

We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,900

Open access books available

185,000

International authors and editors

200M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.
For more information visit www.intechopen.com



Creating a Culture of Learning and Knowledge Sharing in Libraries and Information Services

Octavia-Luciana Porumbeanu Madge
University of Bucharest
Romania

1. Introduction

Organizations have focused over the last two decades on finding a solution which could help them achieve success in a society dominated by changes that maintain and enhance competition permanently. The solution identified by organizations is represented by a new managerial process that concentrates on the most valuable resource currently available to them, namely the knowledge held both at the level of the employees individually and of the processes and practices specific to each organization. Implementation of knowledge management process is largely seen as a critical element in contemporary organizations which will enable and facilitate their survival and success, preservation of their position on the market, and growth of their performance.

Awareness of the importance which knowledge resources have concerning the performance of organizations has led to structural changes and massive investment for implementing knowledge management in organizations. Any discussion and any initiative in this regard involves the recognition of the need to make significant changes at organizational level that refer to the transformation of the way organizations relate to competition, to change and how they act in order to meet the challenges of society. Any knowledge management approach should consider hence that key element enabling organizations to adapt continuously to the changing environment, namely learning. This plays a leading role in transforming organizations and therefore in the implementation of knowledge management, and from there to the discussion on the need for their transformation into learning organizations is only one step.

Competitive advantage, which is often mentioned in literature, is based on the knowledge resources and the learning capacity of organizations (Argyris & Schon as cited in Tschaitichian et al., 2000; Prusak, 1996). It depends according to analysts on the organization's ability to acquire knowledge assets by planning and facilitating organizational learning (Pucik, 1996) which leads to the development, consolidation and growth of these resources, both through internal actions and collaborations, alliances, and partnerships with other organizations. Knowledge sharing too contributes to increasing competitive advantage (Teece, 2002) because value creation is based not only on the possession of knowledge and other assets, but also on the ability to transfer, assimilate, and combine knowledge and other assets.

Knowledge resources as such, their collecting, storage, processing and organization, but also learning as a simple process do not guarantee organizations they will obtain performance in

their work environment, just as simple application of knowledge management models that proved successful in some organizations do not ensure success in a different context. It is necessary to share knowledge and generate new knowledge, and in order to talk about learning, not only at individual, but also at organizational level, and transforming an organization into a learning organization, it requires a clear strategy to help organizations be able to anticipate, react and respond to the changing environment (Senge, 1990). Similarly, any attempt of implementing knowledge management in an organization must start from the need to adapt this process to the conditions in that organization, from studying the context and characteristics of its field of activity and from designing an appropriate model adapted for that organization.

Learning, knowledge sharing and knowledge generation are in a relationship of interdependence. All these processes depend on people, and this refers to the importance of human resources and organizational culture. Even if there is no consensus at this point, after so many years since the breaking out of interest in knowledge management, on its definition, its components, most experts agree on the importance of organizational culture in any knowledge management initiative. The role of organizational culture in the process of knowledge management implementation and in the action of transforming organizations into learning organizations is constantly highlighted in literature. It becomes clear therefore that an organizational culture that fosters learning and knowledge sharing is essential for contemporary organizations seeking increase of their performance and a leading position in their field. Forwards we address this issue.

2. Knowledge management and organizational culture

Among the major themes investigated in recent literature on knowledge management, that referring to the change of organizational culture so as to create a culture that promotes learning and the transformation of organizations in learning organizations has a special place. The concept of the learning organization is essential for any knowledge management project because the improvement of knowledge sharing and learning in organizations is at the basis of knowledge management (Skyrme & Amidon, 2002). Researchers and managers have realized that organizations good at learning will range ahead of the competition (Abell & Oxbrow, 2002), and the strong links between learning and knowledge management are often pointed out in literature (Addleson, 2000; Ali et al., 2006; Skyrme & Amidon, 2002). Learning is intrinsic for knowledge management, contributing to the ability of individuals to share knowledge (Ali et al., 2006) and some analysts understand knowledge management as facilitating interaction among people and groups, this interaction being the real source of knowledge creation and sharing (Addleson, 2000). We can say that an organizational culture oriented towards learning, innovation and performance, supporting communication, collaboration, participation, creativity and sharing of knowledge is essential and facilitate any knowledge management initiative or approach.

2.1 Learning and knowledge sharing in organizations

Experts agree on the need to maximize the responsiveness of organizations to the complexity of the challenges, both in the external environment and within the organization. And learning with the aim of regeneration and development of organizational knowledge is seen as the appropriate response of organizations to what some researchers call the endemic

change in society (Quintas, 2002). Turoff at his turn believes that organizations will succeed based on their ability to learn and adapt (Turoff, 1998, as cited in Gregory, 2000).

