INIS - OPEN INFORMATION SYSTEM FOR SCIENTIFIC AND ACADEMIC COMMUNITIES*

By

Anil Kumar♣
Scientific Information Resource Division,
Bhabha Atomic Research Centre, Mumbai
anil72@barc.gov.in

Sangeeta Singh♣
Department of Library and Information Science,
Dr. C.V. Raman University, Kota, Bilaspur

ABSTRACT

Information management is major task of any information Centre. International Nuclear Information System (INIS) is a world renowned repository of literature on peaceful uses of nuclear energy and allied subjects. The database covers journal articles, books, patents, computer files etc. and 14.3% are Non-Conventional Literature (NCL) of the total input for 2016. NCL is literature which is not easily available through commercial channels such as scientific and technical reports, patents, conference proceedings, doctoral theses etc. This study is aimed to present the trend of publications; observing output of countries; analysing the content through the classification and keywords; and finding out publication forms of the literature during the study period. The classes in the database covers subjects of direct social benefit including nuclear power generation, radiation therapy, radiation protection of public & environment, nuclear agriculture, food preservation, and Knowledge Management and Preservation. The "Knowledge Management and Preservation" subject category of records are mainly dealt with Information dissemination, Information retrieval, Information systems, knowledge preserving and archiving, etc. are highly considerable to library and information professionals in the world. The present study results may be highly useful and handy document for librarians, students, information managers, academicians, and science policy makers.

Keywords: Information Systems; Information Dissemination; Information Retrieval; Documentation, INIS; International Cooperation; Knowledge Management; Libraries; Social; Open database; Open Information system, nuclear science and technology

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♣Correspondence Author: Sangeeta Singh

INTRODUCTION

INIS is operated by International Atomic Energy Agency (IAEA), Vienna with collaboration of 130 Member States and 24 International Organizations. It manages Information, to construct an online publication database related to peaceful applications in the field of nuclear science and technology for the benefit of mankind. It can be accessed through web free of cost. INIS serves worldwide to all researchers, librarians, academicians, scientists, doctors, engineers and students. INIS database covers various aspects of the subject for benefit of the society. It gives the benefits of world co-operation with partners in the information production, to fulfill the need of library society for exchange of universal information timely, advance information systems, encourage the advancement in information handling, information processing, and standardization. The general public can access the INIS collection freely online, providing easy access to trustworthy scientific knowledge available all over the world.

India is the 22nd Member State of IAEA and has participated in INIS programme from its inception in 1970. Scientific Information Resource Division of Bhabha Atomic Research Centre (BARC) is the nodal point and National INIS Centre in India for all activities related to INIS. Anyone can write to INIS liaison office (inis@barc.gov.in) for getting full-text of records covered in INIS, and INIS demo-cum-training programme for universities and institutions. Subjective databases are the representative of samples to study the scholarly publication in any subject. Scientometric studies are mainly depending on such samples of scholarly publishing [1,2,14,17]. Bibliometric is an analysis tool of any discipline of science knowledge and technology development [7]. INIS database have been the focus of study for many scientometricians. Many scientometric studies have been accompanied based on the publications of INIS by Hillebrand [3-6], [8-13]. Literature on the saving living organisms and humans including environmental studies are covered by INIS database with help of member states of INIS. The statistical facts reported and depict in general terms using bibliometric techniques [15-16].

