

## **APPLICATIONS OF KNOWLEDGE MANAGEMENT IN THE AREA OF LIBRARIANSHIP AND INFORMATION SCIENCE: A SYSTEMATIC REVIEW**

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### **ABSTRACT**

The knowledge management (KM) has become an important guideline for the Information and Knowledge Society, as well as for libraries. Thus, this article presents a literature review using a systematic approach, with the proposition of identifying trends and applications of knowledge management in the areas of Information Science and/or Library Science. It has been noticed that there are differences between the concepts of information management and knowledge management characterized as barriers to the implementation of KM. Libraries have often developed KM activities (especially regarding the sharing of knowledge, through Web 2.0 features). The uses currently applied are related to the use of blogs, wiki tools, shared classification systems (tagging), social networks, among others. But in some cases, the libraries are not properly aware of their work. It is necessary that they make KM a part of their routines and think of it in a systematic way, in order to channel resources, planning, among other things, and benefit from the improvements that can be achieved through KM, perfecting their services and satisfying their users.

**Keywords:** Knowledge Management; Information Management; Librarianship; Information Science; Library Science; Knowledge Management Practices.

### **1 INTRODUCTION**

The knowledge management (KM) can be defined as the systematic coordination of people, technologies, processes and organizational structure in order to add value to the organization through the reuse of knowledge and innovation. This coordination is achieved by way of the creation, sharing and application of knowledge (DALKIR, 2005).

Information Science (IS), on the other hand, is a discipline that investigates the properties and behavior of information, including its flow, media processing, access and use. It is related to knowledge, which covers the origin, collection, organization, storage, retrieval, interpretation, transmission, transformation and utilization of information (GLOSSÁRIO..., 2009).

Librarianship is the area that studies the processing, organization, representation and use of information in information units. Originally it was restricted to libraries, justifying its name. But with the technology and the information society advent librarianship courses and its professionals began to work in several different environments.

Considering Librarianship as the oldest activity of organizing documents, IS provides it the ability of building theoretical frameworks and achieving a scientific status of its own while IS finds in Librarianship part of the history and practices which compose what has been developed from many disciplines and applications (ORTEGA, 2004).

In this sense, the relation between KM and IS and / or librarianship seems clear. However, there are not many studies that elucidate the differences and relation between these areas, in addition, the multidisciplinary aspect may be complicated to many approaches. "The first concept needed to any discussion in this field refers to the recognition of its complexity and the need to adopt integrative theoretical-methodological approaches" (SOUZA; DIAS; NASSIF, 2011, p.56).

Perhaps the best explanation lies in the fact that one deals mostly with information and the other focuses on knowledge, naming them as Information Management (IM) and Knowledge Management, respectively. However, it is not clear at what point one ends and the other begins, and if indeed there is a clear difference between these two elements (information and knowledge) in areas that address these issues. One can consider that information and knowledge are the same element developing and being added within a cycle that transforms data into information, information into knowledge, knowledge into wisdom an intermittent cycle.

The IM and KM represent an area of knowledge where contributions are present in several areas and/or fields of knowledge, such as Administration,

Computer Science, Information Science and Industrial Engineering. This epistemological confluence conditions a spectrum of perspectives and heuristics research that often hamper the theoretical construction and practices in this sphere of knowledge (SOUZA; DIAS; NASSIF, 2011).

However, the dividing line between these areas seems tenuous, we believe that it may be a new approach to an area of knowledge already known or different nomenclatures to refer to the same phenomenon. Perhaps a more innovative approach will fit the Information and Knowledge Society.

In this sense, we propose a systematic literature review in order to understand these phenomena through behavioral studies, in order to answer the following question: What are the trends and applications of Knowledge Management in Information Science and / or Librarianship?

### **1.1 Objectives**

Based on the studies in the literature review, we have the following main objective: identify trends and applications of knowledge management in Information Science and/or Librarianship.

To achieve the main objective is mandatory to pass by the following objectives: a) to raise the theoretical approaches and concepts cited in the studies, as well as the relationships between them; b) identify the tools and practices of knowledge management proposals in studies; c) synthesize research through a concept map.

## **2 METHODOLOGY**

The gathering of information and answering the question posed will be realized through a systematic literature review. It is a model that uses rigorous and explicit methods to identify, select, collect data and describe the relative contributions to the research (CORDEIRO *et al.*, 2007).

A good systematic review is based on the proper wording of a question. A well-structured question is the beginning of a good systematic review because it

defines what are the strategies adopted to identify studies to be included and which data will be necessary to be collected from each study (CORDEIRO *et al.*, 2007, p.429).

A systematic review comprises the following steps: a) planning; b) implementation; c) research report (TRANSFIELD; DENVER; SMART, 2003).

## 2.1 Search Planning and Execution

For this review was used as search planning the research protocol (Frame 1) suggested by the Academic Library of *Universidade Federal de Santa Catarina* (UFSC), which describes search strategies according to each database, time parameters, type of material, among other things.

