Trend of R&D Publications in Pressurised Heavy Water Reactors: A study using INIS and other databases

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Digital databases INIS, INSPEC, ISMEC, Chemical Abstracts, Science Citation Index, Web of science, Chemistry Citation Index, BIOSIS, Medline and Analytical Abstracts were used for comprehensive retrieval of bibliographic details of publications on Pressurised Heavy Water Reactors (PHWR) research. Keyword search mechanism adopted for searches in title or descriptors resulted in 5863 records. Taking INIS as base the duplicate records within INIS and between INIS and other databases were identified and removed. Remaining 4851 records were considered for further study. A manual examination of Abstracts of randomly selected 500 records among 4851 showed that about 3 % records were not directly related to PHWR research but only remotely related. It is assumed that this would not adversely affect the result of this study. A detailed analysis of 4851 records was carried out to examine country wise publications, contributing authors, interdomainary interactions, preferred media for publication etc.

Out of the 4851 records, 196 distinct records of publications could not be found in INIS but in other scientific databases, mainly in INSPEC (117 records) and Chemical Abstract (63 records).

Fig.1 depicts year-wise growth of R&D publications related to PHWR since year 1966. The curve gives some indications of Ideal logistic growth model[1] which states that logistic growth in any field of knowledge ideally takes an extended S-shape. Also continued escalation in growth after expected maturation implies emergence of new directions in research, new discoveries and the new opportunities.

Among the 46 countries contributing to PHWR research, India with 1737 publications is the forerunner followed by Canada (1492), Romania (508) and Argentina (334). The total literature output on PHWR research from top 6 countries amounted to about 90%. A graphical representation of the history of ten top contributing countries is given in Fig. 2.

With respect to the international collaboration Canada is at the top with 75 publications followed by USA (28), Romania (26) and Germany (25). Very low collaboration coefficient indicated some degree of self-reliance in this area of research as witnessed in case of India among the prominent contributors.

The PHWR records from all the databases show that 5837 distinct authors have contributed to this field of research. Among the researchers contributing prominently in this field, the first 15 are from India. Top three contributors are H.S. Kushwaha (106), Anil Kakodkar (100) and V. Venkat Raj (76). Also out of the 111 authors contributing more than 10 papers, 83 are Indians with 17 of them occupying the first 14 rank positions.

Content analysis of all the records utilising INIS subject category classification[2] schemes showed that the prominent interdomainary interactions in PHWR subfields are :

Specific nuclear reactors and associated plants with General Studies of nuclear reactors (481) followed by Environmental Sciences (185) and Material Sciences (154).

INIS guide to bibliographic description [3] was used to group the records according to their publication media. Out of 4851 records about 25% papers are published as journal articles and remaining are found in Non-conventional literature (NCL) which includes conference/ symposia papers, technical reports, theses etc.

Also it is found that 292 distinct journal were used to publish 1128 publications out of the 4851 publications. Of late the journals preferred by researchers are 80 in numbers. By the year 2002, the journal Radiation Protection and Environment (continued from Bulletin of Radiation Protection since 1997) contained maximum number (115 papers) of publications on PHWR followed by Nuclear Engineering International UK (84 papers) and Transactions of the American Nuclear Society USA (68 papers).

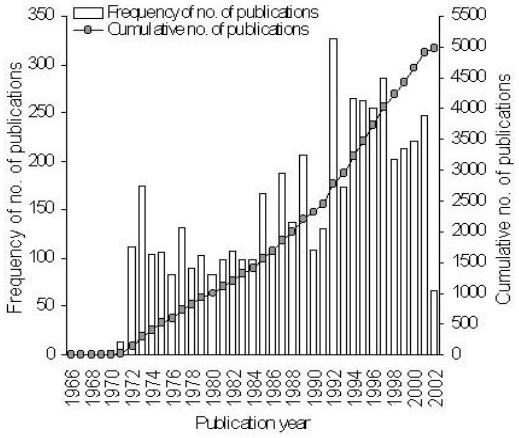

Fig.1: Frequency and cumulative number of R&D publications

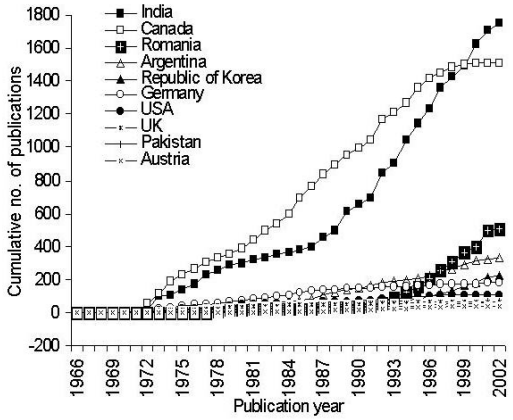

Fig. 2: Year-wise cumulative number of publications by top 10 countries in

[1] SHARMA, P., GUPTA, B.M., KUMAR, S., Application of Growth Models to Scienceand Technology Literature in Research Specialties, DESIDOC Bulletin of Information Technology, (2002) 22 (2), 17-25.

[2] IAEA (International Atomic Energy Agency) INIS: Subject categories and scope description,Vienna,IAEA(1997).

[3] BARREIRO, S.C., HARDIN, N.E. (eds.) INIS: Guide to bibliographic description (IAEA-INIS-1 Rev. 8) Vienna, IAEA (1992).