OBJECTIVES OF THE STUDY

The present study is focused on analyzing bibliographic records published during 2013-2017 and included in INIS database using bibiometric and scientometric methods. A total 6,07,772 records were collected from https://www.iaea.org/inis/ and evaluated as per the purposes of the study. The present study has the following objectives:

To

- observe the worldwide contribution**,**
- five year input & full-text publications trend,
- list classification system and number of records,
- find out highly preferred keyword, and
- review direct few social benefits disciplines in INIS database

RESULT AND DISCUSSION

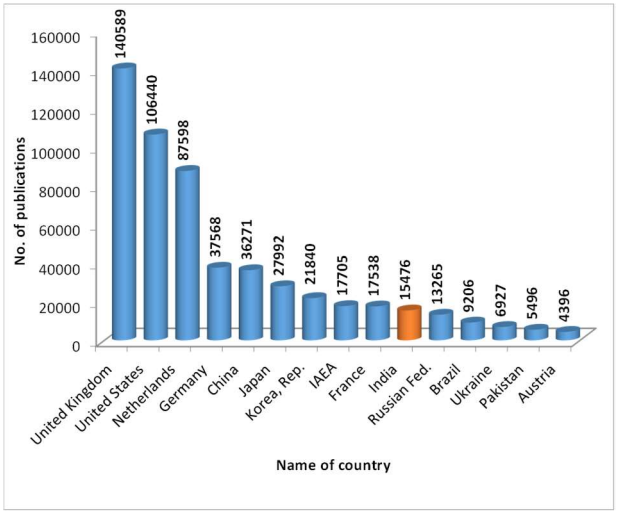

Fig. 1: Country-wise publications to INIS database during 2013-2017

Worldwide contribution to INIS

INIS database is functioned with cooperation of member states and international orgnisations they are consistently contributing bibliographic as well as full text publications to database. A total of 6,07,772 records are input records during the period 2013-2017. Figure-1 presents top contributing countries. United Kingdom with 1,40,589 records (23.1%), United States with 1,06,440 records (17.5%), Netherlands with 87,598 records (14.4%), Germany with 37,568 records (6.2%), China with 36,271 records (6%), Japan with 27,992 records (4.6%), Republic of Korea with 21,840 records (3.6%), International Atomic Energy Agency (IAEA) 17,705 records (2.9%), France with 17,38 records (2.9%), India with 15,476 records (2.5%), and Russian Federation 13,265 records (2.2%) are on the top of the ranks. India's rank is 10th among the countries with 15,476 (2.5%) publications during study periods.

YEARWISE INPUT

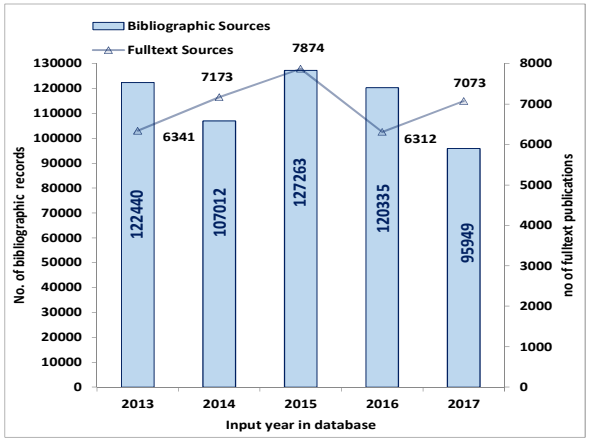

Fig. 2: Year-wise input & full-text publications trend to INIS database

INIS Member States have contributed a total of 6,07,772 records during 2013-2017 with an yearly average of 1,21,554 records. Figure 2 indicates the record incorporate trend and year-wise full-text publications availability in the INIS database.

CLASSIFICATION SYSTEM IN INIS

'ETDE/INIS Joint Reference Series No. 2: Subject Categories and Scope Descriptions' list is one of the publications of IAEA, Vienna. It is a subject classification Scheme of INIS literature. It defines the subject categories and provides the scope descriptions to be used for categorization of the science literature for the preparation of INIS input by national centers. This simplified categorization scheme contains more than 49 basic subject categories are within INIS/ETDE subject scope. Among them, 47 discipline are ranked to which most of the research has been carried out and published in the world during 2013-2017. The categories assigned by information specialists are given in Table I along with number of publications.

