Knowledge Management and New Skills, Roles & Challenges for Librarians in the ICT World

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ABSTRACT

Latest development of Information Communication Technology (ICT) and its applications in Libraries, the concept of document management has been changed to information management and again the entire scenario of information management has started its change to Knowledge Management (KM). This paper discusses the various aspects of Knowledge Management like KM definition, types, characteristics, process, components, stages, tools, principles, objectives of KM in libraries, benefits of ICT in KM, barriers to KM in libraries, ICT for KM in libraries, etc. Paper also focuses on the new skills, roles and new challenges of librarians in managing the knowledge and information in the ICT age.

KEYWORDS: Knowledge Management, ICT for KM, KM enabling ICT Tools and Networks, KM Skills, New skills and roles for librarian in KM, New challenges for Librarians in the ICT world

INTRODUCTION

ICT based 21st century is the era of knowledge and information explosion. In this rapidly changing ICT and knowledge and information are the most important resources, for the growth and development of any libraries and any organizations. The conventional functions of libraries are collect, process, disseminate, store and retrieve information to provide better services to the end users satisfaction. In the ICT or digital environment, the role of libraries is changing to provide the competitive advantage for its users. The success of libraries depends upon their ability to utilize information knowledge of its staff to serve the user community. The ICT has played a significant role in this dynamics which has not only made access across the globe easier, but has facilitated integration of thought processes, synergy in working methods and places, team learning and in enhancing organizational transparency. With the development of ICT and its applications in libraries, the concept of document management has been changed to information management and again, the entire scenario of information management has started its change to knowledge management.
DEFINITION OF KNOWLEDGE MANAGEMENT

Wikipedia “Knowledge management (KM) is the process of capturing, developing, sharing, and effectively using organizational knowledge. It refers to a multi-disciplined approach to achieving organisational objectives by making the best use of knowledge”.

According to Petrash “Knowledge Management is getting the right knowledge, to the right people, at the right time,” This is seems to be similar to Five Laws of Library Science formulated by S.R. Raganathan. KM is a step-by-step process by which the piece of data may be converted into information and the information may be converted into a knowledge location.

According to Taylor (1999) “Knowledge Management is a journey that moves an organization from a knowledge-chaotic environment which is where many organizations are now to a knowledge-centric enterprise that is supported by a comprehensive knowledge system”. This definition emphasises the end-product of knowledge management. Taylor described the journey of knowledge management as a process of five stages: knowledge-chaotic, knowledge-aware, knowledge-enabled, knowledge-managed and knowledge centric.

According to Davenport et al. (1998) “Knowledge management is concerned with the exploitation and development of the knowledge assets of an organization with a view to furthering the organization’s objectives. The knowledge to be managed includes both explicit, documented knowledge, and tacit, subjective knowledge. Management entails all of those processes associated with the identification, sharing and creation of knowledge”. This is an inclusive definition, which focuses on exploitation and development of knowledge to achieve organizational goals.

O’Dell et al. (2000) Knowledge management is a framework, a management mindset, that includes building on past experiences (libraries, data banks, smart people) and creating new vehicles for exchanging knowledge (knowledge enabled intranet sites, communities of practice, networks).

Ron Young, CEO/CKO, and Knowledge Associates International “Knowledge Management is the discipline of enabling individuals, teams and entire organization to collectively and systematically create, share and apply knowledge to better achieve their objectives.”

Therefore, knowledge management deals with creating, securing, capturing, coordinating, combining, retrieving, and distributing knowledge. The idea is to create a knowledge sharing environment whereby sharing knowledge is power as opposed to the old adage that, simply, knowledge is power.
TYPES OF KNOWLEDGE:

- **Implicit Knowledge**: Implicit knowledge is visible and often, confined to the mind of a person. It is hard to codify and therefore, difficult to communicate to others.

- **Explicit Knowledge**: Explicit is recorded and available in various media like books, periodicals, letters, reports, memos, literature, audio-visual material, CDs films, videos etc. or electronic formats like data, software, websites, etc.

