CHAPTER 5

Knowledge Management Strategy

INTRODUCTION

Today, knowledge is recognized as a critical resource for sustaining competitive advantage, learning new skills, solving problems, and developing competencies. Knowledge management (KM) has become an important issue within all kinds of organizations. Organizations implement KM to optimize various types of knowledge resources and maximize their strategic value. If done properly, it can provide tremendous value-added benefits to an organization (Liebowitz, 2001).

KM is viewed as a planned and structured approach to manage the creation, sharing, harvesting, and leveraging of knowledge as an organizational asset, and to enhance an organization's ability, speed, and effectiveness in delivering products or services for the benefit of clients, in line with its business strategy (Du Plessis and Boon, 2004). The success of KM initiatives in an organization depends on creation, sharing, and proper use of knowledge (Gandhi, 2004), because creation transfer and use of knowledge within an organization reduce the chances of duplication, improve productivity, and save significant costs, while lack of transfer and use can lead to information overload and confusion, as well as wasted manpower (Clarke, 2004).

KM in libraries is not a new idea; it has a long history in library practice in the sense of managing recorded or codified knowledge. Librarians have been managing knowledge for hundreds of years, but their role has always been to identify and organize information, share information resources, and connect people to the information they need. The fundamental shift in organizational strategy is due precisely to the realization that knowledge and information are not the same. Information is relatively easy to identify, store and transfer, but it is not the same for knowledge. In this context, the earlier roles of librarians were confined to the management of information. Although information management is an important pillar of KM, KM encompasses broader issues and, in particular, creation of processes and behaviors that allows transformation of information into organizational

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knowledge. Additionally, KM includes a knowledge component that requires several organizational initiatives, including "the care, feeding and training of experts" (Blair, 2002; quoted in Sinotte, 2004, p. 193). This, according to Sinotte (2004), includes both learning and sharing as fundamental processes that are essential in order to utilize existing knowledge and create new knowledge (p. 193). This chapter explains different types of knowledge assets of an academic library and outlines a KM strategy for managing knowledge assets in academic libraries.

CATEGORIES OF KNOWLEDGE ASSETS IN A LIBRARY

One of the important functions of KM is to identify the different types of knowledge in an organization and to develop a strategy to apply that knowledge into practice to maximize its strategic value. Over the centuries many attempts have been made to classify knowledge. However, different fields have focused on different dimensions of knowledge. This has resulted in numerous classifications and distinctions based on philosophy and even religion (Frost, 2010). The literature includes numerous typologies of knowledge, including: scientific and practical knowledge (Hayek, 1945); objective knowledge and knowledge based on experiences (Penrose, 1959); declarative and procedural knowledge (Winter, 1987); incorporated, migratory, embedded, and codified knowledge (Zuboff, 1988; Badaracco, 1991; Blacker, 1993); tacit, explicit, and cultural knowledge (Choo, 2000); personal, proprietary, public knowledge, and common sense (Boisot, 1998); and core, advanced, and innovative knowledge (Zack, 1999).

One of the most cited theories of knowledge classification in the KM literature is one that distinguishes knowledge either as tacit or explicit. The concept of tacit and explicit knowledge was first introduced by Michael Polanyi in 1962, and was later adopted and elaborated by Nonaka (1991) and Nonaka and Takeuchi (1995). One of the fundamental steps in KM is to define and identify what are the key knowledge assets that need to be managed in an organization. In order to manage knowledge, it is essential to understand the nature of different types of knowledge assets in an academic library. Knowledge in academic libraries may me classified into four categories: tacit knowledge, explicit knowledge, procedural knowledge, and cultural knowledge.

Tacit Knowledge

Michael Polanyi described tacit knowledge as knowing more than we can tell, or knowing how to do something without thinking about it, like riding

a bicycle (Polanyi, 1967, quoted in Smith, 2001). According to Smith (2001), it is "practical, action-oriented knowledge or 'know-how' based on practice, acquired by personal experience, seldom expressed openly, often resembles intuition" (p. 314). So tacit knowledge is a kind of personal knowledge that is learned by members of an organization through experience and learning by doing, and is used to perform their work. It contains mental models, perceptions, insights, assumptions, personal beliefs, subjective insights, intuitions, instinct, and values. Since tacit knowledge is embedded in the minds of individuals in the form of their experience and competence, it is very difficult (not impossible) to codify and transfer to others. In the words of Nonaka (1991), "tacit knowledge is highly personal. It is hard to formalize and, therefore, difficult to communicate to others" (p. 98). Tacit knowledge can sometimes be communicated through a shared understanding between individuals. In other cases, tacit knowledge must be converted into explicit knowledge (ie, words, models, or numbers that can be understood) before sharing or communicating it to others (Becerra-Fernandez and Sabherwal, 2006). There are two dimensions of tacit knowledge as described by Smith (2001), the technical dimension and the cognitive dimension:

1. The technical dimension of tacit knowledge encompasses the kind of informal and personal skills often captured in terms of "know-how". This know-how is demonstrated when people master a specific body of knowledge or use skills like those gradually developed by master craftsmen. A craftsman develops a wealth of expertise after years of experience. But he often has difficulty articulating the technical or scientific principles of his or her craft. Thus highly subjective and personal insights, intuitions, hunches, and inspirations derived from a person's experience fall within the technical dimension of tacit knowledge.
2. The cognitive dimension of tacit knowledge consists of beliefs, perceptions, ideals, values, emotions, and implicit mental models so ingrained they are taken for granted (Sternberg, 1997). Cognitive tacit knowledge is deeply embedded in the human brain and therefore cannot be articulated very easily. Although not completely expressible in words or symbols, it may be communicated or revealed to others through rich modes of discourse that include the use of metaphors, analogies, demonstrations, mentoring, and stories.