**Frame 1: Research protocol based on the model of UFSC Library System.**

PROTOCOL FOR SYSTEMATIC LITERATURE SEARCH			
1. Research problem or question What are the trends and applications of Knowledge Management in Information Science and / or Librarianship?			
1.1 Objectives General: Identify trends and applications of Knowledge Management in Information Science and / or Librarianship. Specific: a) <b>To raise the theoretical approaches and concepts cited in the studies, as well as the relationships between them;</b> b) <b>identify the tools and practices of Knowledge Management proposals in studies;</b> c) <b>synthesize research through a concept map.</b>			
2. Search in literature 2.1 Selection of topics			
Topic 1: knowledge management	Topic 2: information science	Topic 3: library librarian librarianship	
2.2 Search terms to include/exclude			
document type	peer reviewed scientific publication	include X	Exclude
publication years	2007-2013 <sup>1</sup>	include X	Exclude
language	english, portuguese e spanish	include X	Exclude

2.3 Sources of information

Source type	Name
Database	Scopus <sup>2</sup>
Database	Web of Science <sup>3</sup>
Database	Library, Information Science & Technology Abstracts with full text (LISTA) <sup>4</sup>
Database	Information Science & Technology Abstracts (ISTA) <sup>5</sup>

2.3.1 Sources of electronic information (database, digital libraries, search engines, repositories)

Source type	Name
Database	Scopus
Database	Web of Science
Database	Library, Information Science & Technology Abstracts with full text (LISTA)
Database	Information Science & Technology Abstracts (ISTA)

2.4. Search strategies according to the resource used

Scopus	“knowledge management” AND (library* <sup>6</sup> OR “information science”) Search field: article title, abstract and keywords. Document type: article.
Web of Science	“knowledge management” AND (library* OR “information science”) Search field: topic (title, abstract and keywords)
LISA	“knowledge management” AND (librar* OR “information science”) Search field: AB Abstract or Author Supplied Abstract
ISTA	“knowledge management” AND (librar* OR “information science”) Search field: KW Keyword Author Supplied

3. Results evaluation

Section 3 of this article.

4. Presenting results (report)

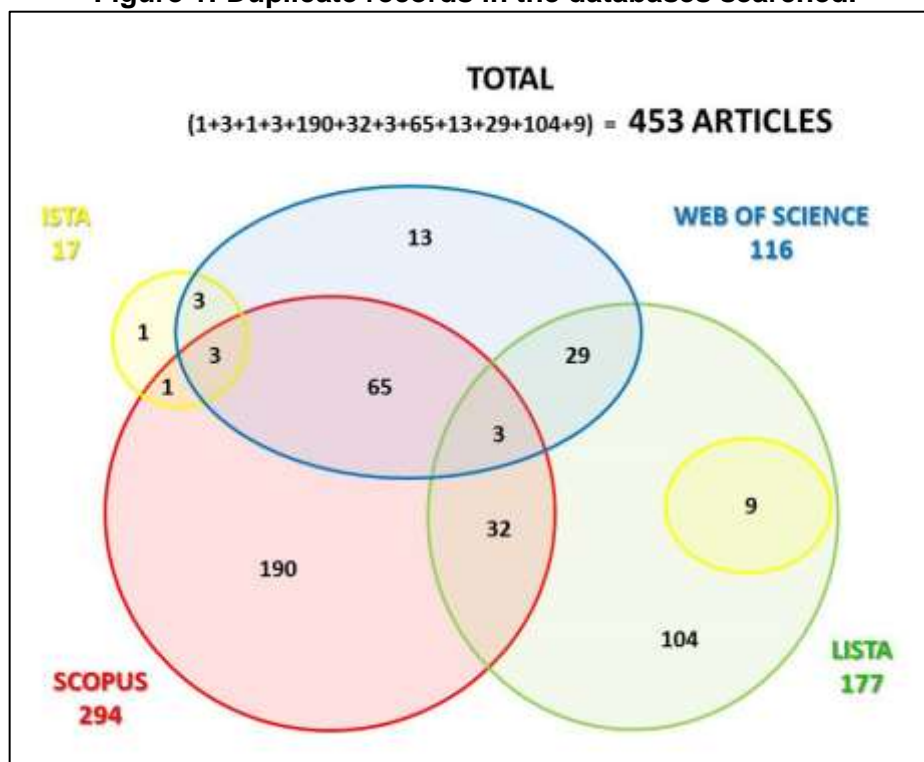
Section 4 of this article.

**Source Adapted: Universidade Federal de Santa Catarina - 2012. Elaborated by the authors – 2013.**

### 3 DATA ANALYSIS

The management of records retrieved (export, delete duplicates, grouping, etc.) was done by means of bibliographic management software (Endnote web), besides the manual step, since the software only identifies a few duplicates. 604 (six hundred and four) records were retrieved. However, after separating duplicates (same record contained in different bases) we came to the total of 453 (four hundred fifty-three) records (Figure 1).

**Figure 1: Duplicate records in the databases searched.**



Source: Elaborated by the authors – 2013.

