DESIDOC Journal of Library & Information Technology, Vol. 34, No. 4, July 2014, pp. 304-308 DOI: 10.14429/djlit.34.5841

Building Knowledge Management-based Systems: Initiatives at Research Centre Imarat

N. Venkatesh and S. Kalpavalli

Research Centre Imarat, DRDO, Hyderabad–500 069
E-mail: venkatesh.n@rcilab.in

ABSTRACT

Information technology (IT) and knowledge society are two important driving forces of 21st century. Internet and web-based technologies have led to a new era of knowledge creation, storage, retrieval and dissemination of information. During the last decade, knowledge management (KM) has been identified as the major management initiative that will help organisations, institutions, libraries and information centres to utilise fruits of IT in fulfilling the objectives of the organisation. Knowledge creation and sharing are widely recognised as important assets of any organisation. In today's context, IT-based services have changed the entire process of information cycle. All library professionals must redesign and reshape the traditional library management tools and apply KM concepts and practices for providing better library services. Since knowledge is a critical asset of any organisation, KM practices will lead to provide right information to right person at right time into a reality. This paper covers KM concepts, changing role of library professionals and current trends in KM practices and information services in DRDO and in Research Centre Imarat (RCI) in particular.

Keywords: Knowledge management, open source software, digital library

1. INTRODUCTION

In Defence Research and Development Organisation (DRDO), project management plays a key role in design, development and production of weapons for Defence services. Documentation practices play a vital role for success of various activities in project management. The success of any project is crucially dependent on the documents produced, stored and retrieved as per user needs. DRDO with a chain of over 50 laboratories and establishments spread across the country are deeply engaged in developing defence technologies[1]. From last few years DRDO has given importance to KM concepts and processes. KM has been recognised as good management tool providing basis for sharing of information assets and achieving organisational goals. In present environment, the key factors for success begin with top management support and commitment, knowledge assets of DRDO and proper planning and control of all KM-related activities. This paper gives details of present KM practices and information services, contribution of DRDO Head Quarters, DRDO libraries to make KM as a management tool for fulfilling organisational objectives. The RCI Library has initiated software development for building KM-based system namely, Knowledge Initiative Tracking System (KITS). It is aimed to realise intranet-based system that supports organisational objectives and develop culture of sharing of knowledge within RCI.

This paper also covers various RCI initiatives in building KM-based systems for providing platform for easy exchange of information and better utilisation of talents of staff for overall development of RCI.

2. KNOWLEDGE MANAGEMENT CONCEPTS

Knowledge management is a cross disciplinary domain. Knowledge management was defined by Devenport as the processes of capturing, distributing and efficiently using knowledge[2]. The second definition, more comprehensive, is given by Gartner Group[3], which states that "knowledge Management is a discipline that promotes an integrated approach to identify, capture, evaluate, retrieve, and share all of an enterprise's information assets". These assets may include databases, documents, policies, procedures, and previously uncaptured expertise, experience of individual workers and also tacit knowledge that which is known but not captured in any formal or explicit fashion. Devenport & Prusak[4] have given another pragmatic description of KM which says, 'A fluid mix of contextual information, framed experience, values and expert insight that provides framework for evaluating and incorporating new experiences and information'.

It is clear that KM involves the identification and analysis of available and required knowledge and the subsequent planning and control of actions to develop knowledge assets so as to fulfill organisational

Received 5 January 2014, revised 15 April 2014, Online published 9 July 2014

objectives. Thus KM practices can be broadly defined as, "The acquiring, sharing and use of knowledge within organisation, including learning processes and management information systems"[5].

2.1 TYPES OF KNOWLEDGE

The KM can be broadly defined as knowledge which is of two types-explicit and implicit. Explicit knowledge is available in the documented form. It can be preserved systematically and can be retrieved, communicated, and used as and when it is required. It is the traditional form of knowledge and is available in the formal, and documented form. It can be easily shared amongst its users. Since very long time librarians and information professionals have been working with the task of collection, organisation and dissemination of it. Implicit knowledge, also known as tacit knowledge is unformulated, related to intuitions, feelings, and emotions. It resides in human minds. It is very difficult to document tacit knowledge. It should be understood gathering of tacit knowledge is a continuous process since expert advice, contextual experience, problem solving capabilities and intuition of an individual cannot be documented.

The main characteristics of KM are human resource management, information technology knowledge sharing, and information management. The details of KM cycle are shown in Fig. 1.