Wijetunge (2002) classified the tacit knowledge of a university into two categories: internal tacit knowledge and external tacit knowledge. Internal tacit knowledge consists of senior and experienced employees with a sound knowledge of work procedures, rules and regulations, etc. and the unarticulated knowledge of the librarians themselves. External tacit knowledge

consists of personnel external to the university with expert knowledge, that is, service personnel, subject experts, and any other person who provides expertise to university libraries.

Bedford et al. (2015) discuss a library's tacit knowledge that takes the form of intellectual assets, which they define as "an aggregation of the intellectual capital of all of its employees." It consists of answers to questions, knowledge of sources, knowledge of subject domains, knowledge of information behaviors, knowledge of the publishing industry, foresight, etc.

Explicit Knowledge

Explicit knowledge is defined by Choo (2000) as "knowledge that is expressed formally using a system of symbols, and can therefore be easily communicated or diffused." It is codified and digitized in books, documents, reports, spreadsheets, white papers, memos, training courses, and the like. Unlike tacit knowledge, explicit knowledge is formal and systematic, and therefore it can easily be retrieved, communicated, and shared through print, electronic, and other formal means. It is a type of academic knowledge that may be acquired through formal education or structured study. Since explicit knowledge is formal and systematic, it is described in formal languages, like manuals, mechanical expressions, copyright, and patents; it is codified and stored in documents, databases, and web pages; and it is retrieved with the help of high-quality, reliable, fast information retrieval systems. However, the process of sharing explicit knowledge requires monetary investment for the development of an information technology infrastructure.

Choo (2000) distinguishes explicit knowledge either as object-based or rule-based. Object-based knowledge is found in artifacts such as products, patents, software code, computer databases, technical drawings, tools, prototypes, photographs, voice recordings, films, and so on. Object-based knowledge is represented by strings of symbols (words, numbers, formulas), or is embodied in physical entities (equipment, models, substances).

Rule-based knowledge is codified into rules, routines, or operating procedures. A substantial part of an organization's operational knowledge about how to do things is contained in its rules, routines, and procedures.

An organization's explicit knowledge also takes the form of intellectual assets which, according to Patrick Sullivan, are "the codified, tangible, or physical descriptions of specific knowledge to which the company can assert ownership rights. Any piece of knowledge that becomes defined usually by being written down or entered into a computer qualifies as an intellectual

asset and can be protected. Intellectual assets are the source of innovation that the firm commercializes" (Sullivan, 1998, p. 23, cited in Choo, 2000).

Explicit knowledge codified as intellectual assets is valuable to an organization because it adds to the organization's observable and tradeable stocks of knowledge (Choo, 2000). After codification, explicit knowledge assets can be reused to solve many similar types of problems or connect people with valuable, reusable knowledge. Once explicit knowledge is codified, it remains with the organization even after its inventors or authors leave the organization. Explicit knowledge serves three important purposes in an organization, as explained by Choo (2000):

- it encodes past learning in artifacts and rules;
- it facilitates coordination between disparate activities and functions in the organization; and
- it signifies technical skill and procedural rationality, and so helps the organization to present a self-image of competence, legitimacy, and accountability.

Bedford et al. (2015) observed that "explicit and encoded resources that libraries manage fall into the explicit knowledge category in the intellectual capital profile of their authors or creators" (p. 83). A library's explicit knowledge includes collection development policies, collection guides, conference proceedings, formal educational credentials, frequently asked questions, information standards, presentations, professional publications, reading lists, webinars, and workshops. Wijetunge (2002) identified two types of explicit knowledge in an academic institution: internal explicit knowledge and external explicit knowledge. Internal explicit knowledge consists of reports, guidelines, theses, databases, minutes of meetings, and any other type of tangible knowledge containers generated within the university. External explicit knowledge encompasses tangible material in the form of books, journals, reports, CD-ROMs, and any other media produced outside the university.

Procedural Knowledge

Procedural knowledge is defined as "an understanding of how to do a task or carry out a procedure" (Awad and Ghaziri, 2004, p. 68). It consists of step-by-step procedures for handling various tasks or explaining various occurrences. Procedural knowledge is contained in the application of a procedure and it is reflected in manual, cognitive, and mental skills. Procedural knowledge usually involves psychomotor skills such as holding on to a handrail while riding an escalator. However, some procedural knowledge

is not psychomotor. Examples of procedural knowledge in the context of a library include acquisitions and selection knowledge, budgeting knowledge, cataloging knowledge, circulation knowledge, facilities management knowledge, information-finding strategies, knowledge of information sources, literacy training knowledge, personnel management knowledge, etc.