### 3.1 Analysis Criteria

At this stage of the systematic review, we make a selection and a quality evaluation of the articles that compose this review set of interest. The work follows an articles selection of inclusion and exclusion criteria as described in the following:

- in relation to the content: were included and selected the articles that cover the area of knowledge management linked to Information Science and/or Librarianship. It is noteworthy that many interesting studies were not included because they did not focus on the main issues related to the implementation of KM in libraries or the use of IS and Librarianship aspects in KM or librarians and their potential for that proposed area;
- in relation to the type of study and research strategy: we considered theoretical articles, empirical, technological and literature review, the most diverse research approaches (quantitative, qualitative and mixed);
- criteria for inclusion/exclusion of articles. Articles with the following



characteristics were excluded:

- meta-analyzes, bibliometric analysis and bibliographies;
- off topic – texts that despite having been recovered in the search with the terms requested, are not associated with each other, or have different contexts, or are not presented as the main theme of study, which is just mentioned or treated superficially;
- events – papers that while addressing the very current information, mention work being performed, usually obtained from information disclosed in events, but do not provide access to the primary source of information.

#### 4 CLUSTERS AND CATEGORIZATIONS

After reading all the abstracts and part of the text when considered necessary, 147 (one hundred forty-seven) were included in the study. The studies were grouped into broad areas. The Frame 2 presents a description of the studies included in each area and main authors.

**Frame 2: Description of studies classified in each category.**

CATEGORY	DESCRIPTION AND MAIN AUTHORS
<b>Semantic Web / Ontologies</b>	Use of ontologies for knowledge sharing projects and semantic web technologies applied to digital libraries. <i>Linked Data</i> . <i>Ferguson (2007); Rautenberg et al. (2010).</i>
<b>New Professional Roles of Information and Libraries</b>	Theoretical discussions and practical examples of the new roles that information professionals and libraries have been acquiring and must develop due to knowledge economy. Including curriculum discussion, skills and abilities to be developed. Opportunities for professionals and libraries in this new scenario. It highlights the relevance of this professional in KM projects and the challenges to be faced. It discusses areas, information services and marketing research. <i>Bandy, Condon and Graves (2008); Baker (2007).</i>
<b>Competence of Librarianship and Information Science in KM</b>	It comprises the skills and abilities of information professionals and libraries contributing to KM. As well as IS concepts and theoretical approaches used in KM. Technique and knowledge from this professionals that favor the implementation of KM. <i>Orzano et al. (2008); Makani (2008); O`Farril (2010); Eldredge, Kroth and Phillips (2011).</i>
<b>Traditional Library</b>	They address aspects from traditional library work focusing on KM, such as acquisition, classification, cataloging, user studies, and preservation, among others. It includes <i>Online Public Access Catalog (OPAC)</i> initiatives

<b>Services</b>	as tools to support KM. <i>Anyira, Onoriode and Nwabueze (2010); Chaudhry and Khoo (2008); Blanco-García (2009).</i>
<b>Theoretical Aspects of KM and/or IS</b>	Theoretical and conceptual aspects of IS and /or KM. Involves evolution, concepts, trends, applications, among others. Theoretical discussion between IM and KM. Includes similarities, differences and relationships. It tracks the discussion on integration movements among areas of disciplines. Future of KM and IS through a library perspective. <i>Capuano et al. (2009); Ferguson (2009); Jain (2007); Dong (2008); Rokkuzzaman and Umemoto (2008, 2009); Kebede (2010); Cheuk (2007); Fallis and Whitcomb (2009); O`Farril (2010).</i>
<b>Management Point of View, KM Models and Methodologies</b>	General and management aspects of KM. Involving leadership, marketing, indicators, cultural, ethical, cognitive and others. It includes KM implementation and comprehension methodologies and models. Conceptual models, theoretical frameworks. <i>Amaral (2011); Daneshgar; Parirokh (2012); Cervone (2011).</i>
<b>Organizational Learning / Innovation</b>	Libraries from an organizational learning view in a KM perspective. How can organizations become learning organizations. This includes the development of new products and services, patents and innovations in general. Culture of innovation. <i>Jain and Mutula (2008); Lozano-Días (2008).</i>
<b>Data Banks/Bases and Knowledge</b>	Presentation and discussion of knowledge resource bases, involving its development, applications, sharing, use, among others. Including institutional repositories and digital libraries as tools for KM, involving projects, content, policies, etc. Knowledge Based Systems. <i>Ayanbode (2011); Kao and Wu (2012); Rah, Gul and Wani (2010); Chaudhry and Khoo (2008); Liang et al. (2008).</i>
<b>Km Tools and Practices</b>	Approaches involving KM tools, based or not in technologies. It presents, identifies and discusses KM tools and practices in general. Information and communication technologies, Web 2.0 collaborative tools (Blogs, wikis, social networking, bookmarking, etc.). Includes knowledge sharing practices, involving methods, tools, objectives and theoretical discussions. <i>Deitering and Bridgewater (2007); Jeng (2008); Mavodza and Ngulube (2011a, 2011b); Barve and Dahibhate (2012); Nelson (2008); Ralph and Tijerino (2009); Ralph and Ellis (2009); Attafar, Soleimani and Shokrani (2011); Che Rusuli, Tasmin and Takala (2012); Ferguson, Hider and Lloyd (2008); Sarrafzadeh, Martin and Azeri (2010); Tasmin et al. (2012).</i>
<b>Others</b>	Studies that do not have main approach in the areas described, such as: information auditing, voice controlled systems, e-commerce and e-government, organizational memory, socio-technical systems, context management, information science, information policy, information security , architectural aspects of library management, quality management, quantum information science. <i>Geographic Information Systems (GIS).</i> <i>Chakraborty (2008); Butler (2008).</i>

**Source: Elaborated by the authors – 2013.**

The Frame 3 presents three categories, but the studies included in these categories were not selected.