No matter how we choose to call the successful organization, competent organization (Sanchez, 2001), intelligent organization (Sydänmaanlakka, 2002), open organization (Addleson, 2000) etc., this is based on learning, it is an organization with a culture where people can interact and share knowledge. The learning organization is indicated as the ideal model to which all structures should turn, although building a learning organization is considered a risky activity (Gregory, 2000) in that it involves creating a new organizational culture. But what is a learning organization? In short, we remember the five main activities which Garvin considers as defining for learning organizations "systematic problem solving, experimentation with new approaches, learning from past experiences, learning from the best practices of others, and transferring knowledge quickly and efficiently throughout the organization" (Garvin, 1993, as cited in Gregory, 2000).

Many researchers make references to the individual as a decisive successful factor for knowledge management, despite the importance which is given to teams and groups (Stacey, 2001). And indeed when it comes to learning and knowledge creation and sharing, one must start from the individual and then reach organizational culture which must support these processes massively (Jacobson, 2006), the individual being the one who can interpret and communicate knowledge with other individuals, groups and organizations (King, 2006). But even if individual talent and creativity are at the basis of learning and innovation, ultimately it is the organizational culture that supports these processes (Kanter, 1996).

Learning is seen as a very complex creative process (Sydänmaanlakka, 2002), it is a social activity (Stamps, 2000) and "the natural connection between working and innovating" (Brown & Duguid, 2000). Some experts even speak of generative learning, ie learning that "increases the organization's ability to adapt to dynamic and unexpected situations and to respond creatively to them" (Ali et al., 2006).

Learning takes place at three different levels: individual, group/team and organizational level and specialists refer to the circular interaction between the individual level and the group/organizational level (Stacey, 2001; Sydänmaanlakka, 2002). There have been created many models in this sense. For example, Sanchez proposed the model of the five learning cycles according to which "individuals in organizations create knowledge, individuals and the groups they work in interact to create shared knowledge and to generate new knowledge and groups use their knowledge to undertake coordinated action and to jointly develop new organizational competences" (Sanchez, 2001). For some specialists it seems more appropriate to talk about organizational learning, ie "the ability of the organization to renew itself by changing its values, practices and processes" (Sydänmaanlakka, 2002) than about the learning organization. Analysts of the learning process forewarn not only about the importance and difficulty of learning how to learn, but also about the need to unlearn, to leave behind old knowledge and practices that would not be useful in the future but could represent obstacles to new activities and new forms of management at organizational level (Cope, 2000; Quintas, 2002).

2.2 Organizational culture

The greatest influence on the organization's performance is thus exerted by the organizational culture with all its components, and its transformation, meaning a greater

emphasis on knowledge sharing, must be the key point in the organization's strategy (Webb, 1998). The elements of organizational culture exert their influence on the way organization "thinks, feels and acts" (Hofstede, 1996). This influence is exercised not only on the organization long-term activity, it also refers to its daily work and thus reflects on the organization's overall performance. A thoroughly investigation and understanding of organizational culture must cover all its components and also all levels on which they manifest, from physical features of the organization, to perception, relationships between employees, practices, habits and values promoted within the organization.

The existence of a shared vision guides the organization in one direction, creates an environment that allows and encourages learning. The same workculture as well as common language and ground lead to better communication and better sharing of knowledge (Davenport & Prusak, 1998) and actually create competitive advantage. Because the essential difference between organizations and which leads eventually to market advantage and success is given by the state in which these resources are found, namely, whether knowledge is found only in the minds of employees, if shared among employees or recognized and used throughout the organization (Sanchez, 2001).

Generating new knowledge is dependent on the organizational culture and in order to improve knowledge sharing and generation an interactive context must be developed and maintained. Because only when organizational culture allows and encourages change, expression of ideas, participation, communication, and dialogue, then learning and knowledge sharing are possible.

When discussing about knowledge resources and their flow in organizations, cultural, physical and organizational barriers should not be overlooked (Barrett, 2000). In terms of knowledge sharing, studying and understanding how this takes place can provide ways to identify and overcome these barriers (Lindsey, 2006). However there are researchers (Firestone & McElroy, 2003) who do not consider that failure of knowledge sharing in organizations is due to cultural barriers and do not give so much importance to the process of changing the organizational culture for implementing knowledge management in that it has only a small role and there are many other factors that influence knowledge management processes.