Table 1: Subject classification system in INIS database and number of records

Sr. no.	Subject category/discipline	No. of Publications
1	Materials Science	75,369
2	Condensed Matter Physics, Superconductivity and Superfluidity	58,815
3	Classical and Quantum Mechanics, General Physics	52,047
4	Radiology and Nuclear Medicine	46,339
5	Inorganic, Organic, Physical and Analytical Chemistry	36,895
6	Instrumentation Related to Nuclear Science and Technology	34,790
7	Applied Life Sciences	28,635
8	Physics of Elementary Particles and Fields	26,608
9	Specific Nuclear Reactors and Associated Plants	26,428
10	Astrophysics, Cosmology and Astronomy	21,905
11	Plasma Physics and Fusion Technology	21,169
12	Environmental Sciences	19,993
13	Engineering	19,434
14	Nuclear Physics and Radiation Physics	18,725
15	Nanoscience and Nanotechnology	14,514
16	Radiation Protection and Dosimetry	13,623
17	Energy Planning, Policy and Economy	12,493
18	Particle Accelerators	10,659
19	General Studies of Nuclear Reactors	9,323
20	Atomic and Molecular Physics	9,119
21	Management of Radioactive Wastes, and Non-Radioactive Wastes From Nuclear Facilities	8,593
22	Radiation, Thermal, Environment. Pollutant Effects On Living Organisms and Biolog. Materials	5,675
23	Nuclear Fuel Cycle and Fuel Materials	5,508
24	Isotopes and Radiation Sources	5,141
25	Mathematical Methods and Computing	5,104
26	Geosciences	4,615
27	Radiation Chemistry, Radiochemistry and Nuclear Chemistry	3,986
28	Nuclear Disarmament, Safeguards and Physical Protection	3,155
29	Biomass Fuels	1,671
30	Solar Energy	1,403

31	Knowledge Management and Preservation	1,005
32	Power Transmission and Distribution	587
33	Wind Energy	437
34	Petroleum	272
35	Coal, Lignite, and Peat	268
36	Natural Gas	233
37	Hydrogen	217
38	Direct Energy Conversion	191
39	Hydro Energy	131
40	Energy Storage	126
41	Fossil-Fueled Power Plants	101
42	Geothermal Energy	54
43	Other Instrumentation	23
44	Tidal and Wave Power	12
45	Oil Shales and Tar Sands	7
46	Energy Conservation, Consumption, and Utilization	6
47	General and Miscellaneous	2368
	Total	**6,07,772**

HIGHLY OCCURRED KEYWORDS

"Keywords" are one of the most bibliometric indicators to understand immediately the thought content of the research paper and to find out the growth of the subject which provided by indexers, and researchers at the time of writing manuscript. Keywords also help to find significant published information and support to users in extracting specific information on a relevant subject. The list of high frequency keywords with at least 48,529 times occurred is given in table II. The high frequency keywords will support us to understand full text aspect of archived articles in the repository. In the current study the keywords appeared in the 'Keywords' field of INIS database was analyzed for the purpose. A list of most frequently occurred 33 keywords/descriptors were given in Table 2. The highly occurred keywords were: Elements (1,43,815), Materials (1,09,444), Oxygen Compounds (1,06,540), Physical Properties (88,669), Metals (88,609), Organic Compounds (84,991), Radiations (83,255), Elementary Particles (73,431), Electromagnetic Radiation (71,117), Chalcogenides (69,564), Simulation (67,872), Scattering (63,343), Nonmetals (61,059), Oxides (60,986), Fermions (59,271), and Isotopes (58,427).