**Frame 3: Categories of studies not included in the review.**

CATEGORY	DESCRIPTION
<b>Advanced Tools and Computer Programming</b>	Approaches focused on the area of Knowledge Engineering and software. That involves requirements engineering, fuzzy logic, computational math libraries, artificial intelligence, expert systems, data mining, computational models, among other subjects.
<b>Education / Learning</b>	Innovative ways of teaching / learning. Corporative educational tools. Virtual Learning Environments.
<b>Information Architecture</b>	Aspects related to constructing and redesigning web sites, according to information architecture. Includes web accessibility.

**Source: Developed by the authors - 2013.**

## 5 SUMMARY AND REFLECTIONS

The studies of categories "Advanced tools and computer programming", "Teaching/learning" and "Informational architecture" had no selected studies, because showed a superficial content about the central approach of this study, focusing mainly towards the respective areas in which they were grouped. What does not make them less interesting, but only outside our scope.

Considering the categories that had their studies selected, most of them ("Semantic Web and Ontologies", "Traditional Libraries Services", "Innovation and Organizational Learning", "Management Point of View/KM Models and Methodologies", "Data Banks/Bases and Knowledge" and "Others") are more numerous among the studies that were not included in the review. What shows us that the studies we were looking for were mainly related to the following categories: "New Roles of Libraries and Information Professionals", "Theoretical Aspects of KM and/or IS", "Skills of Librarianship in KM and IS", "KM Tools and practices".

### 5.1 Theoretical and Conceptual Approaches

We brought some definitions from authors retrieved from the review. In order to substantiate some of the article issues that intend to clarify the congruence, intersections and differences between the concepts and areas of information management, knowledge management and Information Science.

Che-Rusuli, Tasmin and Takala (2012) highlight that the multidisciplinary nature of KM originated the entry of professionals from different fields (Economy,

Administration, Technology, Library Science and Information Science). As for the last ones, the abilities evoked include being familiarized with: information and knowledge, users, and related technologies.

Some of the elements of KM, such as acquisition, creation, renewal, organizing, archiving and dissemination of information are very present in libraries. Due to this reason, many librarians still believe that KM is simply managing explicit or documented information and knowledge, which is what they have done for many years (KOINA, 2003 *apud* JAIN, 2007). Although Chase (1998 *apud* JAIN, 2007) argues strongly that KM is not about managing or organizing books or magazines, search the internet for users or making material movement to disseminate information. The author states that KM is improving the use of organizational knowledge through better practices and organizational learning.

Grey (1998 *apud* JAIN, 2007) distinguishes KM from IM analyzing work patterns: IM works with objects (data or information) and KM works with people. IM deals exclusively with explicit representations and guarantees access, security, delivery and storage. In this case, efficiency, timeliness, accuracy, completeness, speed, cost of storage and recovery, are the main concerns. On the other hand, KM values originality, innovation, agility, adaptability, intelligence and organizational learning. Therefore, KM focuses on people and is concerned with critical thinking, innovation, relationships, exposition of ideas, standards, skills and encouraging learning and sharing of experiences.

According to Nonaka and Takeuchi (1995 *apud* JAIN, 2007), information is a flow of messages, while knowledge is created by these information flows anchored deeply in the beliefs and opinions of its owner. So that information can be considered as raw material for the construction of knowledge, as knowledge is connected to organizational values, beliefs and actions.

Jain (2007) summarizes the differences between IM and KM (Frame 4).

**Frame 4: Differences between KM and IM.**

ASPECT ANALYZED	INFORMATION MANAGEMENT	KNOWLEDGE MANAGEMENT
<b>Work Element</b>	Object (data and information).	People (knowledge).
<b>Validity /</b>	Information has no universally	The KM depends on a greater

<b>Credibility</b>	accepted meaning.	degree of certainty and validity.
<b>Nature</b>	Flows of information.	Knowledge is formed by these IM information flows.
<b>Formation</b>	The information is a framework for knowledge.	Knowledge embraces organizational values, beliefs and actions.
<b>Success Factors</b>	Depends on the preservation and retrieval of information.	Depends on the use of knowledge.
<b>Particulars</b>	Knowledge is extrapolative and future-oriented.	The information is organized data.
<b>Involvement of the Human Element</b>	The IM sees the information as a resource and insists on human involvement in terms of information storage, retrieval and audit. It aims at acquisition, storage, retrieval and dissemination of information.	The KM emphasizes the management of people in order to take into custody the hidden knowledge of their heads. Focuses on knowledge sharing, creating, learning and improving information for the organization.
<b>Type of Knowledge</b>	Focuses primarily on explicit and documented knowledge.	Seeks both explicit and tacit knowledge.

**Source Adapted: Jain - 2007. Elaborated by the authors – 2013.**

Being Librarianship an area linked to IS and related to IM, Sarrafzadeh, Azeri and Martin (2010, p.208) consider

[...] that the differences between Librarianship and KM lie in emphasis and approach matters, particularly where people are at the center of the operation. KM is a people-centered concept.

