Embedded Librarianship in S&T Environment

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ABSTRACT

The utmost priority of a nation is to manage and coordinate its nation-wide S&T activities. The responsibility of the government of the a country lies in developing and promoting the scientific endeavours/ activities/temper in advancement of S&T and ensuring economic growth by the use and commercialisation of S&T. The S&T base involved in natural sciences, technological sciences and engineering technologies of the country covers governmental S&T departments, science foundations, scientific organisations, academic institutions, R&D organisations, etc. National S&T programme system includes R&D project programmes, S&T capability building, S&T supporting environment building, S&T base construction, S&T services, and so on. For successful performance of all these highly important tasks, information is required, which may be sufficient to be only provided on day to day basis or from a distance, but the time has come when it is to be provided by someone who understands the requirements (present and future) of the projects being a proud part of the team carrying out the R&D as a team member in the most efficient and effective manner. In other words, there is a dire need of embedded librarians in the S&T environment. This paper highlights the requirement of embedded librarians and the changing role they have to adopt and perform for the nation's S&T development.

Keywords: Embedded librarianship, S&T in India, challenges for librarians

1. INTRODUCTION

To manage and coordinate its nation-wide S&T activities is the utmost priority of nation. Strategic decisions are to be taken which affect the long term performance of the all those involved in the S&T activities of the country and which relate directly to nation's aims and objectives regarding S&T development and are based on the information of past performances and needs. The government develops and promotes the scientific endeavours/activities/ temper in advancement of S&T and ensures the economic growth by the use and commercialisation of S&T. The government applies S&T and develops mechanisms to improve the quality of life of people by good governance and management of S&T.

The S&T base involved in natural sciences, technological sciences and engineering technologies of the country covers governmental S&T departments, science foundations, scientific organisations, academic institutions, R&D organisations, S&T associations, private S&T institutions, industries, S&T management bodies, and so on. National S&T programme system includes R&D project programmes, S&T capability building, S&T supporting environment, S&T base construction, S&T services, etc. Scientific information is key to success. It is a priority to strengthen

the links between higher education, research and business to drive innovation. The universities, research organisations and industry have to collaborate for S&T generation, knowledge transfer and product development to attend social needs and benefit the society.

1.1 Indian S&T Scenario

As per World Bank report, 2007, India has about 400 national labs, 400 in the government sector R&D institutions and about 1,300 industrial sector R&D organisations. About 4 Lakh personnel are employed in R&D Estts. More than 300 multinational companies have their R&D centers and labs in different sector. Each year, about 450,000 S&T personnel are produced from more than 300 universities and educational institutions[1].

The 2007-2012 plan covers increasing the scientific manpower for changing and improving the Indian S&T, encouraging risk taking by scientists, improvement in education system, development in both basic and applied research and technology, and encouraging scientists and industry to interact with academia. Any country's bent towards the growth of S&T can be judged by the indicators covering the sanctioned amount of R&D funds, expenditure on R&D activities and higher education, personnel

devoted to R&D activities, and output in terms of research publications and patents (including from collaborations between universities/industry/R&D institutions). Foreign investment in R&D, the impact of published papers (inclusion in high-quality conferences or journals), and the number of highly educated citizens that return from abroad to work and live in India1all are indicators for commitment of a nation towards development. Fig. 1 shows the government organisations functioning under central government S&T departments in India[2].

1.2 Embedded Librarianship

Since, long, the librarians/information scientists have been working for scientists/R&D community in R&D projects and are providing specialised services to the researchers/scientists by way of selective dissemination of information (SDI) service or current awareness services such as current currents, newspaper clipping service, indexing services, etc., apart from regular services such as library facilities, circulation, searching, interlibrary loans, etc.

"Embedded librarianship takes a librarian out of the context of the traditional library and places him/her in an "on-site" setting or situation that enables close coordination and collaboration with researchers or teaching faculty. Here, librarians demonstrate their expertise as information specialists who can have a direct impact on the research, teaching, or other work being done. Embedded librarianship focuses on the users and brings the library and the librarian to the user, wherever they are—office, laboratory, home, or even on their mobile device"[3].