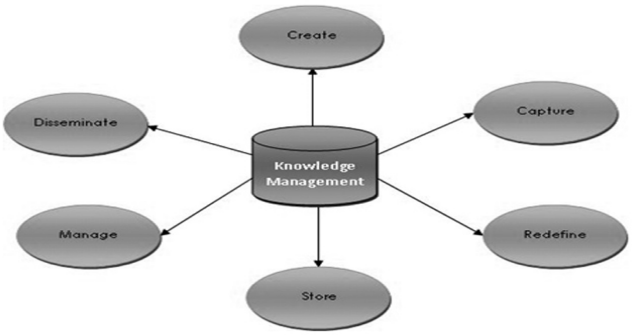

Figure 1. knowledge management cycle.

3. KM AND LIBRARIES

The objective of KM in libraries is to promote knowledge innovation. It refers to the production, diffusion and transfer of knowledge as well as of the network systems constructed by related institutions and organisations. It includes three aspects, namely, theoretical innovation management of knowledge, technical innovation management, and organisational innovation management[6].

3.1 Applications of KM

In a library and information centre, understanding of KM and to assess what library and information professional's role should be to play a part in KM environment is vital. They are to :

- Gain an understanding of KM and the roles, skills and competencies needed in these environments
- Assess the implications for the library and information profession if its members are to play a full part in KM
- Assess the routes available to people wishing to develop KM skills
- Examine the need for information literacy throughout KM environment
- Have continuing professional and technical education and training
- Understand the information management principles
- Understand the publishing processes
- Understand the technological opportunities.

In KM environment, the role of information management includes not only managing traditional library management tasks but also effective use of information and knowledge stored in primary, secondary and tertiary resources both in print as well as electronic format. Information management includes capabilities as well as value addition aspect and opportunities as well as challenges. Thus information management brings together and makes available hardware, software, control mechanisms and online learning resources but KM adds human expertise through human resource development and human resource management and the KM is almost a step ahead of information management[7]. Libraries have to decide what type of knowledge can be institutionalised and shared and what is useful information and raw data8. The core areas of KM-related to libraries are shown in Fig. 2.

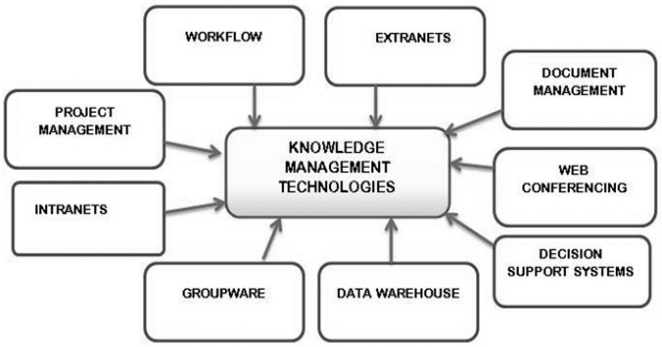

Figure 2. IT relevant to KM in libraries.

3.2 Role of DRDO Libraries

DRDO consists of more than 50 laboratories working areas of Missile Engineering, Aircraft, Optics, Tanks, Naval Systems, Electronics, Life Sciences, R&D Management, etc. All DRDO labs have well developed libraries. All the libraries have made significant progress in following areas:

(a) Library automation
(b) Pull and push-based services
(c) E-journals
(d) Technical reports
(e) CD-Rom services
(f) Document delivery services
(g) Development of digital library
(h) Intranet & internet-based services
(i) Conference papers, standards

Besides the above library service, all libraries have started contribution to KM at lab-level. Defence Scientific Information and Documentation Centre (DESIDOC) have taken large number of steps for promotion of KM culture in all DRDO laboratories. DESIDOC was established with the aim to be a center of excellence in collection, processing, and disseminating scientific and technical information on cutting edge technologies for Defence research and development[9]. It's website can be accessed on DRONA. Since it is the central information system in DRDO, it provides access to number of databases, periodicals, in-house publications, current awareness services, DRDO blog, etc. DESIDOC is the nodal centre for providing e-journals services to all labs under consortium programme. .

DESIDOC has laid good foundation for KM initiatives in all areas of Defence R&D. DRDL, Hyderabad has started KM activities on their intranet, namely, D-net. It provides scope for discussion forums, blog, knowledge shares of the month, knowledge bank, knowledge bites, E-learning, etc. In some labs besides libraries, KM cells are established to take forward KM activities.