Dong (2008) says that KM in libraries has 2 (two) levels, differing from KM in most of other kinds of organization. The first level deals with the conversion of large amounts of knowledge locked inside the minds of employees, the idea is to turn them into explicit knowledge and make them visible, facilitating access and use of codified knowledge throughout the library. The second level refers to the collection, preservation and access to records of human knowledge (traditional library resources). At this level, KM includes the collection and distribution of library resources, such as acquisitions, cataloging, circulation, scanning, interlibrary loan, and dissemination of library resources.

There is a mix of feelings and an ambivalent attitude on the relationship between KM and IS, some support KM as a field of IS, which has been practiced by librarians for a long time (GORMAN, 2004 *apud* CHE-RUSULI; TASMİN; TAKALA, 2012). But both KM and IS are interdisciplinary and are concerned with the identification, acquisition, capture, processing, storage, retrieval, and use of knowledge. While KM focuses on explicit and tacit knowledge, the IS focuses

primarily on explicit or recorded knowledge. In this sense, IS activities are seen only as part of the process of KM (ROKKNUZZAMAN; UMEMOTO, 2008).

Rokknuzzaman and Umemoto (2009) came to a conclusion, based on studies of librarians from their perceptions of KM, that they have different forms and degrees of understanding on what KM is among them. Because of its multidisciplinary nature and emerging perspectives variables, there is no general agreement on this definition, nor is there a standard framework to provide a common platform. Although there is a spectrum of understanding of KM concepts, most library professionals have been focusing on a superficial perception of KM to its use in the axis of digital libraries.

Rokknuzzaman and Umemoto (2010) when studying KM teaching in Librarianship and IS courses, reported that KM is a significant element in teaching Librarianship and Information Science as a business concept in the last decade. There seems to be a close relationship between these areas, but author views are divided, some explain that KM is a concept or a new name for what librarians and information professionals have been applying for years. While others consider that KM differs from Librarianship and IS.

The change of emphasis on knowledge and therefore on KM is a logical progression in the hierarchy of knowledge that professionals have adopted. It can be reasoned that this current shift of focus on knowledge has been established since the early days in the IS professional field, and professionals have worked and positioned themselves for this change, although mostly without having a clear notion of how long it would take to reach this goal. The progression is considered to be a logical thing, once it is understood that KM is the result of practices accumulated from the previous stages that form the basis for this higher stage. As such, there is no inevitable overlapping of concepts, tools and practices of KM when considering the three levels (data-information-knowledge), because they are built on the foundations of the previous phases. What has been done by profession is recognizing the occurrences and characteristics of progression and embracing it as instances of development in the field. But this acceptance is not universal; there are professionals who advocate crucial differences between KM and IM (KEBEDE, 2010).

Anyway, the approaches offer a positive view, considering that most authors advocate the full participation of librarians in KM programs: "Increasingly, library and information professionals have been referred to as knowledge managers; and libraries and information centers, have been referred to as centers of knowledge" (JAIN, 2007, p.337).

However, when it comes to Academic Libraries, Jain (2007) points out that academic librarians have to face the following challenges when working with KM: a) the intellectual challenge of managing tacit knowledge and capturing relevant information from the overflowing reservoir of information; b ) the cultural challenge of developing the right culture to provide an environment of knowledge creation and sharing c) the challenge of managing central repositories of knowledge to the main organization, through the compilation of explicit knowledge documented; d) the challenge of being well equipped in technological know-how to work effectively and efficiently, as well as working in a collaborative way with the IT experts; e) the challenge of editing knowledge by refining and repackaging information in innovative ways with affordable cost and time effectively; f ) the challenge of being knowledge keepers, as experts in the matter; g) the challenge of digitizing the library collection for easy access; h) the challenge of KM as an asset; i) the challenge of updating knowledge available regularly in order to remove the obsolete information and engage the most updated information; j) the challenge of time management, proactive attitude and confidence to provide quality services to library users; k) the challenge of cooperating with teachers and students; l) the challenge of developing the ability to deal with change management.

Librarians have excellent skills in organizing and coding information sources to make them accessible to others. To fully manage knowledge, it is necessary to understand KM's holistic approach and tool oneself up with multidisciplinary skills to add value for its users. This includes (libraries with modern technology; reconstruction of a new kind of culture that encourages sharing and creativity; holistic thinking in building partnerships across the organization; development of KM policies and strategic plans; revitalization of the library as a company – proactive, confident, self-promoting, well trained and well prepared –; and strong partnerships in

domestic, regional and global levels; a leading environment for the practice of KM, including all the resources and incentives) (JAIN, 2007).

## **5.2 KM Tools and Practices for Libraries**

Generally initiatives for the practice of knowledge require specific planning and alignment with organizational objectives. The impulse to embrace KM in university libraries arises primarily from a combination of the budget deficit and ever increasing expectations of users (CHE-RUSULI; TASMINE; TAKALA, 2012).