"Embedded librarianship is an expanding trend and a term used to cover a range of initiatives and service concepts. The development of new, digital information resources and related economic and administrative changes have made embedded

librarianship critically important to librarians and information professionals"[4].

"The term 'embedded librarianship' is widely used in the professional literature. It describes a variety of service innovations in a variety of organisational settings. It is used to describe the work of an academic librarian who participates in an academic course on an ongoing basis, teaching information literacy skills; work of librarians in a research institute; or corporation whose offices are moved from a central library to their customer groups, so that they can work more closely with the members of those groups"[4].

Shumakar[4] in his report on models of embedded librarianship define criteria of 'embeddedness' for library and information service programmes. He analysed embedded librarians as success indicators by collecting data about the practices followed in initiating, operating, and evaluating their services. He also developed guidelines to implement embedded services for the librarians in research environment.

The Purdue University libraries have initiated a strategy to embed its librarians on various projects. These designated librarians identify their faculty's research needs regarding information. Librarians propose faculty-librarian collaborations to address these needs and then to help secure funding. If successful, librarians become partners in the particular research project and have defined responsibilities and activities in it. The embedded librarians in the Management & Economics Library at Purdue University helped in preparing the support through various information literacy programmes[5].

2. S&T KNOWLEDGE AND LIBRARIANS

To build and maintain S&T capability, there is a need of knowledge advancement. It will meet the application needs for innovation support systems which will benefit the society. Innovation for industry covers support for industries through technical and financial support, collaboration support, etc., which will lead to economic benefits such as employment, food, health, increase in GDP, etc. It also needs regulation and standards, policy decision making and S&T implementation, strategic and operational management of S&T resources, etc.

To achieve the national strategic goals, S&T knowledge base is required that ensures excellent scientific, technological and economic R&D and related scientific activities. A nation has to perform S&T at world-class levels of excellence by conducting and supporting leading-edge S&T that meets high standards and ensure appropriate multidisciplinary links across the natural sciences, social sciences and engineering. There is a need to integrate S&T knowledge base of a country to meet the current and future opportunities and challenges by creating
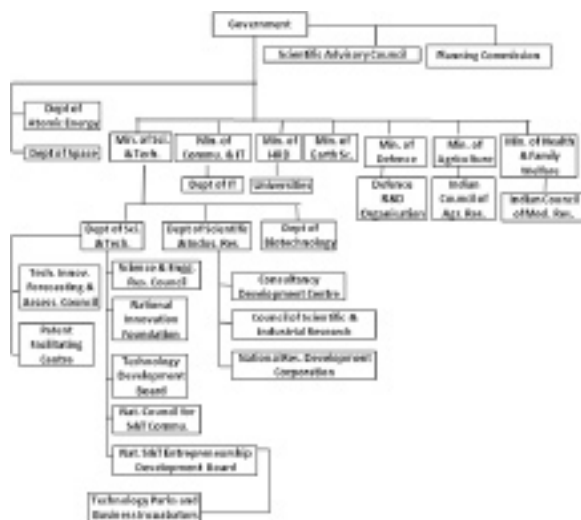

Figure 1. Government organisations under central government S&T departments in India[2].

national knowledge management system and examine the requirements for advanced foresight capacity based on existing practices and future issues for S&T investments and use the resources and funds.

The S&T knowledge base has to be connected nationally and internationally by identify and collaborate with other national and global centres of scientific knowledge; address gaps in S&T capacity; and extend and enhance the recognition of collaborations and contributions to national and international S&T-based priorities. The S&T knowledge base has to be used and shared for greater positive impact through new media, enhance dissemination of and access to S&T within the scientific community and decision-makers; develop mechanisms to ensure the delivery of accurate and timely knowledge and advice to enable informed decision making by applying the knowledge and innovations leading to products and technologies.

