

Core Concepts of Knowledge Management for New Generation Digital Libraries: An Analysis

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ABSTRACT

The library will play a crucial role in the extension and modification of knowledge. The growing need for knowledge management has influenced every component and operation of a library. Knowledge Management requires more effective methods of information handling, speedy transfer of information and linking of information with individuals and their activities. It demands development of information systems and services and customization of information at the individual level. Libraries have been thought of as being expert at collecting and organizing published information.

This paper is intended to give an overview to assist library and information science(LIS) professionals in grasping the essence of this subject and to suggest ways in which knowledge management may continue to affect the LIS field in the near future. First, a brief overview of the origins of the field and some suggestions of why it persists in the face of numerous challenges will be provided. Development of Information Technology (IT) and its applications in Library and Information Centers, 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 mainly focuses on the concept of Knowledge Management and the role of library and information professionals in managing the knowledge and information in the digital environment. It also highlights the importance of library and information professionals in the organizations for various functions such as knowledge creation, acquisition, preservation and sharing knowledge and information.

Keywords: Data, Information, Knowledge, Knowledge management, online public access catalogue , Online resources catalogue, ICT.

Introduction

Knowledge Management arises from many different areas, concerns multiple disciplines, is fast-changing, and has a most frustrating habit of branching off into a myriad of directions. The deeper one delves into this area the more complex it seems to become. The paper is intended to give an overview to assist LIS professionals in grasping the essence of this subject and to suggest ways in which knowledge management may continue to affect the LIS field in the near future.

Data, Information & Knowledge

Data are simple, discrete, facts and figures, such as names, characteristics, and amounts. Data might be a table of circulation statistics, but once those statistics are arranged, charted, annotated, or organized in a meaningful way to describe say trends in library use, you have information.

Information is a bit more complex, for it organizes data for a meaningful purpose. Marc Porat states that "Information is data that has been organized and communicated". Stehen Abram sees the process for knowledge creation and use as a continuum where data transforms into information, information transforms into knowledge and knowledge drives and undergoing behavior and decision making. Information is visible, independent from action and decision, different in format after processing, physical product, independent from existing environment, easily transferable and duplicate. Knowledge is invisible, closely related to action and decision, different in thought after processing, spiritual product, identified with existing environment, transferable through learning and not duplicate.

Knowledge is an intellectual capital when people out of creation, add value to information, it is

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generated. Knowledge is classified and modified. It may be indexing. It is shared. Sharing of knowledge is a core element of knowledge management. IT has provided with number of possible solutions for sharing via e-mail, internet etc. Knowledge is much more complex, and a working definition of it was given by Davenport and Prusak in their book on knowledge management entitled Working Knowledge. According to Davenport and Prusak, "Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experience and information. It originates in the minds of knower. In organizations, it often becomes embedded not only in documents and repositories but also in organizational routines, processes, practices, and norms." While data and information are in a sense bound objects, knowledge is much more a process, a dynamic, or an ability to understand and to share understanding.

Knowledge is classified into three types.

1. Explicit knowledge.
2. Tacit knowledge.
3. Cultural knowledge

Explicit knowledge. It is formal and easy to communicate to others. It is the knowledge of rationality. That is, policies, rules, specifications and formulae. It is also known as declarative knowledge.

Tacit knowledge. It is complex form of knowledge. It has two dimensions namely technical and cognitive. This is personal knowledge, which is in human mind and difficult to formalize and also difficult to communicate.

Cultural knowledge. B.B.Chand describes the cultural knowledge as knowledge which includes assumptions and beliefs. It is used to understand, describe and explain the reality as well as conventions. It is also useful to form the framework among organizational members, recognize the new information and evaluate alternative interpretations and actions.

Evolution of Knowledge Management

The most current and usable definitions of KM adamantly state that it is not simply a technology (McInerney 2002; Koenig 2002; Lang 2001; St. Clair 2001; DiMattia and Oder 1997). So, while technological applications in the form of simple software programs, and more complex elaborate

systems of integrated software and hardware, are often included as part of a definition of KM, they are clearly considered to be only one component of the picture. Over time, knowledge management in organizations has come to refer to a number of integrated components. These components in successful KM programs encompass the creation, codification and application of both information and knowledge. As discussed above, information is what LIS professionals have always dealt so expertly with, those data and opinions that are captured in some fashion, primarily text, and stored for later use. Information is retrievable, storable and documented. From a KM standpoint though, the crucial distinction is that "knowledge is seen as richer than data and information" (Wright 2001). There is some uncertainty whether knowledge exists only within the one who knows, or whether it can be embedded in a process as well; the key point is that people are critical. As Blair (2002) describes it, the essential difference between data, information and knowledge [is] that when we lose data or information, we often lose something that we can physically possess, something tangible. But when we lose knowledge, what we lose is an ability to do something. Within the KM field, knowledge is often further broken down into tacit knowledge (or implicit) and explicit knowledge. The knowledge of any game say cricket would be tacit; it is lost in the attempt to express it, it resides within the knower, and is difficult or impossible to capture. Explicit knowledge is that which can be expressed and captured, at which point it becomes information. Dealing with the transition of explicit knowledge to information is a rather grey area. This results in too much of a confusion surrounding the difference between the management of information and knowledge. It is useful to note that the terms explicit