4. KM INITIATIVES IN DRDO

The broad objectives of KM Initiatives in DRDO include how to meet the growing demands of project management, through performance improvement and breakthrough innovation, by leveraging on the collective knowledge of various organisational entities. DRDO has carried out project, namely, 'Advanced Techniques for Scientific Performance Measurement'. The important findings are:

- Project management, design and development of components, research and development, institutional management and technology management form the main job functions of Senior Scientists.
- Successful completion of projects, R&D management, and knowledge generation have been marked as the most important aspects for performance assessment of scientists.
- Knowledge management was recognised as the first step for enhancing managerial potential and for growth of leadership qualities among scientists.
- The recommended action plan provides major role for senior scientists in the area of KM in terms of effective sharing and utilisation of knowledge assets at various levels. Advanced training in R&D, HR, and knowledge management are essential for career development of all senior scientists.
- DRDO policy in the area of KM aims to achieve higher quality, productivity and better collaboration through the synergy of knowledge, resources, facilities, and employees.

4.1 KM AWARENESS

To improve awareness of KM among DRDO scientists and staff, various seminars, training courses, and conferences are held. Some of the key results are as follows.

(a) DRONA (DRDO Rapid Online Network Access), an intranet linking all labs in DRDO was established.
(b) All scientists and officers have to fill information under personnel information system (PIS) on DRONA. The mandatory fields of PIS include: General Details, Official Details, Family & Education, Job Experience, Promotions, Posting & Transfer, etc. This system provides basis for collection of tacit knowledge of scientists and officers.
(c) DRONA mail, lab-wise information have led to access to all facilities, assets, and developments in DRDO.
d) Human resource management has been given highest importance in DRDO.
(e) Scientists and staff carrying out R&D work leading to patents, copy right, etc., are encouraged for growth of knowledge assets.

5. RCI INITIATIVES

The RCI is a premier R&D lab in the country with an objective of developing the frontier technologies for guided missile systems for Armed Forces. RCI is considered as avionics hub of DRDO and has developed critical indigenous technologies over last 25 years.

The RCI Library has taken steps for growth of digital library concepts. These include: RCI intranet, namely, RC Net; development of digital library of missiles and digitisation of project documents. RCI has started digitisation activities from 2004 in all areas of missile electronics[10]. It has developed Digital Assets Management software to provide access to born-digital and made-digital objects on intranet

suitable for library and lab-level applications[11]. Recently, it has developed in-house software for project information centre in DRDO as per DRDO guidelines for project documents[12]. RCI Library also has initiated following steps to make KM Practices as part and parcel of lab activities. Some of the key features are:

(a) Development of institutional repositories covering papers published by scientists in journals/ conferences/seminars/workshops over last 25 years

(b) Database of all CEP course/training course materials

(c) Database of workshops proceedings held in RCI

(d) Development ofimage database covering all RCI activities

(e) TIRC has collected details of user profile of all Scientists for better understanding of their experience, skill sets and problem solving capabilities

(f) Technical discussions with KM consultants

(g) Study of various open source software features in the area of KM was carried out and Freeplane, Fusion KM, Mediawiki, Moodle, and Opendocman were considered for purpose of study. The study brought out advantages and disadvantages of OSS.

The net result of all these initiatives lead to the need for development of in-house software for KM as per lab requirements. RCI Library has initiated in-house software development, namely, knowledge initiatives tracking system (KITS) using SQL server and .net. A broad frame work of KITS designed as per RCI requirements is shown in Fig. 3. The framework is based on a conceptual model where various Knowledge sources at the content-level interact to realise an integrated knowledge structure.

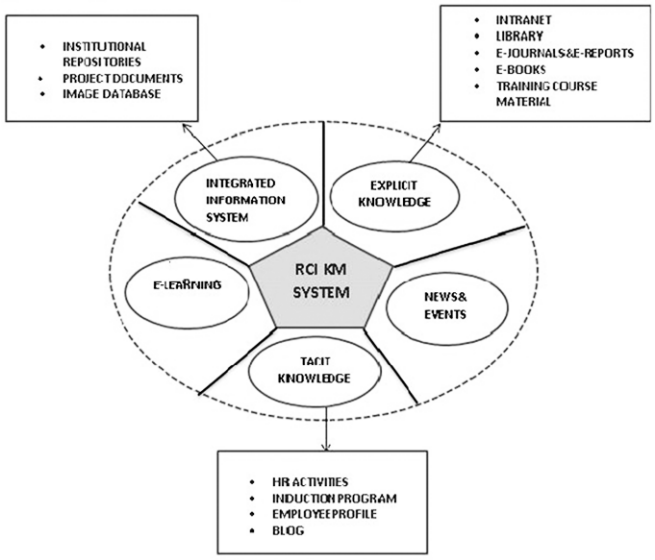

Figure 3. Conceptual model of KM.

Some of the key advantages of KM initiatives at RCI are:

(a) Development of intranet-based system supporting culture of sharing of Knowledge

(b) Encourage knowledge creation and growth of integrated information system

(c) Provide a platform for all HR activities

(d) Development of blog for easy exchange of ideas

(e) Better control of all the knowledge assets.