Cultural Knowledge

Davenport and Prusak (2000) emphasized that, for a KM system to be successful, it is critical to have a knowledge-oriented culture; that is, a culture that encourages and rewards knowledge sharing. The cultural knowledge of an organization consists of the beliefs that are held to be true based on experience, observation, and reflection about itself and its environment (Choo, 2000). An organization, over time, develops shared beliefs about the nature of its main business, core capabilities, markets, competitors, and so on. These beliefs are used as criteria for judging and selecting alternatives and new ideas, and for evaluating projects and proposals. Cultural knowledge is used in an organization to answer questions such as "What kind of an organization are we?," "What knowledge would be valuable to the organization?," and "What knowledge would be worth pursuing?" The answers in turn depend on shared assumptions and beliefs about what business the organization is in, what its core competencies are, and how it wants to grow over time (Choo, 2000).

Leonard (1995) describes how organizations supply and sustain values and norms that "determine what kinds of knowledge are sought and nurtured, what kinds of knowledge-building activities are tolerated and encouraged" (cited in Choo, 2000). Although cultural knowledge is not written down (but is conveyed in stories, histories, and reward or evaluation systems), it remains with the organization through employee changes and staff turnover. Cultural knowledge in a library includes collaborative, community-oriented, fair rewards and recognitions, service orientation and attitude, learning culture, mentoring and coaching culture, open-mindedness, being open to different types of learning experiences, being open to experimentation, and a strong community culture (Bedford et al., 2015).

To make KM efforts successful, it is important to differentiate between information and knowledge. Gandhi (2004, p. 371) emphasizes that:

> *Not all information is knowledge. Information cannot become knowledge until it is analyzed and acted upon, and it will only be acted upon in the right organizational culture. While most organizations and employees suffer from information overload, they do not suffer from knowledge overload. On the contrary, there is a dearth of*

knowledge. One of the biggest challenges of KM lies in being able to make sense of the mountains of information, sifting out valuable information, and sharing it.

Academic libraries have different types of knowledge: tacit, explicit, procedural, and cultural. In libraries, tacit knowledge resides in senior and experienced employees with a sound knowledge of information resources, work procedures, rules and regulations, etc. and the unarticulated knowledge contained in the librarians themselves. Explicit knowledge is either created within the organization, including reports, memos, guidelines, theses, minutes of meetings, etc., or acquired from external sources, including books, journal articles databases, external reports, government information, etc. Procedural knowledge includes the knowledge of various library processes and functions (eg, knowledge of acquisition and technical processes, etc.). Cultural knowledge includes "the shared assumptions and beliefs that are used to describe and explain reality, as well as the criteria and expectations that are used to assign value and significance to new information" (Choo, 2000). Examples of different types of knowledge assets of libraries are shown in Table 5.1.

All categories of knowledge are considered as the key knowledge assets of an academic library which should be managed properly. KM provides academic libraries with an enormous opportunity to improve their effectiveness, both for themselves and their parent institutions. Librarians in academic libraries can adopt KM practice as a way to expand the library's role in areas such as administration or support services, where libraries have had little impact in the past. IT serves as a tool to help with capturing, organizing, sharing, and applying knowledge. An open favorable culture that encourages sharing of ideas and best practices and the transfer of knowledge is a critical enabler of KM.

STRATEGY TO MANAGE KNOWLEDGE IN LIBRARIES

One of the important objectives of KM is to turn an organization into a learning and sharing organization by linking people together and creating a flow of knowledge generated by people in different units. Thus the purpose is innovation and reuse. Innovation is closely linked to the generation of new knowledge or new linkages between existing knowledge, while reuse forms the basis for organizational learning and should be viewed more as a dissemination of innovation (Dalkir, 2005). A KM strategy is a general, issue-based approach to defining operational strategy and objectives with specialized KM principles and approaches (Srikantaiah and Koenig, 2000).

Table 5.1 Knowledge assets of libraries

Types of knowledge	Examples of different types of knowledge
Tacit knowledge	Answers to questions
	Knowledge of library collections
	Knowledge of subject domains
	Knowledge of information behaviors
	Knowledge of scholarly publishing models
Explicit knowledge	Collection development policies
	Collection guides
	Conference proceedings
	Formal educational credentials
	Frequently asked questions
	Information standards
	Professional publications
	Reading lists
	Webinars and workshops
Procedural knowledge	Acquisitions and selection knowledge
	Budgeting knowledge
	Cataloging knowledge
	Circulation knowledge
	Facilities management knowledge
	Information-finding strategies
	Knowledge of information sources
	Literacy training knowledge
	Management knowledge
	Program planning knowledge
	Reference service knowledge
	Knowledge of search strategy formulation
	Storytelling knowledge
	System design knowledge
Cultural knowledge	Collaborative, community-oriented, fair rewards and recognitions
	Service orientation and attitude
	Learning culture
	Mentoring and coaching culture
	Open-mindedness
	Different types of learning and experimentation experiences
	Strong community culture

Courtesy Bedford, D.A.D., Donley, J.K., Lensenmayer, N., 2015. The role of librarians in a knowledge society: valuing our intellectual capital assets. In: Current Issues in Libraries, Information Science and Related Fields. Advances in Librarianship, vol. 39, pp. 81–113. Published online: 15 June 2015 http://dx.doi.org/10.1108/S0065-283020150000039011 (accessed 15.12.15).

