

# Digital libraries and knowledge management in multicultural environments: librarian's perspectives

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**Abstract:** Few studies have examined the connection between knowledge sharing processes in digital library environments from the point of view of librarians. This research paper aims to survey librarians from different European countries in order to identify whether the establishment of a knowledge distribution mechanisms or sharing environment is a familiar territory for librarians in a digital library setting. Two online questionnaires were designed and disseminated electronically to various countries. The questions followed a seven point semantic referential scale and the processing of the data was performed in SPSS software. Spearman's test were also performed for checking any correlations between the factors that motivate knowledge sharing attitudes on the one hand, and on the other those factors that influence the effectiveness and efficiency of digital libraries. The results indicated that librarians accept digital libraries as knowledge management and sharing systems but opinions vary as to whether the designing of a digital library affects the way knowledge is shared. Cross reference of data shows similarities and differences between the four countries.

**Keywords:** Establishment of a Knowledge Distribution Mechanisms

## 1. Introduction

The growth of digital libraries has lead to the creation of an abundance of available global resources and has lead to libraries without walls. Marchionini, Plaisant and Komlodi (2003, p.123) consider digital libraries as the logical extension and augmentation of physical libraries in the electronic information society. The diffusion of digital libraries has altered established library practices and has "challenged the status of the library as the only provider of information (Sarrafzadeh, Martin & Hazeri 2010, p. 198). According Giannakopoulos, Kyriaki-Manesi and Zervos (2012, p. 129), digital library is a "technological application that allows the management of Library, archive and museum content in a digital form".

Inevitably the growth of electronic content has changed library users' research attitudes and association with knowledge. On the other hand, librarians are seeking

ways of integrating electronic and digital content with print content and thus offer a comprehensive knowledge source base for research, learning and instruction. This research paper provides literature reviews with functional definitions for both digital libraries and knowledge management, explores the connections between knowledge sharing and digital libraries and provides data from 7 countries.

## **2. Literature review**

### *2.1. Digital Libraries*

Digital libraries include “a wide range of working systems and research prototypes, collections of information and documents, and technologies” (Van House, Bishop, and Buttenfield 2003, p.1) and broaden their range into several directions. Ioannides suggests that ‘Digital libraries represent the meeting point of a large number of disciplines and fields’ (2005, p.255). While Deegan and Tanner (in Tedd & Large 2005, p. 19) write: ‘there are many different kinds of digital libraries creating, delivering and preserving digital objects that derive from many different formats of underlying data, and it is very difficult to formulate a definition that encapsulates all of these.’

Among the many definitions (Schwartz 2000, Karvounakis & Kapidakis 2000, Bawden & Rowlands 1999) the most widely accepted is from the Digital Library Federation (DLF) which states that “Digital Libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities”.

The digital libraries phenomenon is ever changing in its nature due to its inevitable interaction with IT advancements. This broadens the research spectrum which evolves from covering issues such as users' satisfaction to knowledge management and multilingualism. More requirements and expectations are surfacing as information provision is creating a competitive market arena, library users become more demanding and digital libraries grow more. Current research explores the needs and expectations of academic users' viewpoint towards maintaining and supporting multilingual digital library environments (Wu, He, and Luo 2012). Librarians and IT employees who work and build up multilingual digital environments are called to create and share cross-lingual access to information resources.

The developments in digital libraries affected the role of librarians and presented them with the opportunity to redefine their traditional roles. Deegan & Tanner present two additional roles for librarians and information professionals: those of knowledge mediator and knowledge preserver (in Tedd & Large 2005, pp. 214-215). What becomes evident is that ‘the knowledge management skills of librarians should be put to work in the management of data and other forms of knowledge’ (Lor 2008, p. 118).

The application of knowledge management systems is strongly connected to and lies at the heart of creating sustainable digital libraries. Ponzi identified the top 10 interdisciplinary influences of knowledge management in rank order with the library and information science holding the fourth position (in Wallace 2007, p.5).

## *2.2. Knowledge Management*

According to Dillon the definition and viewpoints on knowledge management are so many that it “makes a consolidated understanding of the core concept difficult and that none of the definitions is fully satisfactory” (in Wallace 2007, p.3). The Encyclopedia of Library and Information Science defines knowledge management as ‘a management practice that uses an organization’s intellectual capital to achieve its organizational mission’ (Clair 2003, p. 1486). There are two basic concepts of knowledge in the knowledge management theory: tacit and explicit. The latter ‘is formal and systematic, it can be easily communicated and shared’ while tacit knowledge is ‘deeply rooted in action, it’s highly personal and hard to formalize (Nonaka 1991, p.98).