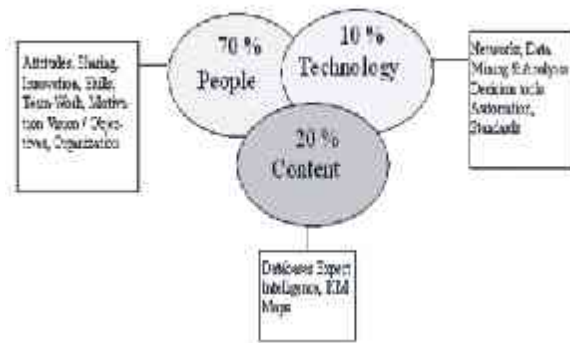


Figure 1

knowledge and information are often used interchangeably.

The key issue that separates KM from other similar concepts, such as information management, is the fundamental belief that people, as opposed to electronic or print materials, are essentially at the core of the development, implementation and success of KM initiatives (Blair 2002; Cheng 2001; Alavi and Tiwana 2002; Lang 2001).

So the need to deal with information persists, but is complicated by the need to also address that people carry tacit knowledge with them. Many initiatives seek to make codifying tacit knowledge a core part of any KM plan, but the recognition is prevalent that this is not always possible and that direct human contact is necessary in order for people to attempt to share some kinds of tacit knowledge effectively. Figure 1 depicts the various components or sub factors of knowledge management and their contributions.

The origins of knowledge management (KM) explain a great deal about its current condition. Prusak (2001) looks at the multi-disciplinary contributions that gave rise to an increasing interest in knowledge including the fields of economics, sociology, philosophy, and psychology, as well as information science. Core reasons for the development of a need and desire to manage knowledge are outlined by a number of researchers and writers in the field. There are several factors that are regularly described. The first of these is the shift from an industrial model of business, one where an organization's assets were primarily tangible and financial (e.g. production facilities, machinery, land and ever cheaper labor costs), to one where assets are primarily intangible and tied up in the knowledge, expertise and capacity for innovation of its people (Blair 2002; Prusak 1997; Lang 2001), software companies and KPO firms are some examples. Where once a business valued itself based on what it owned and how it controlled costs, we have moved into an era where competitive advantage is based on the creation of knowledge and its effective use. Over time the ability of a company to differentiate itself from the competition by streamlining production and reducing costs has evaporated. Now, in order to compete in a market where the gains from managing these tangible assets have shrunk, successful competing requires innovation the creation of new ways to do things through the creation of new

knowledge. For the foreseeable future, this will be the way in which corporations thrive or disappear. Another factor is the dramatic increase in the volume of information, its electronic storage, and increased access to information in general. (Nobody would have thought of 100 TB of data in 1970's) This has increased the value of knowledge, because it is only by knowledge that this information can be evaluated (Prusak 2001). This increased value of knowledge is exemplified by shifts in the LIS field. Once it was sufficient to help people find information; now, because there is so much more information and such wide access to this huge volume, both good and bad, it has become increasingly important that people know how to evaluate what they find, giving rise to new discipline such as Data Mining. Knowledge is also valued highly because it is closer to action (McInerney 2002). Information on its own does not make decisions; it is the transfer of information into people's knowledge base that leads to decision-making and thereby to action. The increase in the value of what people know, especially that which is difficult to capture or express, is a common theme in the literature (Alavi and Tiwana 2002; Wright 2001; McInerney 2002; Blair 2002; Prusak 2001).

Evolution of KM can be characterized as a movement from "collection development," to "collection management," to present day "knowledge management."

The Collection Development Era: Libraries across the globe expanded rapidly in the post World War II and post sputnik era of 1950 to 1975. Major portion of time was spent on acquiring material to build collections as quickly as possible. It was the era of scouring in-print and out-of-print book vendor catalogue, clearing out the inventories of book stores, raiding foreign libraries, and international book buying trips. Print material, in the form of books, journals, and manuscripts, was pretty much the exclusive, or at least the predominant, medium for library acquisitions during this "collection development" period.