The objective is to identify how the organization can best leverage its knowledge resources to develop innovative products and services and to gain a competitive advantage over its competitors. One of the important steps in KM implementation is to define a KM strategy. Once the KM strategy is clearly defined, other options like baselining and technology may be explored. KM strategy helps an organization to develop a road map that can be used to identify and prioritize KM initiatives, tools, and approaches in such a way as to support its long-term business objectives. A KM strategy, according to Dalkir (2005), helps to address the following questions: (i) Which KM approach, or set of KM approaches, will bring the most value to the organization? (ii) How can the organization prioritize alternatives when any one or several of the alternatives are appealing and resources are limited?

Academic libraries have long been described as the heart of their universities because of the strategic position they occupy. They were established to support the mission of the universities by providing resources to aid teaching, learning, and research. The environment in which academic libraries operate today and the way people search and access information has changed due to the rapid developments in information and communication technologies (ICT). Development of the Internet, the World Wide Web, user-friendly databases, and search engines has not only made a profound impact on the structure and functioning of academic libraries, but also has challenged the status of academic libraries as the only provider of information. This is because of the alternatives, such as Google Scholar, that are available for people to locate and access scholarly literature from commercial publishers. Technological changes, along with external pressure of market forces, have forced academic libraries to transform their structures and implement new managerial processes. These changes help them become more flexible and thereby stimulate innovation and performance to survive in the face of competition from emerging groups of information suppliers and ever increasing levels of user expectations (Sarrafzadeh et al., 2010). KM is one of these processes, and has been recognized worldwide as a very useful solution for the survival and success of academic libraries (Porumbeanu, 2010).

KM strategies are broadly classified as (i) codification and (ii) personalization. The major difference between these two strategies is that they emphasize different aspects of KM; that is, one strategy focuses on knowledge transfer and sharing, and the other on processes and technology. A codification strategy is described as extracting explicit knowledge from the person

who developed it, storing it in databases, and promoting its subsequent reuse by anyone who needs it (Kumar and Ganesh, 2011). The success of a codification strategy for managing knowledge in an organization depends on the use of information technologies, such as intranets, knowledge repositories, document management systems, information retrieval systems, data mining or knowledge discovery tools, etc., to enhance the quality and speed of knowledge capture, storage, organization, retrieval, and transfer.

It is also believed that a great deal of organizational knowledge is tacit in nature and the use of information technology alone is not sufficient to share and use this type of knowledge. Therefore the emphasis of a personalization strategy is on tacit knowledge and its transfer and sharing among employees. This may be facilitated by direct interactions between people by connecting them with each other (Hansen et al., 1999). However, the use of this strategy requires investment in building networks of people, where knowledge is shared not only face to face, but also virtually over the telephone, by e-mail, and via video-conferencing. Use of the Internet (e-mail, social networking, etc.), teleconferencing and video-conferencing, communities of practice, storytelling or mentoring, and setting up shared physical and virtual spaces are some of the common practices related to this strategy.

KEY COMPONENTS OF KM STRATEGY

KM strategy has three critical components: people, processes, and information technology. Each of these components plays a significant role in KM and can have a tremendous impact on its success or failure. The state of knowledge maturity can be measured by systematically addressing these three basic pillars of KM, as they are recognized as the key foundation areas of KM:

- *People*: people and culture—these address the "mindset" and relate to attributes of assessing people and culture.
- *KM process*: process and strategy—these facilitate and guide the efforts of the people to capture and use the knowledge in the organization to achieve business benefits.
- *Information technology*: information technology infrastructure—this is an enabler that helps people harness the maximum out of KM initiatives.

People and Culture

One of the most important enablers of KM is an open and favorable culture that encourages people to interact with each other, share ideas, experiences and viewpoints, and be heard without fear of reprisals. The absence of a

favorable culture that encourages collaboration, trust, knowledge sharing, listening, learning, and creativity can be a major barrier in developing and implementing a successful KM project. KM has two parts: first, management of knowledge and information; and second, the management of individuals who possess specific expertise, abilities, or knowledge. These two parts are integrated with the help of specific processes and technology to facilitate KM. The ultimate goal of KM is to manage explicit and tacit knowledge within an organization. Explicit knowledge in an organization can easily be identified, acquired, organized, stored, and transferred. To manage explicit knowledge, organizations must:

- generate, create, or acquire knowledge;
- codify and organize knowledge to facilitate easy access;
- make knowledge available to others through communication or publications;
- facilitate access to, and retrieval of, knowledge; and
- use and apply knowledge to solve problems, support decisions, improve performance, coach, and analyze situations and processes to support business activities (Sahasrabudhe, 2000, cited in Gandhi, 2004).

As discussed above, the most valuable knowledge of an organization resides in the minds of its workers, which is usually known as tacit knowledge or the intellectual assets of an organization. Organizations face difficulties in transferring and utilizing this type of knowledge. To make use of this knowledge, it must either be converted into an explicit form or shared with others. Different techniques are used for the codification or articulation of tacit knowledge. Knowledge may be shared either face to face or remotely with the help of ICT. Communities of practice, apprenticeship, mentoring, tutoring, formal and informal meetings, conferences, seminars, workshops, etc. are some of the methods of sharing knowledge face to face. Telephones, video-conferencing, e-mail, intranets, and social networking are some important ICT-based tools used to share knowledge virtually. Gandhi (2004) mentioned that "tacit knowledge can be managed in two ways. It can be converted to explicit knowledge, through written communications, interviews, and oral histories. Organizations can also create knowledge communities or communities of practice to transfer tacit knowledge through face-to-face interaction, verbal communication and dialog, hands-on instruction, interactive problem solving, networking, coaching, mentoring, training, and professional development opportunities" (p. 371).

