', etc.

#Cluster 4: Meteorological analysis is represented by author keywords such as 'relative humidity', 'rainfall', 'principal component analysis', 'precipitation', etc. which are all connected to the gene research theme.

#Cluster 5: Earthquake and Seismic Hazard is characterized by author keywords 'seismotectonics', 'seismicity', 'seismic hazard', 'peak ground acceleration', 'magnetic susceptibility', etc.

#Cluster 6: Earthquake And Agriculture is represented by author keywords such as 'tectonics', 'Himalayan foreland basin', 'granite', 'holocene', 'water resources', 'agriculture', etc.

#Cluster 7: Biology and Biomass is represented by the following most frequently used terms: 'bacteria', 'biomineralization', 'bioremediation', 'coal', 'cold fusion', 'fungi', 'hydrogen', 'excess energy', etc..

#Cluster 8: Analysis of Science and Technology based on Bibliometric Method is represented by author keywords 'arsenic', 'bibliometric analysis', 'bibliometrics', 'biotechnology', 'citation analysis', 'web of science', etc.

#Cluster 9: Ocean Issue And Marine Ecosystem contains author keywords such as 'Arabian sea', 'carbon', 'clay minerals', 'coral reefs', 'cyanobacteria', etc.

#Cluster 10: Medicinal Plants is represented by author keywords such as 'medicinal plants', 'Ayurveda', 'cancer', 'cultivation', 'diabetes', 'drug discovery', etc.

#Cluster 11: Fundamental Research of Physics is represented by author keywords 'quantum gravity', 'general relativity', 'string theory', 'Einstein', 'gravity', etc.

## Conclusion

The aim of this study was to establish the bibliometric profile of *Current Science* using bibliometric analysis and mapping methods. The results revealed that during 1961–2015, publications (34,042) in *Current Science* could be divided into 17 different document types based on WoS database. Interestingly, these document types were totally different compared with the findings of Iefremova *et al.*[9], whose analysis was based on classification proposed by the journal's webpage (19 document types). The trend of publications was unstable. Compared with the steady decline in the number of articles and notes[10], there was also been a steady decline in the number of five publication types (articles, letters, notes, editorial materials and reviews) after 2008. The IF of *Current Science* showed an overall increasing trend by year and the journal was placed in the quartile Q2 within 'Multidisciplinary sciences' category. The *h*-index of *Current Science* was 82, and 24 authors have more than one *H*-Classic articles. Publications in *Current Science* were dominated by India and Indian institutions, which is consistent with the analysis performed by Iefremova *et al.*[9] using 2380 articles published in the journal. The cooperation among authors from different countries and institutions regarding co-authorships should be strengthened. Author keywords co-occurrence analysis revealed 11 research themes, indicating that *Current Science* is a multidisciplinary science journal.

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ACKNOWLEDGEMENT. This work was supported in part by a grant from National Natural Science Foundation of China (Number: 71171033).

Received 14 December 2016; revised accepted 22 March 2017

doi: 10.18520/cs/v113/i03/386-392