In the context of all these issues discussed in recent literature that analyzes the knowledge economy with its global competition and continuous changes, the process of knowledge management and the importance of organizational culture, we turned our attention to a particular type of organizations that play a key role in the knowledge-based society, namely libraries and information services, and we proposed to investigate how they could implement knowledge management in order to meet the challenges of the current environment. Thus, we conducted a research that spanned a period of five years to develop a general model for implementing knowledge management in libraries and information services and to identify and outline the directions for creating in these organizations a culture of a learning and knowledge sharing. Developing organizational practices and a culture centered on the ability to create and assimilate new knowledge and to share knowledge will assist libraries and information services with protecting themselves in front of changes and redesigning their management systems.

3. Libraries and information services in the knowledge-based society

Libraries and information services, like other organizations in current society are faced with an acceleration of changes and a growing competition. The environment in which libraries

operate, the way people search and access information have changed in recent decades, mainly due to the developments in the information and communication technology area. Libraries are no longer the only providers of information and globalization and networking bring serious challenges to these institutions. But libraries should make use now, as so often in the past of the changes in society and exploit them for their advantage and become more competitive. Libraries and information services need an analysis and a change of their functioning models so that they can adapt to the conditions in the market of information transfer and deal with the more specific requirements of users.

Libraries are organizations with a very long history. They have always adapted to the needs and requirements of society, but kept their core mission and objectives, that is conservation of written cultural and scientific heritage and information dissemination. Libraries have survived many changes because they knew how to adapt. They have transformed their structure and reorganized their services to meet changes and maintain their position in society. Transformations that libraries have gone through over the years have followed the changes in society and come to meet society demands. Libraries and information services have demonstrated a great openness to change, entering into new paradigms many times along their history.

At present, for surviving in a globalized economy and for maintaining their position as important players in the knowledge market, libraries and information services must continue to redesign their management systems. They need for this to promote flexibility, transparency, organizational learning, improve efficiency and effectiveness, and they also need permanent training of staff, reassessment and adaptation of working methods to contemporary requirements. At the same time, libraries should give major importance to the policy of competence and co-operation and should have a modern approach to project management, that is results-orientated and centered on the capitalization of the major strategic resources of the current society – information and knowledge – that define and shape actions, interactions, human activities and institutions. Higher levels of performance and continuous innovation can be achieved by libraries and information services through the identification and development of better ways to manage and exploit knowledge assets.

It appears that knowledge management is nowadays the foundation of organizational development in all fields of activity. And the relationship between knowledge management and libraries and information services is "an organic one, based on the movement forms of information as a joint constituent element" (Stoica, 2006). For being successful in this globalized world, libraries and information services should become knowledge driven organizations. Knowledge management practices will allow them to function effectively and efficiently in this environment. Some libraries have already turned into learning and knowledge centres, others invest now in implementing solutions for managing better their knowledge resources, but these initiatives should consider how librarians create, acquire, share and use knowledge effectively. Development of practices that allow collective experience and learning is important in libraries and information services too because the benefits will be for the individual, the group and the organization as a whole. Roberts and Rowley emphasize in the context of libraries the need to understand the complexity and significance of the individual, groups and teams (Roberts & Rowley, 2004).

Libraries and information services should act as "living organizations", should build and develop a culture that fosters thinking, learning, creating and sharing knowledge. For sharing knowledge is necessary to have within libraries open communication, interpersonal context, trust, transparency of decision making, appropriate rewards, teamwork,

cooperation, etc. All these aspects enable, support and facilitate learning. In libraries and information services it must be understood the way in which new knowledge is generated at the group level, what motivates librarians to share what they know, how knowledge is shared and managed among the employees.

In this study we address some of the issues to be considered when they want to transform the organizational culture and orientate it towards learning and knowledge sharing and to implement knowledge management in libraries and information services.

Libraries and information services should encourage and support at organizational level training and development of well-knit communities that collaborate and learn. They should encourage employees to develop and express new ideas, to participate in all activities and decisions within the library. Participation and knowledge sharing contribute to the development and transformation of libraries and information services into learning and also long-term successful organizations.

4. Conducting the research

This study is based on research conducted between October 2004 and December 2009. For the data collection we used a multi-method approach which included questionnaire surveys in large Romanian libraries, semi-structured interviews with the library staff and participant observation of staff meetings in one of the library on which we focused our research beginning with March 2007. The combination of these three methods gave us the possibility to use data obtained through these different techniques and offered a large and complete perspective of the aspects investigated. This approach helped us with a better understanding of the collected data and ensured an increased validity of the results. We proposed in 2004 to carry out a study on knowledge management in Romanian libraries and information services and starting from the first results we focused on the organizational culture in Romanian libraries and on the aspects that could lead to the transformation of the organizational culture in one that encourages learning and knowledge sharing and on the elements of a model for implementing knowledge management in libraries and information services.