The success of an organization depends largely on its culture, which in turn influences the employees' attitudes and behaviors. In the context of a discussion on the strategy of KM implementation, the change of culture

at organizational level is extremely important. The existence of a favorable environment for communication, collaboration, knowledge sharing and transfer, as well as easy identification of the organization's knowledge assets, is essential in making KM initiatives successful. If libraries and other information services are to survive in the contemporary information marketplace, the creation of a culture oriented towards performance, which appreciates and encourages communication, collaboration and that rewards creativity and new ideas is essential. This also has to be a culture oriented towards people, employees and users, one which meets their information needs and one of permanent change, oriented towards learning and continuous professional training, and one that stimulates knowledge sharing and development. Thus a knowledge and learning-oriented culture would facilitate the implementation and development of KM systems, which are extremely important for organizations such as libraries.

KM Processes

KM provides an opportunity for libraries to leverage the available knowledge that may help librarians to carry out their tasks more efficiently and effectively (Maponya, 2004). The KM process, according to Roknuzzaman et al. (2009), consists of the following steps:

- identification of knowledge needs;
- the assessment of existing knowledge resources and services;
- acquisition of new knowledge in order to accomplish the knowledge needs;
- integration of new knowledge and services;
- modification of the existing system;
- replacing outdated knowledge;
- evaluation of knowledge;
- continuous improvement; and
- providing knowledge in the best possible way to all members of the community.

Thus the process of KM implementation involves identification, acquisition, capture, codification, storage, sharing, and application of knowledge. These processes are facilitated by the application of IT. Additionally, an open and favorable culture is required to encourage people to share their knowledge and best practices with other people in the organization. The process of KM implementation is a dynamic and cyclical process that motivates employees to continuously engage in acquiring new knowledge, creating new information and knowledge on the basis of acquired knowledge, sharing

knowledge with other employees in the organization, and applying new knowledge to improve the overall performance of the organization in terms of developing innovative products and services. But three things are essential to make KM initiatives successful. First, people must have the knowledge and willingness to acquire new knowledge; second, they must use and apply that knowledge in working practice; and third, they must have the ability to know when to apply or use that knowledge (Gandhi, 2004). The knowledge processes introduced above are briefly described below.

Knowledge Identification and Acquisition

The first step in the KM process is the identification of existing knowledge which is valuable, reliable, and useful to the organization. According to Gandhi (2004), the following types of knowledge may be useful for librarians in libraries:

- knowledge of a specific job or task, for example, how to do reference work;
- a list of subject- or task-level experts who have the best qualifications, the latest training, or the expertise to best perform certain jobs/tasks;
- a list of experts who can solve particular types of problems that have the potential to reoccur;
- knowledge of historical precedents—have certain processes been tried before and what was their outcome;
- knowledge of users and competitors; and
- knowledge about creating successful project teams—knowing who has the skill sets for similar projects and who has worked together successfully in the past.

For the mapping and inventory of existing knowledge resources, libraries need to carry out a knowledge audit. With the help of a knowledge audit, libraries can easily measure the gap between available knowledge and required knowledge. This gap can be filled by acquiring new knowledge in the organization.

If the required level of knowledge is not available, then it has to be acquired. Since the success of KM depends on the availability of knowledge in the organization, staffs that are recruited must have knowledge of work processes. They are also expected to acquire knowledge continuously from different sources to keep them updated. According to Maponya (2004), knowledge in libraries can be acquired through:

- establishing knowledge links or networking with other libraries and with institutions of all kinds;
- attending training programs, conferences, seminars, and workshops;

- subscribing to listservs and online or virtual communities of practice; and
- buying knowledge products or resources in the form of manuals, blueprints, reports, and research reports.

Knowledge in libraries is also acquired through knowledge fairs, learning communities, study mission, tours, advisory boards, job rotation, stories, myths, and task forces, experiments, and observations (Smith, 2001). Other methods of knowledge acquisition in libraries include transfer of knowledge directly from experienced employees to less experienced employees. The process of direct transfer of knowledge from people to people is known as socialization, where skills may be transferred through training, apprenticeship, and mentoring. Additionally, libraries organize training programs, conferences, seminars, methodological workshops, and formal or informal meetings to provide learning opportunities for their employees.

Knowledge is also acquired indirectly by writing down the answers to the following questions:

1. What do you know about your strengths?
2. What are the strengths, weaknesses, values, and ambitions of others with whom you work?
3. How would you approach a similar job differently in the future?

If a library does not possess sufficient levels of knowledge internally, it must therefore be acquired from external sources if it is useful to the goals of the library. The library as an organization must look outside its own boundaries to outsource or acquire new knowledge. Knowledge, particularly tacit knowledge, can be acquired through external sources by collecting and compiling information about knowledgeable human resources. One of the best methods is to maintain résumés online and keep these résumés updated. These résumés must show the unique expertise of people so that they may be consulted. Choo (2000) suggests compiling an expert directory for providing quick access to expertise. This can be done by maintaining electronic yellow pages. The electronic yellow pages must be organized properly to find relevant experts. They should include complete contact details so that when an expert is located, he or she may be contacted for assistance. A link should be provided in the yellow page for sending e-mails or viewing personal home pages.