6. PROBLEM AREAS

The KM is highly useful in ongoing renewal of organisational processes. There is need for better co-ordination between libraries, computer centre, human resource division and top management to achieve better results. HRD activities should support the change in management role and promote an understanding of organisational culture. Network facilities, better skill sets for library staff and manpower training in KM for all scientists and staff is the need of the hour.

7. CONCLUSIONS

The significance of KM is felt in all organisations. The KM concepts and activities have brought information management and network issues into focus. The key KM resources are not only technology but also people, contents, and economics. Thus KM is a key tool for building the era of web-native science and technology developments in DRDO. Information professionals have to take full advantage in present IT scenario by understanding the potential of KM and laboratory objectives.

AKOWLEDGEMENTS

The authors are thankful to Shri G. Satheesh Reddy, OS & Director, RCI for permitting to present the paper.

REFERENCES

1. Moorthy, A.L. DRDO e-journals consortium. *DESIDOC J. Lib. & Inf. Technol.,* 2009, **29**(5),18-23.
2. Devenport, T.H. Real success knowledge management projects. *Sloan Manag. Rev.,*1998, **39**(1), 43-57.
3. Duhon, B. It's all out heads. *Inform,* 1998, **12**(8), 9-13.
4. Devenport, T.H. & Prusak, L. Working knowledge: How organisation manages. Harvard Business School, Boston. 1998.

5. Natarajan, M. KM in Hybrid Libraries. *In* NACLIN-2000: Library and Information Networking, edited by H.K. Kaul & Harish Chandra. Paper presented at the 3rd National Convention on Library and Information Networking, 24-25 December 2000, Chennai. DELNET, New Delhi, 2000. pp.1-8.
6. Shanhong, Tang. Knowledge management in libraries in the 21st century. *In* 66th IFLA Council and General Conference, 13-18 August 2000, Jerusalem, Israel. pp. 13-18.
7. Ravichandra Rao, I.K. Information Management: An overview. *In* CALIBER-98: Information Management in Academic and Research Libraries, edited by M. Mahapatra & D.B. Ramesh. Paper presented at the 5th National Convention for Automation of Libraries in Education and Research, 4-5 March 1998, Bhubaneswar. Information and Library Network Centre (INFLIBNET), Ahmedabad, 1998. pp. 1-8.
8. Dabas, K.C. & Gill, N.S. Knowledge management: An overview, exploration and implementation in university libraries. *In* NACLIN-2000: Library and Information Networking, edited by H.K. Kaul & Harish Chandra. Paper presented at the 3rd National Convention on Library and Information Networking, 24-25 December 2000, Chennai. DELNET, New Delhi, 2000. pp.18-31.
9. Moorthy, A.L. Souvenir on National Conference on Digitisation & Digital Preservation,11-12, December 2008, DESIDOC, New Delhi, pp. 1-6.
10. Venkatesh, N.; Ramana Rao, G.V. & Kalpavalli, S. Digitisation issues in DRDO-prospects and problems. *In* NCDDP-2008, edited by Shashi Tyagi & B. Nityanand. Paper presented at the National Conference on Digitisation and Digital Preservation, 11-12 December 2008, New Delhi. DESIDOC, New Delhi, 2008, pp.3-7.
11. Venkatesh, N.; Nageswara Rao, K. & Kalpavalli. S. Development of digital assets management software for Research Centre Imarat. *DESIDOC J. Lib. & Inf. Technol.,* 2012, **32**(5), 447-51.
12. Venkatesh, N. & Kalpavalli S. Development of software for project information centres (SPIC) in DRDO. *PM World J.*, 2013, **2**(6), 1-9.

About the Authors

Mr N. Venkatesh is working as Scientist 'F', Head, Technical Information Resource Centre (TIRC), Directorate of HRDG, RCI, Hyderabad. He has obtained MSc (Physics) in 1981 and BLIS in 1982 from Osmania University, Hyderabad. He has attended one year training course on Information Science in National Centre for Science Information, Indian Institute of Science, Bangalore in 1984. He joined DRDO as Scientist at the Institute of Armament Technology, Pune in 1985. He has published research papers in various conferences and journals. His areas of interest include: Library management, digital libraries & information management, project documentation, and knowledge management.

Ms S. Kalpavalliis is working as Contract Engineer in TIRC, RCI, Hyderabad. She holds MCA from Osmania University, Hyderabad. Her current areas of work are: Library automation, software development for digital library applications, knowledge management, etc. She has published four articles.