MAJOR CHARACTERISTICS OF KNOWLEDGE MANAGEMENT ARE:

- A holistic approach,
- It’s action-oriented,
- Ongoing process,
- Ever-changing,
- People-oriented,
- Emphases on organisation
- Performance improvement, and
- Value-adding and
- Goal-oriented or visionary perspectives

KNOWLEDGE MANAGEMENT PROCESS

P. Galagan (1997) has proposed a set of knowledge management process as below:

- Generating / creating new knowledge within the organization;
- Accessing knowledge from external sources, i.e. outside the organization in terms of documentary sources;
- Representing knowledge in documents, databases, software and so forth;
- Embedding knowledge in processes, products, or services;
- Transferring existing knowledge around an organization and giving room for further knowledge generation;
- Using accessible knowledge in decision-making and policy formulation;
- Facilitating knowledge growth through culture, awarding system and incentives; and
- Measuring the value of knowledge assets and the impact of knowledge management.

COMPONENTS OF KNOWLEDGE MANAGEMENT
The knowledge management environment centered round three components. They are,

- **People:** Technology experts, Knowledge professionals, Knowledge managers
- **Process:** Creation, capturing, storing, sharing, Application, and
- **Technology:** Hardware and software packages

**STAGES IN KNOWLEDGE MANAGEMENT SYSTEM**

- **Identify Knowledge:** Core Competencies, Knowledge Domain, Knowledge Gap, People and skills
- **Collect Knowledge:** Buying Knowledge – Recruiting, Data entry, Merging the Organizations, OCR and scanning, Outsourcing, Rending Knowledge – Consultant, Searching for information to include
- **Select Knowledge:** Assess the value of Information, Find the insight
- **Store Knowledge:** Expert System – Storing of expert knowledge, Repository, Keep and Index the knowledge dynamically
- **Share Knowledge:** Selective Dissemination of Information, SECI Model
- **Create Knowledge:** SECI Model
- **Apply Knowledge:** Perform Support System, Problem Solving and Task analysis

**TOOLS OF KNOWLEDGE MANAGEMENT:**

- Agents’ technologies
- Data analysis data ware housing
- Data ware housing: Meta data
- Electronic document management
- Groupware
- Help desk technologies
- Information retrieval tools
- Intranet/Extranets
- Machine learning
- Mapping tools
- Ontology’s (Computer based)
- Portals
- Work flow management systems
PRINCIPLES OF KNOWLEDGE MANAGEMENT

Thomas H Davenport has formulated ten principles of knowledge management as listed below:

- Knowledge Management is expensive
- Effective management of knowledge requires hybrid solutions of people and technology
- Knowledge Management is highly political
- Knowledge Management requires knowledge managers
- Knowledge Management benefits more from maps than model, more from markets than from hierarchies
- Sharing and using knowledge are often unnatural acts
- Knowledge Management means improving knowledge process
- Knowledge access in only the beginning
- Knowledge Management never ends
- Knowledge Management requires a knowledge contract

OBJECTIVES OF KNOWLEDGE MANAGEMENT IN ACADEMIC LIBRARIES

The main objective of Knowledge management is to ensure that the right information is delivered to the right person just in time, in order to take the most appropriate decision. The objectives are as follows:

- To promote collection, processing, storage and distribution of knowledge
- To promote scientific research
- To promote relationship between library and users
- To protect the intellectual property right, ICT era
- To create knowledge repositories and manage knowledge as an asset
- To organize the value of knowledge and improve effective research

BENEFITS OF ICT IN KNOWLEDGE MANAGEMENT

The ICT is combination of computers, databases, and telecommunications, especially the Internet, provide managers with an incredible number of options for improving the way organizations function. Whenever, ICT provides a systematic and professional approach to the management of Information Technology service provision. Adopting its guidance offers users a huge range of benefits that include:

- Reduced service costs
- Save the time of users as well as staffs
• Quality and quantity improvement
• Improved user services
• Improved customer/user satisfaction through a more professional approach to service delivery
• Improved productivity
• Information Technology helps to maximizes the benefits
• Provides confidence to managed and cover risk to achieve the organizational goal
• Faster and easier recovery of data and disseminate the information
• Reducing risks and errors

BARRIERS TO KNOWLEDGE MANAGEMENT IN LIBRARIES
Every librarian who works in academic, public or any special library wants to use the techniques of knowledge management to achieve the organizational goal and provide better service to its users but due to some following barriers they are not able to use that:
• There is no co-operation between senior and junior library staff.
• Generally, the junior staff cannot share their knowledge and ideas when they feel there is no benefit of this in terms of salary increases.
• Every library cannot participate in terms of modern technology and its management
• Lack of communication skills.
• Lack of staff training.
• Lack of sufficient budget / funds
• Lack of tool and Information communication technologies
• Lack of Centralized policy for Library Cess