Knowledge Capture and Codification

According to Gandhi (2004), knowledge capture "involves the key inputs and outputs of knowledge. Key inputs may include specific data and information, verbal or written communications, and other shared explicit and tacit

knowledge such as best practices. Key outputs may be [in the form of] internal documents, reports, research papers, procedures, internal benchmarks, and best practices" (p. 373). Knowledge capture is important for the success and development of a knowledge-based organization. Much of the knowledge in an organization resides in the heads of the people, and if it is not captured and stored, it is more likely to be lost when an employee leaves the organization. Therefore it is essential to identify the expertise and the skills of staff and capture it to avoid a collective loss of organizational memory.

Libraries need to develop systems to identify people's expertise so that it may be captured, shared, and reused in the future. Formal processes of capturing knowledge include collating internal profiles of librarians and also standardizing routine information-update reports. Additionally, libraries can capture the most commonly received enquiries at the reference desk and place them within easy reach to better serve users in the shortest time possible. It is important to create databases of frequently asked questions to enable librarians to not only provide an in-depth customized reference service but also to become knowledgeable about handling different enquiries (Maponya, 2004).

Since tacit knowledge is intuitive and practice-based, it cannot easily be passed on to others. To make the best use of tacit knowledge, it must be codified into an explicit form. Once tacit knowledge is codified and converted to explicit knowledge, it may easily be stored, organized, combined, accessed, shared, and manipulated in different contexts. The codification of knowledge provides several benefits to libraries:

- Codification enables libraries to secure knowledge. A library is in less danger of losing its intellectual assets, even when its employees retire or leave the organization.
- Codification enables fast access and retrieval of knowledge.
- Codification facilitates sharing, reuse, reflection, and ongoing learning.

The processes of codification and representation of knowledge for access and reuse are not new to Library & Information Science (LIS) professionals, as they are involved in many stages of the knowledge processing cycle. Gandhi (2004) outlined the following steps in the codification and representation of knowledge:

1. Identifying, acquiring, or extracting valuable knowledge from documents, discussions, or interviews, usually accomplished with the help of subject matter experts.
2. Refining, writing up, and editing "raw knowledge" (such as project files, presentations, e-mail messages), and turning it into "processed knowledge" (such as lessons learned, best practices, case studies).

3. Organizing the processed knowledge and making it accessible by adding index terms, subject headings, cross-reference links, and metadata.
4. Packaging, publishing, and disseminating knowledge through a variety of channels, including intranet web pages, CD-ROMs, subject-oriented pathfinders, and "knowledge portals" that are focused on particular business needs or issues.
5. Designing and managing the overall information architecture consisting of a set of well-defined standards and schemes for organizing, classifying, publishing, and navigating the organization's intellectual content.

Knowledge Organization and Retrieval

Knowledge organization and retrieval refers to the processes of "knowledge structuring and storing that make it more formalized and accessible" (Massa and Testa, 2009, p. 130). These processes focus on developing systems to systematically capture, record, organize, and store the key inputs and outputs of knowledge, and to find, collect, and organize internal knowledge and best practices (Gandhi, 2004).

Librarians have experience of knowledge organization. They have already using library classification schemes, cataloging codes, lists of subject headings, thesauruses, and metadata sets for creating surrogates of documents. This experience may be utilized by librarians in the development and use of knowledge taxonomies, knowledge mapping, electronic yellow pages, data mining, and data warehousing to manage both tacit and explicit knowledge. Librarians also have the expertise to achieve file management, create databases and archives to enable knowledge sharing for all of this material and to make it available to a wider audience. The experience of librarians in the organization of knowledge via metadata, understanding user needs, knowledge of integrated and federated searching, and professional skills must extend beyond commercial information (Roknuzzaman et al., 2009).

In a university, faculty members and researchers produce thousands of research papers, books, theses, conference papers, reports, and working papers. Much of this material is not published commercially in books or journals. "Learning objects" are produced for use in teaching and they are not easy to locate outside the course for which they have been developed. Much of this material is created in digital form and this might be captured using web-based digital submission systems. Librarians have already realized the need to create institutional repositories (IRs) for capturing, organizing, archiving, and providing access to knowledge generated within a university. IRs are created for members of the university to store scholarly output so that it can be managed well and retrieved easily.

Once knowledge is organized, it can be stored in knowledge repositories for preservation as well as multiple uses. For the purpose of knowledge retrieval distribution and sharing, a number of knowledge discovery tools and techniques are used to facilitate the retrieval process. Web-scale discovery tools, data mining, browsing, and searching are some of the popular tools used for knowledge discovery and retrieval. Since explicit knowledge can simply be converted into digital form, it can easily be kept in digital files and databases. However, organizing and storing tacit knowledge is still a challenge for LIS professionals. Since tacit knowledge is hard to articulate, it might need to be packaged in a more indirect form, like a storytelling video. Agent-based retrieval systems may be used to capture the interests and or knowledge of library staff and users.

Knowledge Transfer and Sharing

Knowledge transfer is described by Massa and Testa (2009) as "the processes of transferring, disseminating and distributing knowledge in order to make it available to those who need it" (p. 130). The transfer of knowledge encompasses activities and processes associated with the flow of artifacts from one agent to another. Sharing of knowledge is described by Van den Hoof and De Ridder (2004) as the process whereby individuals mutually exchange explicit and tacit knowledge and jointly create new knowledge. Explicit knowledge can easily be captured, stored in databases, retrieved, and distributed across the organization. However, valuable knowledge exists in people; it is more difficult to share this information. Providing access to this know-how to other organizational members eliminates duplication of efforts and forms the basis for problem solving and decision-making.