Though knowledge management originated in the business and commercial sector in the beginning of the 1990’s there are common grounds with digital libraries. Knowledge management is at the “core position in Digital Libraries” and similarly digital libraries are “not so efficient without effective Knowledge management” (Shuchun 2002, p. 507). Shanhong (2000) claimed that ‘Knowledge management will inject new blood into the library culture’ and she describes the ways libraries can integrate knowledge management and dissemination practices into their services.

The connection is also verified by a research conducted by Roknuzzaman, Kanai and Umemoto (2009, pp. 379-380) which has shown significant overlaps between digital libraries and knowledge management. Both of them hold the same objective, content resources, people are considered to be ‘the key actors in the organizational processes and the main users of information and/or knowledge systems’, they share the same process mechanism of the life cycle of information/knowledge and finally, the use of technology tools and techniques for content management and retrieval.

In today’s economy where knowledge is seen as a prime asset (Van den Hooff, Schouten, and Simonovski 2012) cultivating a knowledge sharing culture is difficult and it is primarily a principle fostered by the organization. Organizations which employ knowledge management values develop a knowledge – based culture, promotion of knowledge sharing, innovations in Digital Libraries services and a strong leadership position for Digital Libraries (Roknuzzaman, Kanai, Umemoto 2009, p. 372).

A concern in organizational knowledge sharing as expressed by Ghosh and Jambekar (2003, p.9) is that people ‘might not be willing to share negative experiences and lessons learned based on failure because of their negative connotation’ but ‘these problems can be overcome with the effective utilisation of traditional resources (manpower, materials and money) as well as information and knowledge resources’. It is evident from previous research that “library staff acknowledges that the new digital working environment affects the way in which they share knowledge and recognize the importance of the role of intrinsic motivation in knowledge sharing” (Garoufallou et al. 2009, p. 2). Also, Parirokh, Daneshgar and Fattahi (2008, p. 107). reveal in their research ‘that the majority of libraries investigated are quite friendly towards knowledge sharing, and the majority of librarians value the importance of knowledge sharing’

## **3. Methodology**

Creating and organizing digital libraries and institutional repositories is a trend being followed by most of the academic and not only institutions worldwide. Over

the last two decades thousands of digital libraries have been established. The aim of this paper is to identify the librarians' perspectives regarding any connection that may appear between digital libraries and knowledge management systems in various cultural environments. Do librarians consider the developing of knowledge management important for a successful digital library?

The systems that organized knowledge were traditionally distributed by librarians. The researchers trying to expand the awareness regarding librarians' behavior in sharing knowledge between themselves, proceeded to a second survey. What motivates a librarian to share his/her knowledge in the work environment? Is s/he influenced by intrinsic or extrinsic factors?

Deltos Research Group has distributed the two online surveys since 2010 (<http://www.deltos.org>). Various European countries contributed to the surveys. Most of the respondents come from four countries of Greece, Czech Republic, Malta, and Cyprus. Though, the survey that focused on how digital libraries can be used as knowledge management systems, collected responses also from Great Britain, Slovenia, and Portugal. Both of the instruments incorporated items following a seven point semantic referential scale, and it was circulated via e-mail. The analysis included comparisons on the mean values of all variables, examining each country's participants' perceptions on both topics. Furthermore, a set of Spearman's tests were also performed for checking any correlations between the factors that motivate knowledge sharing attitudes on the one hand, and on the other those factors that influence the effectiveness and efficiency of digital libraries as KM systems. The collected data were analyzed in SPSS software.

#### **4. Results**

One hundred ninety four (194) people responded to the survey on digital libraries as knowledge management systems. Forty eight of them were from Greece, thirty eight from Cyprus, twenty five from Malta, twenty three from Slovenia, twenty two from Great Britain, twenty from Portugal, and eighteen from Czech Republic. The questions followed the Likert Scaling method with rating from one to seven. The results express the respondents' opinions on whether digital libraries can be used as knowledge management systems and what elements are considered as more important in a digital library. As revealed in the table below, most of the participants were neutral on considering digital libraries as knowledge management systems. A guesstimate is that the librarians who took part to the survey still consider digital libraries as simple repositories and not as organized knowledge management systems.