ICT FOR KNOWLEDGE MANAGEMENT IN LIBRARIES
Libraries should be developed / modified based on the perfect environment for new ICT/media applications. Due to impact of globalization, economic competition and revolution of ICT, the libraries are undergoing tremendous change its environment. ICT tools and techniques, knowledge management systems, internet, web resources, digital libraries have made a significant change in the existing library systems and services. It is a major challenge for the library professionals. Knowledge acquisition is the starting point of knowledge management in Libraries. The application of ICT enlarges the scope of knowledge acquisition, raises knowledge acquisition, speed and reduces knowledge acquisition cost. It is impossible to accomplish such
important tasks by using man’s brain only in the modern society in which the knowledge changes with each passing day. It will be possible to link closely knowledge sources and knowledge workers by computer or internet networks, thus constructing knowledge networks in libraries based on realization of single point informationalization. Data wise technologies developed the following list of information and communication technologies for the knowledge management.

- Intranet within an organization
- Document management systems
- Information retrieval systems
- Relational and object databases
- Electronic publishing
- Groupware and work flow systems
- Internet/Wi-Fi technology
- Push technologies
- Help desk applications
- Brain storming applications
- Data warehousing and data mining

With the advent of computers things have changed now. In knowledge management process different technologies are being used. These technologies are identified and selected based on the requirements and the type of knowledge that need to be managed. Two technological approaches are to be worth mention here, i.e. pull and push technologies, whenever we deal with KM and technology. These two technologies determine how the end-user or knowledge seeker gets / extracts his / her knowledge. Pull technology includes the conventional information retrieval techniques, search strategy, search engines etc. where the user takes the initiative without anybody's help and seeks or extracts or pulls the information from the knowledge base or knowledge store. Push technology, on the other hand is, providing information services in anticipation. Here, the user is not directly involved in seeking information, but it is pushed from the knowledge store or knowledge repository from time to time. Alert services, news group services etc. are some of the examples of push technologies. Some of the technologies that get associated with KM are: Internet, Intranet, Extranet, Data Warehouses, Data Mining, Artificial Intelligence, Expert Systems, Knowledge Base Management System, Information Retrieval, etc. publishing technology and etc.
KNOWLEDGE MANAGEMENT ENABLING ICT TOOLS AND NETWORKS

Several KM enabling ICT tools and networks were identified to be relevant for developing the proposed framework due to their significance in carrying out KM roles. These include Knowledge Portals, Electronic Document Management Systems, Academic Publishing, Academic Contents and Exchanges, Database Management Systems (DBMS), Data Warehouse, Data Mining, Groupware, Communities of Practices (CoP), Social Communities of Interests, and Individual Communities of Interests (Omona, et. al., 2010).

KM Enabling ICT Tools/Networks

<table>
<thead>
<tr>
<th>ICT Tools/Networks</th>
<th>Description of Roles</th>
<th>Examples</th>
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</thead>
<tbody>
<tr>
<td>Knowledge Portals</td>
<td>Search and access to internet/web-based knowledge</td>
<td>Google, Yahoo</td>
</tr>
<tr>
<td>E-Document Management Systems</td>
<td>Knowledge repositories created by individual academic libraries and institutions</td>
<td>Digital Library, Electronic Library, Virtual Library</td>
</tr>
<tr>
<td>Academic Publishing</td>
<td>Proprietary digital libraries for online and electronic access to academic publishing, Databases</td>
<td>Emerald, Elsevier, EBSCO, DELNET</td>
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<tr>
<td>Academic Contents and Exchanges</td>
<td>Electronics or Digital or Online Collections of course materials and learning objects</td>
<td>MIT Open Course, NPTEL</td>
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<tr>
<td>Databases Management Systems- DBMS</td>
<td>Set of computer programs that control the creation, maintenance, and the use of database</td>
<td>Library Users records</td>
</tr>
<tr>
<td>Data Warehouse</td>
<td>A repository that facilitates reporting and analysis of data</td>
<td>Financing data, budgeting data, collection data, etc.</td>
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<tr>
<td>Data Mining</td>
<td>The process of extracting patterns from data</td>
<td>Academic/Library profiling</td>
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<tr>
<td>Groupware</td>
<td>Is designed to help people involved in a common task achieve their goals</td>
<td>Knowledge Forum, Wikis</td>
</tr>
<tr>
<td>Communities of Practices (CoP)</td>
<td>Groups of practitioners networking in a particular fields of endeavor to define a practice and knowledge domain</td>
<td>Library Consortia, Educational Research Services</td>
</tr>
<tr>
<td>Social Communities of Interests</td>
<td>Social networks drawn together to share knowledge and build relationships</td>
<td>Facebook, MySpace, Flickr</td>
</tr>
<tr>
<td>Individual Communities of Interests</td>
<td>Tools for individuals to manage personal knowledge and networks</td>
<td>Blogs, Twitter, Line, WeChat, Whatup</td>
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KM process can be divided into four different aspects, i.e. Knowledge acquisition, knowledge creation, knowledge storage, and knowledge application. Knowledge acquisition is the first process of KM which emphasizes and gives special importance to individual knowledge capability in the organizations. Knowledge acquisition and collection can be derived both from internal knowledge resources, i.e. knowledge about work practices, reports and documents of various knowledge and from external knowledge resources, i.e. environmental data, clients’ data, competitors’ data and other resources including external benchmarking. A sufficient knowledge database available both quantitatively and qualitatively will positively affect the knowledge acquisition capability.