Transfer of knowledge enables library staff to put this knowledge into practice and share it with their colleagues. Then it may be collectively applied, utilized, and used to attain the library's ultimate goals of satisfying users' needs, developing research activities, creating new knowledge, promoting library functions, and building up a knowledge culture. The competitiveness, quality of products and services, and overall performance of the library largely depend on the dissemination or transfer of knowledge. Knowledge sharing among employees of the library gives way to sharing of ideas and knowledge. This is a very effective means of knowledge creation, especially in the case of tacit knowledge. The more the employees interact, the more tacit knowledge is created. Effective knowledge-sharing practices enable libraries to reuse and regenerate knowledge at individual and organizational levels. Knowledge in the library can be transferred and shared in the form of a number knowledge-based services and products, including

e-mail, electronic publications, presentations, websites, online discussion forums, video-conferencing and collaboration tools, virtual classrooms, corporate intranets, web portals, blogs, knowledge banks, etc. (Roknuzzaman et al., 2009).

Knowledge Use and Application

Knowledge application is defined "as the process of incorporating knowledge into an organization's products, services and practices to derive value from it" (Massa and Testa, 2009, p. 130). The life cycle of KM begins with the acquisition of knowledge and ends with the application of this acquired knowledge in practice. Employees use and apply this knowledge to improve performance and generate new knowledge in the process. The application of knowledge is the ultimate goal of the whole knowledge process. Knowledge is used and applied for taking decisions and solving problems. In the library context, the acquired knowledge may be used and applied for responding to the answers of reference questions, taking decisions about the best reference sources to consult to answer a particular question, developing need-based collections, planning and redesigning innovative library services, avoiding redundancy, etc.

Information Technology

KM initiatives have the best chance of success when the organization's information technology infrastructure is already in place, is robust and diversified enough to suit differing needs of staff, enabling staff to coordinate. IT applications facilitate and improve the process of collection, organization, storage, and dissemination of knowledge. Organizations use IT-based systems, such as relational database management systems, document management systems, the Internet, intranets, search engines, workflow tools, performance support systems, decision support systems, data mining, data warehousing, e-mail, video-conferencing, bulletin boards, news groups, and discussion boards. These systems provide a number of possible solutions for capturing, organizing, and sharing recorded human knowledge. Thus information technology is vital in enabling and facilitating many KM processes and initiatives. With the proper use of information technology, organizations can extract and organize knowledge, make it accessible to employees, and even speed up the knowledge transfer process.

IT supports KM initiatives in academic libraries in two ways: by providing the means to acquire, organize, store, retrieve and disseminate knowledge (Sabashini et al., 2012), and by connecting library users with librarians

and library services through the use of web-based ICT tools to communicate with library users and share information and knowledge (Jain, 2007; Yuan et al., 2013). The most common applications of IT-based tools in academic libraries include:

- communication tools such as e-mail, instance messaging, telephones, teleconferencing, intranets, video-conferencing, etc.;
- long-standing tools such as databases, institutional archives, etc.; and
- social media tools such as wikis, blogs, online communities, and social networking sites.

Some examples of ICT that can enhance or support KM initiatives are listed below:

- video-conferencing/telephone
- groupware; an example is Lotus notes
- intranets/Internet
- portals
- expertise location
- electronic bulletin boards
- knowledge directories
- databases
- electronic mails
- intelligent search engines
- blogs/Facebook/Twitter.

KM MODEL FOR LIBRARIES

Several KM models have been developed for manufacturing and service sector organizations. On the basis of a review of literature and personal observations during the research, a model for the successful implementation of KM is proposed to suit the requirements and conditions of academic libraries. An attempt is made to outline the elements of the proposed model to formulate some basic steps which may be followed as the starting point in the implementation of KM in academic libraries. The proposed model is composed of five elements, as shown in Fig. 5.1.

Knowledge and Expertise

The fundamental element of the proposed model is the requirement of professional competencies. Professional competencies based on activities such as knowledge organization and preservation, information search, retrieval and dissemination, the creation of information products and services

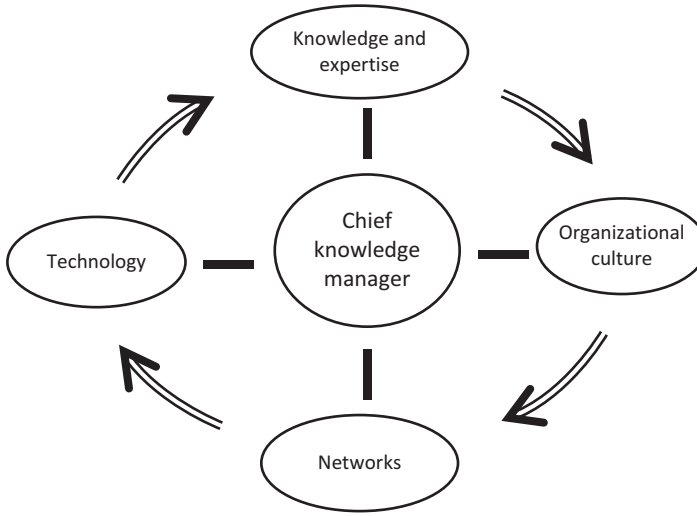

Fig. 5.1 Knowledge management model for libraries.

with added value constitute essential organizational assets of academic libraries. Therefore firstly academic libraries should identify and focus on those few processes which they do best, developing and improving them all the time. Through a variety of mechanisms of organizational learning, academic libraries can create, collect, and use the knowledge necessary for these processes. Based on this knowledge, they can develop new operating procedures and improve the existing ones. Organizational learning is essential for developing professional competencies and it must be fostered and enhanced continuously.