The Collection Management Era: Over the next twenty-five years, from roughly 1975 to 2000, the conditions for and nature of collection development changed. The money flowed less freely; the cost of library material, particularly the cost of journal subscriptions in science and technology, rose more quickly than library budgets; and, of course,

something of an information technology revolution occurred. We can characterize this period as one that emphasized "management" over "development" in the collections field of librarianship. 1979 was a banner year for the emerging collection management field. The American Library Association (ALA) first issued Guidelines for Collection Development, which began to codify the practice of collection development and management, and the two most important and influential studies of resource development and use in research libraries were published: Charles Osburn's *Academic Research and Libraries Resources: Changing Patterns in America* and Allen Kent's *Use of Library Materials: The University of Pittsburgh Study*. Essentially, what Osburn and Kent told us was that we had to pay more attention to the changing information needs and habits of American scholars and scientist as we built research library collections. In 1981, the American Library Association sponsored its first institute on collection development and management at Stanford University. Collection management emerged as a more complete and balanced approach to the collections arena of librarianship. Not only did collection development officers and bibliographers select and acquire new resources, they also conducted use and user studies, prepared careful collection policies to guide their work, and they participated in preservation and cooperation to extend the life and scope of collections.

The Knowledge Management Era. At the beginning of the 21st century "knowledge Management" was largely focused on the concept and meaning of "collection." A collection, while still vitally important to a research library, is too static and too limited a concept to fully describe the range of information resources now offered to users. As we all know by now, digital information resources offered by our libraries to our users may or may not be actually owned by or housed in our libraries. In a new information universe characterized by multiple and changing formats and by networked access, does the term "collection" really convey what research librarians do today? Are the databases and electronic texts we lease and the Internet sites we link to really our "collections"? And beyond digital surrogates for print formats—online reference tools, full text electronic articles, and e-books—do World Wide Web sites, preprint archives, learning objects, and the burgeoning array of unpublished digital assets being created on our campuses qualify as "collections"? This

new situation where the boundaries seemed to be expanding well beyond traditional "collections," is the "knowledge management."

KM in Library-Information Centers and its need for LIS professionals

As a learning organization, libraries should provide a strong leadership in knowledge management. Libraries should improve their knowledge management in all 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, technology, staff and space, libraries must carefully analyze the needs of their users and seek to develop cooperative acquisition plans to meet the needs of users. Libraries should be developed and maintained an integrated online public access catalogue (OPAC) with both internal and external resources as well as printed and other formats of knowledge. Useful websites and knowledge sources should be regularly searched and selected from the internet and included in OPACs. In the current digital and networked knowledge age, the size of information sources on the web is growing exponentially. No one really knows exactly how many web pages are on the internet, because new web pages are added every second. Universities and research organizations are knowledge reservoirs. These highly valued intellectual assets, regardless of whether they are explicit or tacit, should be inventoried, archived, indexed, frequently updated and made accessible in digital form. Libraries should use the new approach to capture web information by cooperative efforts such as Dublin core metadata and the cooperative online resources catalogue (CORC). Other new methods such as data mining, text mining, content management, search engines, spidering programs, natural language searching, linguistic analysis, semantic networks, knowledge extraction, concept of yellow pages, and such technologies in information visualization as two dimensional or three dimensional knowledge mapping etc., have been a part of recent developments in knowledge management systems.

Blair (2002) states that successful KM requires both the ability to access stored information and the knowledge among workers to "evaluate the validity and reliability of information obtained from unfamiliar sources." this may be an opportunity for

LIS professionals to implement their expertise in information literacy instruction. Other familiar territory for LIS professionals exists in the KM field as well; this includes a continuing need for expertise in information management, and high levels of support for teams engaged in innovative pursuits (Cheng 2001; St. Clair 2001). Additionally, LIS professionals bring to KM a client-focused viewpoint, where technology is important but not dominant.

The implications for the LIS profession to make a contribution in the area of content management is likely obvious to those within the profession; Koenig urges us to make sure that it is also known outside of it. He cites a 2001 conference session that detailed a highly successful KM initiative. It was later discovered that the program involved the input of a number of librarians. When asked after the presentation whether this was considered to have a significant impact on the project's success, the session presenters admitted that it had. Koenig (2002) points out that the truly remarkable part of the story is not that librarians were useful and critical staff for project success, but that the presenters chose not to mention it in the formal presentation. The LIS profession has a responsibility to market its skills to those who could make good use of them.