**KNOWLEDGE MANAGEMENT IN LIBRARY**

Davenport explains that Knowledge Management as a process is about acquisition, creation, packaging and application of reuse of knowledge. In any organization, the libraries are the backbone of information dissemination and the different services offered by the libraries are mainly designed to fulfill the goals/missions of the organization. The main aim of library is to provide right information to the right user at the right time.

As a learning organization, libraries should provide a strong leadership in knowledge management. Libraries should improve their knowledge management in all of the key areas of library services. To cope with the exponential growth in human knowledge, libraries need to develop their resources access and sharing strategies from printed to electronic and digital resources. Limited by funding, information technology, staff and space, libraries must carefully analyze the need of their users and seek to develop cooperative acquisition plans to meet the needs of users. Libraries should be developed and maintained an integrated Web based online public access catalogue (OPAC) or Web based online public access catalogue (Web OPAC) with both internal and external resources as well as printed and other formats of knowledge. Libraries should use the new approach to capture web information by cooperative efforts such as Dublin Core, Metadata and the cooperative online resources catalogue. Other new methods such as data mining text mining, content management, search engines, natural language searching, concept of yellow pages and such technologies in information visualization as two dimensional or three dimensional knowledge mapping.

Librarians deserve a central role in the development of processes and policies that harness an organization’s knowledge base. As keepers and disseminators of information within organization, librarians make substantial contributions to the successful implementation of
knowledge management projects. Libraries are information centers established in support of the mission of their parent institutions to generate knowledge, and people equipped with knowledge in order to serve the society and advance the well-being of mankind. In the ICT/digital age, Libraries face challenges from both within (academia) and without (the business sector). Implementation of knowledge man Academic departments, or even faculty and students, may purchase or build their own portals to meet their academic and/ or research needs. Libraries are under pressure from two sides: reduced budget and increased demand from faculty and students. The implementation of Knowledge Management in libraries is mainly driven by its mission rather than by the competition from Internet-based reference services or electronic books.

NEW COMPETENCIES AND SKILLS OF LIBRARIANS IN KM

Librarians should possess excellent communication skills, and abilities to offer specialist skills such as expertise in electronic systems and resources or experience of planning and delivering training. They should have skills in persuasion and reasoned argument in a changing and complex organizational environment. The various skills needed by librarians in KM programme are:

- **Interpersonal Communication skills** for transferring tacit knowledge to explicit knowledge. It also encourages people to identify and share relevant ideas, knowledge and information.

- **General management skills** such as leadership, human resources management, change management, project management, etc. are seen as a vital part of KM programme that librarians should have.

- **Information management** skills like classification and cataloguing, indexing and abstracting, information consolidation and repackaging, content management, storage and retrieval, construction of controlled vocabulary and thesaurus.

- **ICT skills** like webpage development, database design and management, web publishing, Internet publishing, designing and application of search engines, networking to gather, share and disseminate knowledge.

- **Other skills such as**, strategic thinking, writing, teaching and learning skills, presentation skills, skills to convert information into knowledge, and skills to understand KM principles and processes are also very much essential for KM programme.