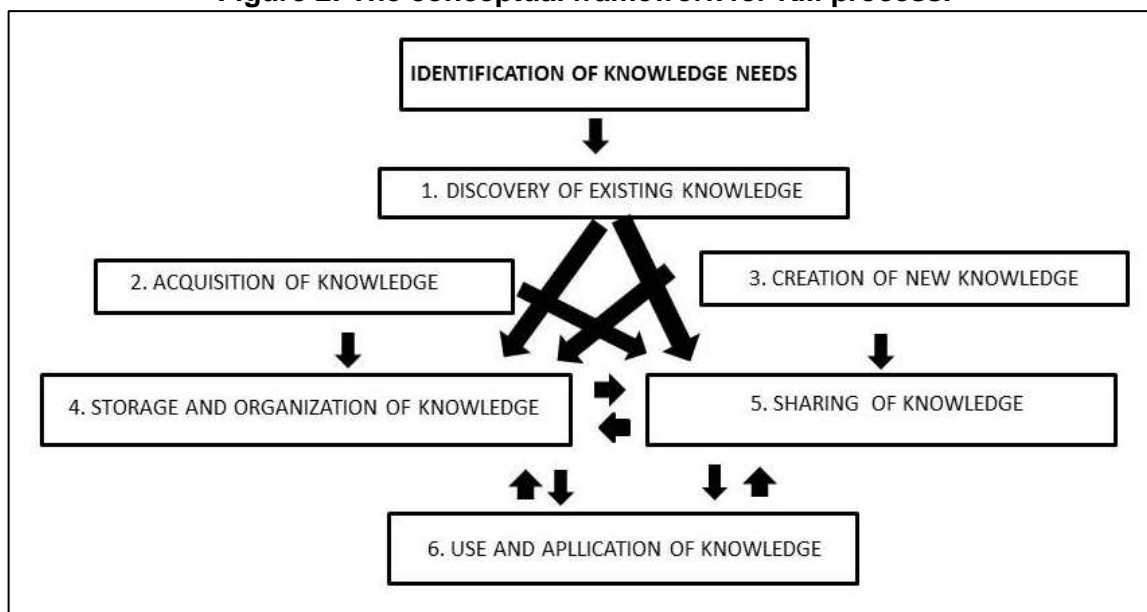
One can clearly see that the environment in which academic libraries operate is changing. While facing challenges and opportunities academic libraries need to come up with a response in order to better serve the needs of the academic community. One way to do this is by engaging in practices of knowledge management, this is, create, capture, share and use knowledge to achieve the goals of the library (CHE RUSULI; TASMINE; TAKALA, 2012).

For this engagement to take place, tools and methods are needed so that the practices achieve the desired results on KM. Besides analytical tools that help librarians to provide innovative services, conceptual models are important due to the amount of information and knowledge that libraries manage (DANESHGAR; PARIROKH, 2012).

Upon the importance of KM acceptance in the current context, the conceptual frameworks and models have emerged to support this task. Che-Rusuli, Tasmin and Takala (2012) point out that rather than adopting a highly technology focused approach, is more interesting to engage the preexisting people, technology and library management. Thus, a framework is presented (Figure 2) to illustrate the implementation of KM processes in libraries.



Figure 2: The conceptual framework for KM process.



Source Adapted: Che-Rusuli, Tasmin and Takala – 2012, p.124.

From the survey of the initiatives presented as KM practices in libraries, is presented in Table 5 which organizes the included in the review.

Frame 5: KM tools and practices in libraries.

KM PRACTICES	CHARACTERISTICS
<b>Communities of Practice</b>	Used for various purposes, task forces, committees, study groups, always with the goal of incorporating the benefits of collective wisdom.
	<i>Nelson (2008).</i>
	The existence of practical knowledge sharing and practice communities, for example, is very important.
<b>Mentoring</b>	The mentor’s knowledge may be segmented so that information can be acquired in packages in order to enable the learner to assimilate it better and faster within a specific task; here the learner is seen as an interactive learner and not as a passive knowledge recipient.
	<i>Nelson (2008).</i>
<b>Web 2.0 Tools</b>	Collaboration tools designed to improve the exchange of knowledge and productivity. Emphasizing blogs, wikis, storage and editing of documents, used and updated frequently; tagging (classification system), applied to various resources, bookmarking, books, people, etc.
	<i>Nelson (2008).</i>