Organizational Culture

The second element of the proposed model is the people, the human resources, and the organizational culture. Organizational culture (including aspects such as communication, organizational learning, knowledge sharing, and communities of practice) is a fundamental element of the KM process. The chances of success in the implementation of KM are almost absent in any kind of organization, including libraries, without the development of a collective culture open to change. For increased efficiency in KM in academic libraries, learning, creativity, and quality should be valued and sought, the acquisition of new skills and knowledge must be an ongoing process, investment in human resources and in the further training of employees should be made. Communities of practice should be encouraged. An online

discussion forum may be created, which may help to improve the processes of organizational learning, sharing of knowledge and expertise. Appropriate measures must be taken by librarians so that knowledge sharing takes place, perhaps leading to the establishment of organizational changes to encourage greater use of this forum. A system must be set up for periodic evaluations and rewards to encourage people to contribute their knowledge and to use the knowledge of others.

Information Technology Infrastructure

The third element of the proposed model is technology, which can underpin the process of KM by improving the methods of organizational learning and knowledge sharing. Technology plays a fundamental role in creating a culture and an infrastructure to stimulate and enable access to knowledge and expertise exists in the organization. KM systems based on advanced technologies may collect the relevant knowledge and experience in an organization and may make it available anywhere and any time, thus supporting the process of decisions that are made within the library. KM systems support the processes of identification and codification of knowledge, sharing and distribution of knowledge, and also the processes of creation of new knowledge and integration of this into the organization. With these systems, knowledge can be preserved in the organizational memory for the training of future employees and for helping them in making decisions. Technology-based systems can also connect academic libraries to external sources of knowledge. With the help of these systems, people having expertise in specific areas can be located and a knowledge directory can be created. This knowledge directory can help people: (i) contact specific areas of expertise, (ii) get in touch with those who possess knowledge, and (iii) easily identify experts and share knowledge with them.

Networks

The fourth element of the proposed model is networks, such as the partnerships with other public or private organizations and libraries. Networks and collaboration represent a solution for extended access to knowledge for more creative uses and for increased quality of the processes and services. Academic libraries should be organized in networks, with all the human, information, knowledge, and technology resources they possess. This will provide an opportunity for academic libraries to use human knowledge productively, and thereby make academic libraries more efficient and competitive. Also, as part of a network, academic libraries are able to focus on

creating and improving the facilities and infrastructure that encourage and support learning. Through partnerships and networks, academic libraries have more knowledge assets, which ultimately improve overall library functions and services.

Creation of the Position of Knowledge Manager

The last element of the proposed KM model is the creation of the position of knowledge manager in academic libraries. The creation of a knowledge manager position appreciably increases the chances of success in the implementation of KM in academic libraries. Knowledge managers will coordinate the technological infrastructure, human resources, the processes of creation, use and sharing of knowledge, and the cooperative relationships of the organization. They will be responsible for the smooth running of the processes of KM within the academic library, will coordinate the design and implementation of KM programs and systems that will find new sources of knowledge and will identify new ways to use knowledge effectively in the organization.

This model will help academic libraries in the implementation of KM through the:

- identification of the most important processes, products and services of academic libraries, and their evaluation;
- identification of knowledge resources and skills in the organization in order to exploit these resources; and
- identification of potential external partners for collaboration.

The proposed model places the knowledge assets of the organization (which are in the minds of people, in the organization processes, practices, and activities) at organizational level to support the expansion and improvement of the main activities deployed by academic libraries:

- the acquisition, organization, processing, and preservation of documents;
- information search and retrieval;
- information dissemination;
- development of information processes and services;
- provision of information services for users, etc.

SUMMARY

The process of KM implementation starts with the internal analysis of the organization to identify its main activities, operations, and most requested services. The next step in the process of KM implementation is the

identification of relevant skills, competences and knowledge, which are the basis of carrying out different operations and providing services. Once the relevant and appropriate skills, competences and knowledge are identified, they must be put into action through the application of appropriate KM tools and techniques. If relevant skills, competences, and knowledge are not available internally in the organization, they must be acquired, developed, and improved through the process of organizational learning. Additionally, an organizational culture, which is open to change and favorable in terms of organizational learning, knowledge sharing cooperation and teamwork, is essential for better communication at organizational level. Finally, a well-defined KM strategy needs to be formulated in order to integrate the essential components of a KM system, that is, people, processes, and information technology. The success or failure of KM implementation largely depends on systematically integrating these three basic pillars of KM, as they are recognized as the key foundation areas of KM. Formulation of a well-planned KM implementation strategy is one of the important steps in the KM implementation process, as it leads the whole organization towards achieving a successful KM implementation and allows it to stay competitive. The KM strategy should be rooted in and guided by an understanding of the nature and types of organizational knowledge, so that it can tell us what works, what matters, what we should trust, where things can go wrong, and how we can fix them.

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