The question that mostly concerned the researchers was examining the elements that should be considered in creating an effective knowledge management system within a digital library. From the presented factors in the questionnaire, the respondents considered as more crucial the "technology support" with 93.2% positive answers (values 5 to 7), the "rich metadata description" (86.6%), the "good knowledge of subject" (82%) and "understanding user needs" (80.4%). It can be estimated that the librarians who responded to the survey maybe face difficulties in their collaboration with their library's IT staff and the technological support they receive on the digital libraries projects. Also, the fact that the description of the items in a digital library received that high percentage of positive answers maybe shows the necessity of qualified personnel at the position of a digital library cataloguer. Obviously it is perceived that the more analytical and full of data an item is, the easier could be to be retrieved in a search.

Table 1. Digital Libraries as Knowledge Management Systems

Digital libraries as KM Systems	Percentages						
	1	2	3	4	5	6	7
Do you think that digital libraries can be used as Knowledge Management Systems?	0	0.5	0.5	38.1	10.8	26.3	23.7
Do you think that digital libraries have affected the way people share their knowledge on workplace?	0.5	0.5	19.6	54.6	14.4	6.7	3.1
Do you think that the designing of a digital library affects the way knowledge is shared?	0	0	24.7	18	25.8	22.2	9.3
What elements should be considered in creating an effective KM system within a digital library? Understanding User needs	0	0.5	7.2	11.9	24.7	19.1	36.6
What elements should be considered in creating an effective KM system within a digital library? Good knowledge of subject	0	0	7.7	10.3	19.1	37.1	25.8
What elements should be considered in creating an effective KM system within a digital library? Rich metadata description	1	0	9.3	3.1	38.7	10.3	37.6
What elements should be considered in creating an effective KM system within a digital library? Strategic plan establishment	0.5	7.7	10.8	23.7	25.8	18	7.2
What elements should be considered in creating an effective KM system within a digital library? Technology support	0	0	0.5	0	27.3	38.1	27.8

The Spearman's correlation test was performed in order to see any positive correlations between the variables. The purpose of selecting Spearman's correlations was due to the fact that the data was not normally distributed. The results showed that the effect of the design of a digital library in the way people share their knowledge was positively correlated with two elements that should be considered in creating an effective KM system within a digital library. These were "understanding user needs" (rs=0.590, N=194, p<0.01, two-tailed) and "rich metadata description" (rs=0.770, N=194, p<0.01, two-tailed). Also, "understanding user needs" was positively correlated with "good knowledge of subject" (rs=0.668, N=194, p<0.01, two-tailed) and "rich metadata description" (rs=0.581, N=194, p<0.01, two-tailed).

145 people participated at the survey which was examining the librarians' knowledge sharing attitudes. Most of the respondents were coming from Greece (119) and the rest were from Malta (16), from the Czech Republic (7), and Cyprus (3). Regarding the sex, the 113 were women, fact that confirms that librarianship is a female henpecked profession. In regards to the type of the library, 32 work in academic libraries, 9 in college libraries, 3 in school libraries and 2 in special libraries. The rest of the respondents were students (n=54). Also, 26 mentioned they are librarians, 9 library assistants, 10 library administrators, and 1 archivist.

At the Figure 1 we may see the factors that seem to influence more librarians' behaviour regarding their attitude with sharing knowledge on workplace. At a scale of one to seven where 1 is equal to strongly disagree and 7 is equal to strongly agree the 75.2% of the participants replied that they share what knowledge they may have on the subject when a colleague asks for help or assistance. Also, 51% of them replied that they seek knowledge and help from their colleagues, when they encounter a work related problem. Consequently, it could be mentioned that librarians are keen on sharing their knowledge with their colleagues, as well as with requesting their colleagues' assistance when they need it.