	<p>Wiki tools as Instruction Wiki Library (<a href="http://instructionwiki.org">http://instructionwiki.org</a>): an effort to develop a web based knowledge sharing resource, by virtue of the desire repeatedly expressed by the librarians, to share resources, ideas and knowledge.</p> <p><i>Deitering and Bridgewater (2007).</i></p> <p>Some of the ways in which library users can use the functionality of Web 2.0 include the use of the Online Public Access Catalog (OPAC) tagging, so that they can have a set of records of their preference to use, easily accessible in a tag cloud, or have a social network account such as Twitter, Facebook, MySpace or delicious. The library should use collaborative and interactive workspaces available, such as wikis, to find and share knowledge and expertise.</p> <p><i>Mavodza and Ngulube (2011a).</i></p> <p>Blogs can help librarians to meet KM needs by being useful for knowledge sharing among employees and to build connections with users.</p> <p><i>Dong (2008 apud JENG, 2008).</i></p> <p>The use of free software to maintain and manage web sites, including Drupal, Plone, Joomla, Word Press (<a href="http://wordpress.org">http://wordpress.org</a>), play a key role in KM projects, because they deal with large volumes of information and provide Web 2.0 services.</p> <p><i>Barve and Dabihate (2012).</i></p>
<b>Network Analysis</b>	<p>Mapping and measuring relationships and flows among people, groups, organizations, computers; or information / knowledge processing, or other entities; or what goes to whom, regarding information needed to realize a work. It helps to identify the main people in the organization, people who are not fulfilling what is expected from them, etc.; contributing to the diagnosis and planning of the organization.</p> <p><i>Nelson (2008).</i></p>
<b>Question Point (QP)</b>	<p>Question Point (QP) a virtual reference service with a knowledge basis, could serve as a KM system. The QP has many features, including chat reference, issue tracking mechanism, reporting capability, and a knowledge base built from a database of questions and answers completed. Can be considered a tool for KM reference service in libraries.</p> <p><i>Ralph (2008 apud RALPH; TIJERINO, 2009), Ralph and Ellis (2009).</i></p>
<b>Collective Cataloging</b>	<p>The use of KM tools is not a privilege of respected librarians. Catalogers have used "[...] records shared through collective cataloging [...]", using the bank from other institutions such as Library Congress (LC), Online Computer Library Center (OCLC), among others.</p> <p><i>Ralph and Tijerino (2009, p.334).</i></p>
<b>Information Management / Services</b>	<p>Information management, including content management, information and records management, information retrieval, analysis, and critical sources of information, information auditing.</p> <p><i>Ferguson, Hider and Lloyd (2008).</i></p> <p>Information service including collection, organization, analysis and dissemination of business information.</p> <p><i>Ferguson, Hider and Lloyd (2008).</i></p> <p>Organization and retrieval of information.</p> <p><i>Sarrafzadeh, Martin and Azeri (2010).</i></p>
<b>Education</b>	<p>Education and user training.</p>

	<i>Sarrafzadeh, Martin and Azeri (2010), Ferguson, Hider and Lloyd (2008).</i>
<b>Systems and Information Technology</b>	Information systems and technology management, including support of information systems, infrastructure provision, use of new technologies to enable knowledge sharing, intranet and website management.
	<i>Ferguson, Hider and Lloyd (2008).</i>
	Development of intranets, content management and institutional repositories.
	<i>Sarrafzadeh, Martin and Azeri (2010).</i>
<b>Research Support</b>	Involves the delivery of a research base for decision making.
	<i>Ferguson, Hider and Lloyd (2008).</i>
<b>Mapping of Knowledge</b>	It includes the analysis of information flows and the development of "solutions" to its problems.
	<i>Ferguson, Hider and Lloyd (2008).</i>
<b>Knowledge Plan</b>	Creating a "knowledge plan". Planning, development and implementation of strategies, processes and systems to support the achievement of added value to knowledge assets of an organization.
	<i>Ferguson, Hider and Lloyd (2008).</i>

**Source: Elaborated by the authors – 2013.**

Tasmin *et al.* (2012), through a data collection research in libraries in Malaysia indicate that KM practices most seen refer to knowledge sharing and preservation.

Mavodza and Ngulube (2011b), based on the results of research, which proposed the use of technology-based identification mechanisms and techniques of KM library practices, indicate that some respondents did not know or perceive the difference between documents and assets, information and knowledge, and do not see information and knowledge as institutional assets.

It is important to understand that any plan to include KM techniques in a library creates the need to understand the users that the library serves, especially regarding the use of fast changing modern information technologies. Furthermore, any initiative for a library to use KM techniques require a careful and detailed study in its pragmatic use, in order to enable and support the entire institution for the use of intellectual capital available for their learning (MAVODZA; NGULUBE, 2011b).

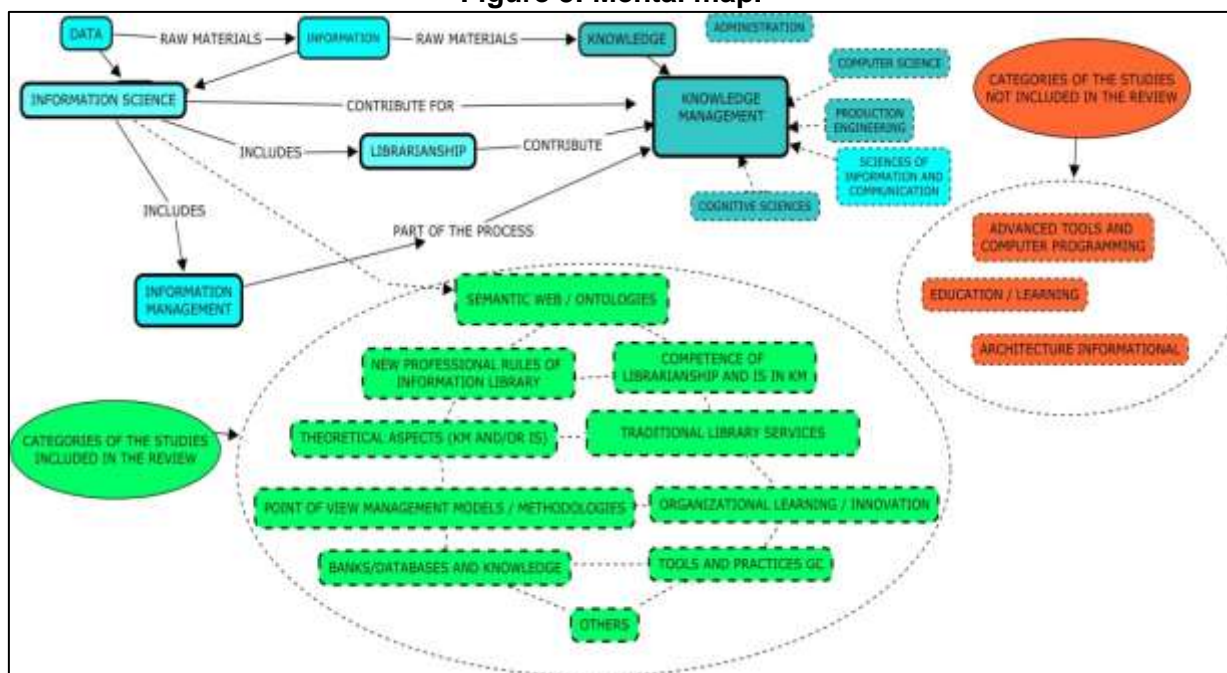
Attafar, Soleimani and Shokrani (2011) have concluded, based on the results obtained from investigating the conditions of KM components in libraries of Isfahan<sup>7</sup>, the effective use of organizational knowledge through modern tools like KM is a