NEW ROLES OF LIBRARIANS IN KM
The conventional role of librarians was to collect, process, disseminate, store and utilize information to provide multi-disciplinary services to the personal and professional needs of the library users. They were also involved in a continuous search for excellence and codifying information sources. But now their role is not restricted to information management only. They play major role in KM programmes and in identifying, acquiring, developing, resolving, storing and sharing of knowledge.

Abell and Oxbrostated that “Librarians have to identify, acquire and evaluate internal and external sources of knowledge and integrate, organize and make relevant knowledge available to the right person at the right time”. Educating people the advantage of sharing knowledge, experience and expertise is an important task that librarians have to perform. Staff should be trained to use a wide range of retrieval and analysis tools.

The 21st century brings with it new roles and requirements for different competencies and skills for librarians, beyond those traditionally practiced and understood, thus requiring increased intellectual flexibility. Librarians now need to be equipped as, or capable of performing or adapting to, the following new roles:

- **Technology experts** both in using and training technology.
- **Knowledge mappers/engineers**: representing or mapping tacit and explicit knowledge to enable its classification, dissemination and identifying the gaps in the knowledge.
- **Knowledge gatekeepers**: acting as subject experts and familiar with evolving vocabulary (taxonomies, metadata, metatags and filtering etc.).
- **Knowledge editors** to repackage knowledge into the most accessible, appropriate formats.
- **Networkers and Knowledge Brokers**, with good networks of contacts within and outside the organisation.
- **Web designers** to display and share knowledge in eye-catching ways.
- **Programmers** to customise their instructions and services according to their customers’ needs.
- **Knowledge and information disseminators** rather than custodians of information.
- **Researchers** both for personal and professional development and for providing up to date assistance to patrons.
- **Knowledge consultants** to provide expert advice beyond the usual operational zone.
- **World knowledge content experts** to keep updated with international news in their specialised areas.
• Metadata specialists able to describe and dictate management and preservation strategies for digital information

• Knowledge Asset Managers to Identify evaluate advice upon and manage a portfolio of knowledge assets, such as patents, trademarks, copyrights, etc.

NEW CHALLENGES FOR LIBRARIANS IN ICT WORLD
Some of the major challenges faced by librarians would include:

• Content development in digital format: Information professionals must widen the scope of information management, identifying information sources and providing effective, relevant and accessible information services and capitalize on the library and information environment of the 21st century.

• Continuing Education & Training Programmes: developing professional skills through refresher courses, conferences, workshops, seminars etc.

• Financial Support: developing appropriate infrastructure/resources

• Intellectual capital management

• Technological – trauma and infrastructure

• Change management

• Management of tacit knowledge is not so easy. It is hard to know what is in human mind. It is also difficult to capture knowledge and manage it within a large academic library.

• Introduction of multi-disciplinary growth of subjects

• Need Based Curriculum: Education curriculum needs to be conceived in relation to market needs and employer perceptions about the competencies of professionals.

• Balancing both tradition and technology while designing curricula

• Ability to adopt a just-in-time rather than just in-case approach.

• Balancing both tradition and technology while designing curricula

• Creating innovations in teaching, learning and research methods to improve the transfer of knowledge.

GOOD SUGGESTIONS FOR KM
The ICT and knowledge need to work together and focus on getting the right information to the right people at the right time. The entire librarian and information scientist community should have knowledge management strategy or framework to use the ICT to disseminate the
information as demanded or required. The following points are identified for the better implementation of knowledge management in libraries mostly in Libraries:

- To provide sufficient budget
- To provide special fund for the new information and communication technologies
- To equip library with new information and communication technologies with network facility
- Interchange of staffs among libraries
- Staff sharing to develop their professional and ICT skills
- Organize a training programme and inter-change of staff for time being on State or National level
- UGC, AICTE or Government Body may establish a monitoring centre specially for libraries to monitor the standardizations of library and provide assistance

CONCLUSION
KM helps librarians in improving the services being rendered to their users. Librarians have to recast their roles as Knowledge Manager. The librarian’s roles should not be limited to being the custodians of information but they have to acquire skills to keep themselves updated so as to cope intelligently and objectively with the effective and efficient knowledge management in libraries. Information and communication technology and systems can provide effective support in implementing knowledge management. Librarians should train themselves and their staff to develop the appropriate knowledge management systems and use information and communication technologies to equipped libraries to provide better, faster and pinpointed services to its clients/users.

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