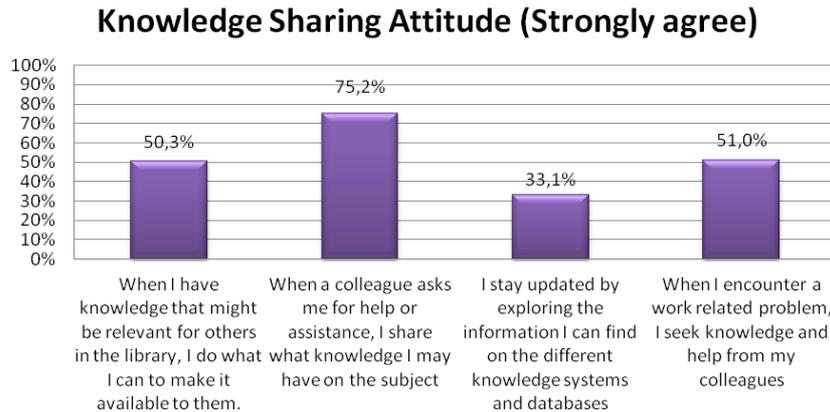


Figure 1. Knowledge Sharing Attitude.

The intrinsic and extrinsic factors that influence the knowledge sharing behavior were also examined. Regarding the intrinsic factors, 55.9% of the participants responded that they share knowledge because it is an important value for them and 47.6% because it is an important part of their job. Team working and group collaboration is either required or preferable for the 40.7% of the participants, and also 40.7% of them share their knowledge because of the pleasure of discovering new insights.

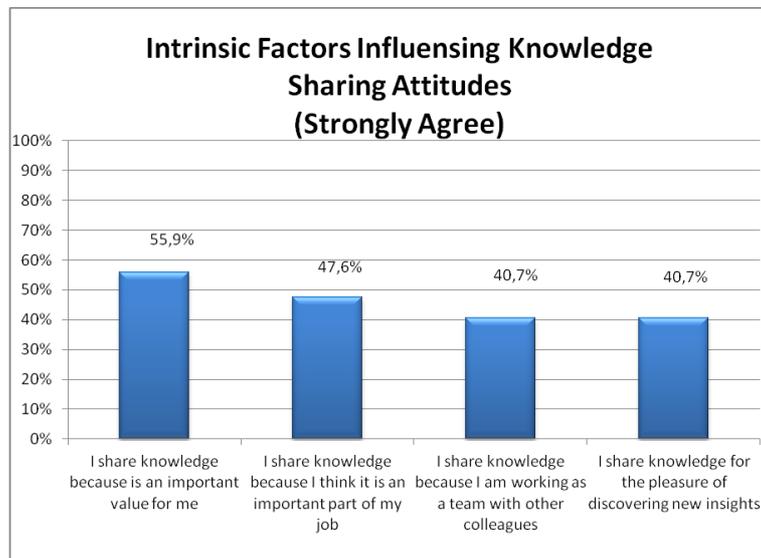


Figure 2. Intrinsic Factors Influencing Knowledge Sharing Attitudes.

The extrinsic factors didn't seem to motivate librarians as much as the intrinsic factors for sharing their knowledge. The following chart shows that the bigger percentages of the responses were found among the negative values of the scale. More specifically, most of the librarians (29%) responded that they strongly disagree with the statement "I share knowledge because it may help me get a salary increase" and 23.4% do not share their knowledge in order to be praised by their director or by their colleagues (21.4%). Also, 22.1% of the respondents do not intend to get promoted through sharing their knowledge.

The only statement that diverged from the aforementioned extrinsic factors was “I share knowledge because it is important for the evaluation of my job performance”. A total sum of the positive values on the scale (5-7), shows that the majority of the librarians (59.3%) would adopt knowledge sharing attitude in order to receive a higher level at the evaluation of their job effectiveness. The researchers, though, see a conflict between the results of the last two extrinsic statements. How is it possible librarians to disagree with getting promoted via knowledge sharing (51.8% is the sum of negative values of the scale/1-3), when they agree for evaluation purposes? It is possible a positive evaluation to lead to promotion.