Since long the librarians or information specialists have been serving and contributing the S&T community by developing and managing information resources and collections of books, journals, reports (both paper and electronic), as well as websites selecting, acquiring and cataloguing information; automation activities; database procurement and also development, searching and delivering information managing infrastructure; training and recruitment of specialised and trained staff; budgeting and purchasing resources; and many other activities.

For successful performance of all highly important tasks of S&T field, information is required, which is not sufficient to be only provided on day to day basis or from a distance, but the time has come when it is to be provided by someone who understands the requirements (present and future) being a proud part of the team carrying out the R&D as a team member in the most efficient and effective manner. In other words, there is a dire need of embedded librarians in the S&T environment be it S&T organisations, institutions, labs, industry, etc. They have to assist researchers with literature searches using databases, printed resources and the internet; deliver information and learning skills courses for those engaged in scientific activities and dealing with their enquiries, with the deep understanding of their project requirements.

3. ROLE OF EMBEDDED LIBRARIANS IN S&T ENVIRONMENT

The librarians have always kept pace with time and evolved themselves to perform better and sustain over a period of time. Traditionally, the libraries are inviting users in their domain and providing various services such as reading, referral, document delivery, documentation, database search services—online and offline searching, ask a librarian

service, etc. They have tried to reach to them by automation by creating their libraries websites, digital libraries, virtual libraries, mobile-enabled library homepages, Webopac, Web 2.0 tools such as social networking sites, discussion forums, RSS alerts, chat, news, etc., and using them successfully to give services to their patrons. For S&T community, library and information professionals have been providing all these services by developing and using S&T databases covering full-text journals, abstract journals, numerical data, theses, dissertations, e-books, conference proceeding, patents, standards, etc. They are developing customised digital libraries, gaining expertise in search services, creating S&T databases, and lots of other services.

As embedded librarians in S&T environment, they have to take themselves a step further. They have to consider the client's project holder's domain as their own domain by considering themselves as group/team's part. Being part of a team, they have to help researchers at every step of their research programmes or even beyond. They have to adopt the role of cross-functional team member. Their role may begin with literature survey to avoid repetition of scientific research and to help experts to objectively and correctly evaluate novelty of scientific achievements, and is carried out by the institutions with corresponding qualifications. They can provide information retrieval, and information analysis. They can provide information services for S&T strategic decision-making by being an integral part of nation's S&T Think Tank. Following steps are highly important for an embedded librarian:

(a) Understand the projects' aims and develop systems to organise, manage, and deliver project documentation or other needed materials.

(b) Regular meetings with project holders regarding their information-related needs and services

(c) Collaboration on or contribution to their project holders's work to expend into critical areas of his interest, i.e., customer content, analytical assumptions, methods, and techniques

(d) Supporting the group(s) work by providing deeper and more granular insight to provide subject-focused analysis support

(e) Attend meetings/conferences of users' application areas to understand current project needs, and futuristic requirements

(f) Engaging in social interactions with the customer group and help in their requirements (E.g., provide study material, presentation support, documentation of proceedings, etc., if they are conducting a course or seminar)

(g) Meeting with user group management to review changes in requirements

(h) Provide awareness and user training about information resources or information management tools away from library, such as in laboratories, a conference room, etc.

(i) Developing the means and facilities such as e-communications and/or collaborative workspaces, including e-mail, wikis, blogs, and other web-based workspaces for better collaboration and dissemination of information.

(j) Act as knowledge management catalyst by collecting the data/reports generated during the period of research project. They can disseminate the same at the time of need or for long-term preservation.

4. PROFFERED ROLE OF DESIDOC

DESIDOC is one of the premier institute of DRDO is involved in various activities such as publishing, printing, database creations, institutional repository, knowledge management, etc. It also provides S&T information service using LIS sources, to its HQrs, and its various labs across India. DESIDOC is closely working with various academic institutions, R&D centres and production agencies of S&T Ministries/ Deptts in Public & Civil Sector including Defence PSUs and ordnance factories[6].