Importance of I.T., HRM, User Services in Knowledge Management for LIS

To facilitate the implementation of knowledge management, a well-defined and operational knowledge management system should be in place. Latest information technology should be used in the libraries. In this regard, the library director / librarian should consider himself as the chief knowledge officer of the entire organization and should work together with the chief information officer, heads of the planning department, the computer and information technology center, the human resource management department, the finance department etc., to design and develop such a system. Such knowledge management system should be built on the existing computer and information technology infrastructure including upgraded intranet, extranet, internet and available software programs to facilitate the capture, analysis, organization, storage and sharing of internal and external information resources for effective knowledge exchange among users, resource persons (faculty, researchers, subject experts etc.), publishers, government agencies, business and industries and

other organizations via multiple channels. In recent years, many of the newly developed information technology for databases and information / document management can be utilized in knowledge management such as data warehousing, data mining, text mining etc.

Library and information centers should be developed/modified based on the perfect environment for new media applications. Due to impact of globalization, economic competition and revolution of ICT, the libraries are under going a tremendous change in their 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. Knowledge acquisition is the starting point of knowledge management in Libraries. The application of IT, 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.

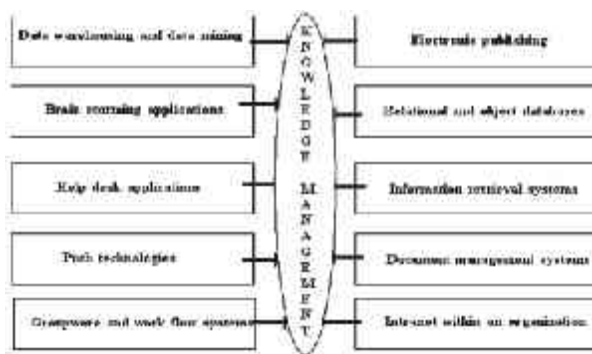


Figure 2 Highlights data wise technologies for knowledge management.

The most important resource in the knowledge economy system is the talent that grasps knowledge. The talent competition has become the focus of market competition in the knowledge economy era. In the knowledge economy era, the libraries will attach importance to vocational training and lifelong education of library staff to raise their scientific knowledge level and ability of acquiring and innovative knowledge. They also will respect the human value, guide and bring into play wisdom potentialities of library staffs. It is an important way

for raising work efficiency of library staff. An all round improvement of library staff's quality and positioning of the human value will become important objectives of knowledge management in Library and Information centers. The library staff members of Universities and research committees should be inventoried, indexed regularly and be made searchable and accessible through electronic databases created and maintained by libraries. The expertise should be appreciated with appropriate rewards and incentives. As a learning organization, libraries should allocate annual funding to provide continuing education and staff training to all staff members. Knowledge must be renewed and expanded to prevent it from becoming stagnant. Libraries should also encourage the transfer of knowledge and experience from experienced staff to new staff members. A mentoring system should be in place to help new comers to learn from experienced library staff. Informal seminars, discussion sessions for staff can interact and exchange "lessons learned" "best practices" and other experiences should be scheduled at regular intervals and at convenient times sit and chat rooms can be created through intranet libraries should be attending to favorable working conditions and environment, which will contribute to better staff retention.

The utmost goal of knowledge management is to provide users with a variety of quality services in order to improve the communication, use and creation of knowledge. Information about each user can be obtained by analyzing the records of user registration, surveys, circulation and inter library loan, frequently asked reference questions and the use of e-journals and digital resources etc., User satisfaction and needs should be collected through periodical user's surveys. The findings should be used for the planning and redesign of the existing library services. Some of the manual services of the library such as "new publication alert" and "dissemination of information" should be done automatically by employing the "push technology" with great efficiency and convenience. Each library user can also set up his virtual "my library / portal" for new information / resources provided by the library.

Conclusion

KM is an emerging field, much talked about since late 1990s. The nature of knowledge and its management is difficult to estimate. Knowledge management has been regarded as strategically

important for organizations to gain a competitive advantage over their competitors, to add value to their products, to win greater satisfaction from their customers. In the library world, there is a lesson to be learned from the business world. For any library to succeed in implementing knowledge management will require a strong leadership and vision from the top administration. Information Technology and systems can provide effective support in implementing knowledge management. Libraries should work together with Information Technology Professionals and others to develop the appropriate knowledge management systems. Libraries, with limited budget and human resources, should utilize the current management structure and technology to implement KM, either bottom-up or top-down. KM will help to increase operational efficiency of our libraries to meet ever increasing needs of our clientele. It is significantly more likely that LIS professionals will move into KM initiatives while involved in more conventional roles that already exist in organizations. It is important to realize that KM is more than technical systems and software; it also refers to the requirements of receptive organizational culture and supportive upper management needed to succeed. There is an opportunity for LIS professionals to help shape the future of knowledge management, if we are willing to become members of broader organizational communities and embrace the inherent challenges in this highly complex field.

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