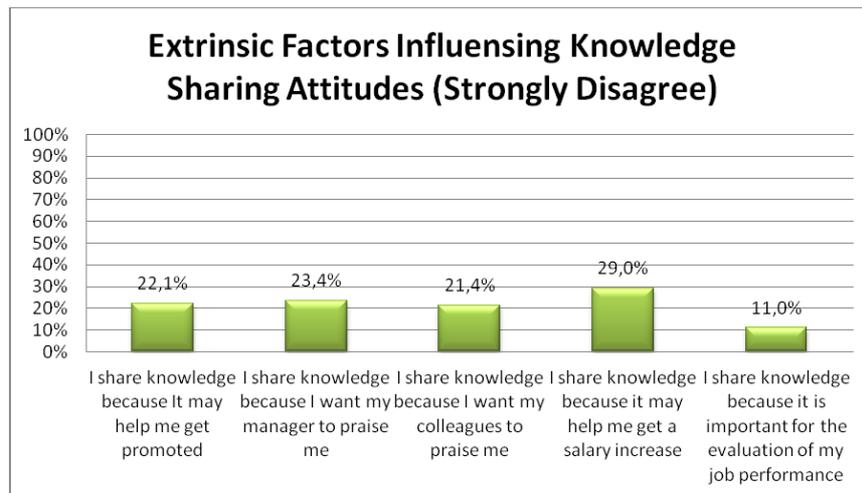


Figure 3. Extrinsic Factors Influencing Knowledge Sharing Attitudes.

A set of Spearman’s tests were also performed in order to examine possible correlations between the variables. It was found that the participants tended to share their knowledge when it was needed because “giving knowledge was important to them” ( $r_s=0.526$ ,  $N=170$ ,  $p<0.01$ , two-tailed). From the results also appeared that in the sharing knowledge attitude of librarians some intrinsic factors were strongly correlated to each other. More specifically, the intrinsic factor “I share knowledge because I like it” was strongly correlated to “I share knowledge because it is an important part of my work” ( $r_s=0.640$ ,  $N=167$ ,  $p<0.01$ , two-tailed) and to “I share knowledge because it fulfils my personality” ( $r_s=0.772$ ,  $N=133$ ,  $p<0.01$ , two-tailed).

Although, as it is aforementioned the participants were motivated by intrinsic factors for sharing knowledge with their colleagues, some correlations were interesting between the intrinsic and extrinsic factors. Specifically, the intrinsic factor “I share knowledge because I want to find out whether my ideas are relevant” was positively correlated to the extrinsic factor “I share knowledge because it may help me get promoted” ( $r_s=0.383$ ,  $N=136$ ,  $p<0.01$ , two-tailed). Also, the intrinsic factor “I share knowledge because the senior management does so” is positively correlated to the extrinsic factor “I share knowledge because it may help me get a salary increase” ( $r_s=0.480$ ,  $N=133$ ,  $p<0.01$ , two-tailed). The intrinsic factor “I share knowledge because it is easy to do so” was correlated to the extrinsic factor “I share knowledge because I want my colleagues to praise me” ( $r_s=0.246$ ,  $N=137$ ,  $p<0.01$ , two-tailed) and the intrinsic factor “I share knowledge because sharing is safe and confidential” was correlated to the extrinsic factor “I share knowledge because it is important for the evaluation of my job performance” ( $r_s=0.301$ ,  $N=103$ ,  $p<0.01$ , two-tailed).

## 5. Conclusions and recommendations

The results from the survey regarding whether digital libraries can be considered or used as knowledge management systems, revealed the positive notion of the librarians. The gathered data indicate that librarians could perceive a digital library as successful mainly based on the description of the items. If the items are analytically described by a professional cataloger with good knowledge on the subject, then it is more probable for this digital library to have high usage statistics and consequently to be more effective. The technological support is another factor perceived important for the successfulness of the digital library. Even though nowadays librarians are familiar or even vastly skilled with technology, setting servers and digital libraries requires qualified knowledge that very few acquire. It is very crucial for a library to have a systems librarian or at least to collaborate on such issues with the institution's IT department.

The knowledge sharing survey presented a collaborative behavior among librarians from the four countries under examination. Most of the respondents seemed to be eager to help their colleagues if they are requested for help and provision of knowledge. They also appeared to seek for help from their colleagues when they encounter work related problems. The question that rises though is "does this knowledge distribution attitude functions only when sharing is reciprocal?" Even though the data showed that librarians are mainly motivated by intrinsic rather than extrinsic factors, what happens in the case knowledge is only offered? Answering at this question involves psychological elements that were not originally examined in this survey.

In overall, it can be concluded that the data showed librarians' positive attitude on digital libraries as knowledge management systems. It is perceived, though, that as digital libraries develop they will be recognized as crucial components in the practice of knowledge management electronically. A more recent survey could present any changes in this notion and more detailed aspects could present what factors and elements would affect to a successful digital library nowadays.

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