Table II.: List of high frequency keywords

Keywords/ descriptors	**Frequency**
Elements	1,43,815

Materials	1,09,444
Oxygen Compounds	1,06,540
Physical Properties	88,669
Metals	88,609
Organic Compounds	84,991
Radiations	83,255
Elementary Particles	73,431
Electromagnetic Radiation	71,117
Chalcogenides	69,564
Simulation	67,872
Scattering	63,343
Nonmetals	61,059
Oxides	60,986
Fermions	59,271
Isotopes	58,427
Calculation Methods	57,496
Body	54,368
Nuclei	53,215
Equipment	52,786
Evaluation	52,149
Spectroscopy	50,556
Microscopy	49,039
Transition Element Compounds	48,588
Coherent Scattering	48,529
Diffraction	47,896
Diseases	47,609
Organs	47,361
Measuring Instruments	46,547
Medicine	45,777
Comparative Evaluations	45,047
Nanostructures	45,023
Spectra	44,520

SOCIAL BENEFITS DISCIPLINE IN INIS

INIS is not only having nuclear science and technology literature. It also covers other literature if atomic energy/techniques applied in Physics, Chemistry, Biology & life sciences, medical science, environmental studies, Sewage/treatment processes, radiation/sterilization process in industry, agriculture, food irradiation/food preservation, power generation, living organism protection, and even library and information science (LIS) field. Information science literature are classified in "Knowledge Management and Preservation" subject category with 1005 publications including 612 full-text publications in INIS database during the study period (See table 1). Highly significance sixty six keywords under "Knowledge Management and Preservation" subject category are shown in table III (Anil Kumar 2018).

TABLE III: Highly ranked keywords related Information management under "Knowledge Management and Preservation" subject category of INIS database

Sr.No.	Keyword/Descriptor
1	Knowledge management
2	Training
3	Educational facilities
4	Information systems
5	Developing countries
6	Information
7	Knowledge preservation
8	National organizations
9	Cooperation
10	Information dissemination
11	Information retrieval
12	Manpower
13	Learning
14	Technology transfer
15	Document types
16	Personnel management
17	Internet
18	Information systems
19	Attitudes
20	Planning
21	Operation

22	Resource development
23	Government policies
24	Knowledge base
25	Safety culture
26	Information dissemination
27	Meetings
28	Analog systems
29	INIS
30	Accidents
31	Energypolicy
32	Regional cooperation
33	Standards
34	Scientific personnel
35	Simulation
36	Vertebrates
37	Documentation
38	Decommissioning
39	Communications
40	Computer codes
41	Control systems
42	Information retrieval
43	Security
44	Computerized simulation
45	Energy sources
46	Implementation
47	Recommendations
48	Design
49	Employment
50	Maintenance
51	Mathematics
52	Human factors
53	Database management
54	Decision making
55	Public opinion
56	Evaluation

57	Laws
58	Safety standards
59	Computers
60	Control
61	Data
62	Processing
63	Sustainable development
64	Computerized control systems
65	Information centers
	Truncated……

CONCLUSION

All the member states of INIS are actively participating in this co-operative endeavor and are sharing the innovative knowledge to scientists, engineers, radiologists, doctors, librarians, professors and students. Database repository have archived more than 40 lakhs bibliographic records including more than 5.28 lakhs full text documents, which are accessible to everyone around the world free of cost. Maximum records are covered under the subject categories of materials science, Condensed Matter Physics, Superconductivity and Super fluidity, Classical and Quantum Mechanics, General Physics, Radiology and Nuclear Medicine, Inorganic, Organic, Physical and Analytical Chemistry, Instrumentation related to Nuclear Science and Technology, and Applied Life Sciences in INIS during the study period.

INIS also has a huge remarkable collection of general aspect in Physics, Chemistry, Biology, medical science, environmental studies, agriculture, food irradiation/food preservation, power generation, including 'Knowledge Management and Preservation' which are significant for the LIS professionals. These bibliographic as well as full-text documents are quite useful to support professors, students and indexers to know which types of publications appeared related to library and information science discipline in INIS database. The 'Knowledge Management and Preservation' related documents may highly useful in understanding the knowledge management processes and techniques used world-wide and that may in turn help LIS professionals to implement it in their own institutions.

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