The information professionals/information scientists can play a vital role as embedded librarians for various projects in various labs. They can understand the requirements of their R&D community and tantamount between DESIDOC and other labs. For accomplishing such aim, a coordination and collaboration is mandatory between DESIDOC and labs. Along with its world class services, by creating national S&T institution database related to defence science & technology, R&D industry database, database on S&T experts of national and international repute, S&T projects database, current areas of research and not only this but also integrate these databases it can emerge as the Centre of Excellence and innovation for defence research.

Embedded librarian can work in the following directions and support decision makers, strategy scientists, information analysts and others in the field of S&T developments trends and strategic trends by following ways:

- Create and provide information services for advancement in S&T critical decision making, long term planning, and supporting R&D and its management so that they can focus on research rather than search

- Support innovative research models by combining core information and insight content of the organisation

- Keep track of current and new activities, new areas of research, and strategies of S&T institutions at national and international level

- Undertake research in understanding the market in same and allied areas of research

- Analysis and evaluation of the critical trends, new inventions, recent development in technologies, S&T policies, and future directions

- Conduct scientometric studies and analyse the defence related S&T areas

- Create a federated unified platform to access information from various resources including strategy policy resources, technology industry resources, socio-economic resources, etc.

- Explore the scientific progress of different countries, i.e., S&T labs, academia by using data collection, data extraction, text mining, data harvesting, etc.

- Undertake tasks such as documentation for patent initiation, filing, project approval, applying for awards, etc.

- Initiate KM activities in the user group for their application areas

- Organise awareness programmes regarding publisher policies for submission of their research for wider dissemination their work

5. CONCLUSIONS

The LIS professionals have proven themselves with time. The information professionals should discover for new role and pursue it. Where there is a will, there is a way. Same way, for any R&D project, there is need of embedded librarians who will be an integral part of the project. The success of the project will be their success. They will be a team player. They have to be proactive, knowledgeable, hardworking and extremely supportive and there will be collaborative relationship development and strengthening between researchers and embedded librarian. The only requirement is that they have to work hard and prove themselves.

The librarians have to demonstrate their value to the research institutions in new way. At the same time embedded librarians have to face the challenges including the intricacies of learning management systems; multiple and changing communication strategies, technology failures; scientists' and researchers' expectations and collaborations, increased workload, and competing demands. As an embedded librarian model evolves, expends and matures these challenges are to be addressed, solutions identified, and best practices developed. The embedded librarians have to transcend traditional roles and undertake the

unique value only they can add as part of library and information centres and as individuals. They can make innovative efforts, coordinated teamwork and more accountability through value addition, expertise and knowledge to satisfy their patrons and create delight.

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REFERENCES

1. S&T Strategies of Six Countries: Implications for the United States. Committee on Global Science and Technology Strategies and their Effect on US. National Security, Standing Committee on Technology Insight—Gauge, Evaluate, and Review. Division on Engineering and Physical Sciences. National Research Council of the National Academies. The National Academies Press, Washington, DC 2012.www.nap.edu

2. Indian S&T Landscape. International Science & Technology Affairs Directorate (ISTAD) Council of Scientific & Industrial Research (CSIR), India. 7/23/2009 http://www.newindigo. eu/attach/IndianSTLandscape.pdf

3. Jake Carlson & Ruth Kneale. Embedded librarianship in the research context: Navigating new waters. *College & Research Libraries News*, March 2011, **72**(3), 167-70

4. Shumakar, David & Talley, Mary. Models of embedded librarianship. Final Report. SLA Research Grant 2007. 2009. http://hq.sla.org/pdfs/EmbeddedLibrarianshipFinalRptRev.pdf (accessed on 9 May 2014)

5. Kirkwood, Hal & Evans, Kelly. Embedded Librarianship and Virtual Environments in Entrepreneurship Information Literacy: A Case Study.10.1080/08963568.2011.630583. pp. 106-16

6. www.drdo.org (accessed on 9 May 2014)

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