challenge faced by libraries, which intensifies the need to improve KM components with emphasis on mechanisms.

### 5.3 Synthesizing Research Graphically

To display the relationship between concepts and various approaches in the literature from the combination of search terms, we have used a concept map. Taking advantage of the easy reading and understanding provided by mental maps, it became easier to understand the concepts and approach KM used in Information Science.

**Figure 3: Mental map.**



Source: Elaborated by the authors – 2013.

The map shows all the categories of the studies included in the review or not, and the relationship between knowledge areas and disciplines, verifying that the areas of KM, IM, IS and Librarianship are related and interdependent, but KM differs from the others by focusing on people and their knowledge, overriding attention given to data and information in other disciplines.

## 6 CONCLUSIONS

Working with a large number of studies is time consuming, but more comprehensive. It is possible to have a more holistic view of reality, which can be important not to lose relevant studies once one keeps in mind that the studies excluded outnumbered the ones included, then it is expected that the amount of significant research unrecovered to be close to null.

The extraction of information from the abstracts was a complicating factor, considering that most of them did not have enough information to dismiss the text reading (context, objectives, methods, results and conclusions).

The importance of the presence of the librarian and the role of Librarianship and Information Science in KM became evident. The libraries have been developing KM activities, even without a clear understanding on the matter. The amount of studies that proliferate with 'new roles' as a theme demonstrate the importance and interest in discussing these issues in the professional environment. The "[...] library professionals have excellent information and IM skills, but they need to improve their skills to work with KM" (ROKKNUZZAMAN; UMEMOTO, 2009, p.653-654).

To establish the knowledge practice in an organization, it is necessary to carry out an exercise to identify knowledge gaps. In the case of university libraries, KM also seeks to extend the role of the librarian to manage all types of information and tacit knowledge for the benefit of the library (CHE-RUSULI; TASMIN; TAKALA, 2012).

KM can help libraries to develop into more efficient organizations, taking advantage of the new demands of the Knowledge Society leading to the improvement and development of new services to users, in addition to increasing the use, creation and sharing of knowledge among the library staff. Implementing KM in libraries leads to perfecting the ability of these organizations to learn, identify and use knowledge of internal and external resources in their processes and activities.

The practices most seen refer to the activity of knowledge sharing through the use of Web 2.0 tools. This fact was ratified by Tasmin *et al.* (2012), from data



collection research in libraries in Malaysia, which raised the percentage of existing KM practices according to the kind of initiative.

The KM in libraries will also lead to the generation of new knowledge, development of new procedures and practices to improve the integration and sharing of knowledge within organizations. A KM program tailored specifically to libraries can reduce costs, increase revenue and staff efficiency, improve the activities, products and services, improving library performance and guaranteeing a position in the knowledge market (PORUMBEANU, 2009).

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## NOTES

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<sup>1</sup> Searches were performed on February, 23, 2013.

<sup>2</sup> Data base of abstracts, quotes from scientific literature and academic information sources with great international representation in all knowledge areas. It indexes more than 15 thousand journals, 265 million Internet page, 18 million of patents, among other documents.

<sup>3</sup> Multidisciplinary basis that indexes only the most cited journals in their respective fields. It also works as a quote index, informing for each document, the documents quoted by it and the documents that have quoted it. It has over 9.000 indexed journals nowadays.

<sup>4</sup> International data base designed for library and Information Science professional and other related areas experts. It indexes more than 500 publication titles. Artificial Intelligence; Information Technology; Storage and Management; Internet Technology; Knowledge Management; Libraries and archives; information Management; Usage and users studies; Biomedical Information; Information recovering systems; Editing; Telecommunication and Internet.

<sup>5</sup> Information Science main data basis.

<sup>6</sup> Omitting part of the word library (represented by \*) allows us to retrieve variant forms of it (libraries, librarians, librarianship), according to the specification of each data base.

<sup>7</sup> Isfahan is the capital of Isfahan Province in Iran, located about 340 km south of Tehran.





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