An initial study, the first ever in Romania regarding knowledge management in the field of library and information services, took place between October-November 2004 in four Romanian libraries and information services and it investigated on the basis of a questionnaire consisting of 14 questions whether a favourable climate for effective knowledge management could be identified. Eighty questionnaires were randomly distributed to the library staff in the participant institutions. There was a response rate of 85%. We identified enough elements that could support the creation of such a culture over the next few years. Most of the librarians who participated in this study were familiar with this new process, having a fairly good perception of what knowledge management represents, were open to the idea of knowledge sharing and considered the implementation of a knowledge management strategy by their organizations as necessary and beneficial (Porumbeanu, 2006; Madge, 2010).

Starting from the results of this first study that showed that a culture of knowledge sharing amongst the participant librarians did not exist, we undertook a second questionnaire survey between December 2006 and January 2007 which analyzed the particular characteristics of the organizational culture in five large Romanian academic libraries, namely the values promoted by this culture, their policies concerning staff, and

organizational development, their managerial style, knowledge sharing, their embracing of creativity, innovation, performance, communication, change, collaboration and continuous professional development amongst other elements. The questionnaire consisted of 10 questions and eighty questionnaires were distributed at random to the library staff in the five participant institutions. There was a satisfactory reply rate of 82.5%. The results showed that regarding the values promoted by the organizational culture in their library, the participants indicated performance, professionalism, efficiency, teamwork, communication, competition, and innovation. Most of the librarians in the survey were open to the idea of knowledge sharing and many of them characterized the managerial style in their organizations as being one that creates a stimulating climate (Porumbeanu, 2010).

The methodology of the study evolved over time and because we considered that for studying the organizational culture we needed more direct contact with the library staff and the organization environment, and a greater closeness to the specific values and the activity of that organization, we included other two methods, interviews and observation. Starting with March 2007 we focused our research just on one library, the Central Library of the "Carol Davila" University of Medicine and Pharmacy - Bucharest. We decided to focus our research only on one of the libraries surveyed in the previous study, having in view that the results were similar in the participant libraries and also considering that in the case of a smaller scale study we would be able to come with some concrete solutions, suitable for that library. We chose this library also because it proved a great availability over the years for research, this library being involved in other studies too, for example user studies (Porumbeanu, 2008, 2009a, 2009b). 28 semi-structured interviews of approximately 30 minutes in length with staff from all levels were conducted to ensure an adequate representation. There were also six informal follow-up interviews. They all took place between March-June 2007. The third method, observation of meetings refers to observations of eight staff meetings at the same library between September 2007 and December 2009. The interviews and observations offered us data from "inside", staff points of view and clarified specific aspects of the organizational culture in the library studied.

By analyzing the data collected and the results achieved we could design in 2006 a strategic model for implementing knowledge management (Madge, 2011) and after that, in 2010 we also outlined courses of action to create a culture of learning and knowledge sharing in libraries and information services. However, detailed presentation of the results of this research is not subject to material. We propose in this paper to present briefly the model for implementing knowledge management in libraries and information services and the outline of the framework for creating an organizational culture oriented towards learning and knowledge sharing in this type of organizations.

5. Strategic model for implementing knowledge management in libraries and information services

Despite some common elements and depending on their particular field of activity, organizations present a number of features including the nature of the products and services they produce, their clientele or the public. They therefore require appropriate ways of implementing the new functions of management corresponding to specific conditions found in each organization. Starting with these issues, based on our research results but also reports of applications of knowledge management in organizations from different countries and industries identified in a review of the literature, and bearing in mind the characteristics

of the institutions involved in the information transfer, we believe that in order to obtain optimal results in the implementation of this new function in libraries and information services, managers must focus on creating a specific model, adapted to the needs and conditions of their structures. The model should be based on an in-depth analysis of the organization and the relationships within it, and those with the external environment. We designed in 2006 a strategic model (Figure 1) and formulated a few basic ideas which could be the starting point in implementing knowledge management in libraries and information services (Porumbeanu, 2006, 2009c).

The value of products and services provided by libraries and other information services has always relied not only on tangible resources, but also on the intangible ones, their knowledge assets. And today, these organizations may have a higher performance compared to other structures that appear in the market of information transfer, because they have a better knowledge of the ways in which they can create and provide quality information products and services to meet user needs. And this is thanks to their long institutional experience and also to their staff and their specialist training. The organizational knowledge, both in its practices and procedures and which the specialists possess, is difficult to imitate, it is unique and can be transformed into strategic benefits in the long term.

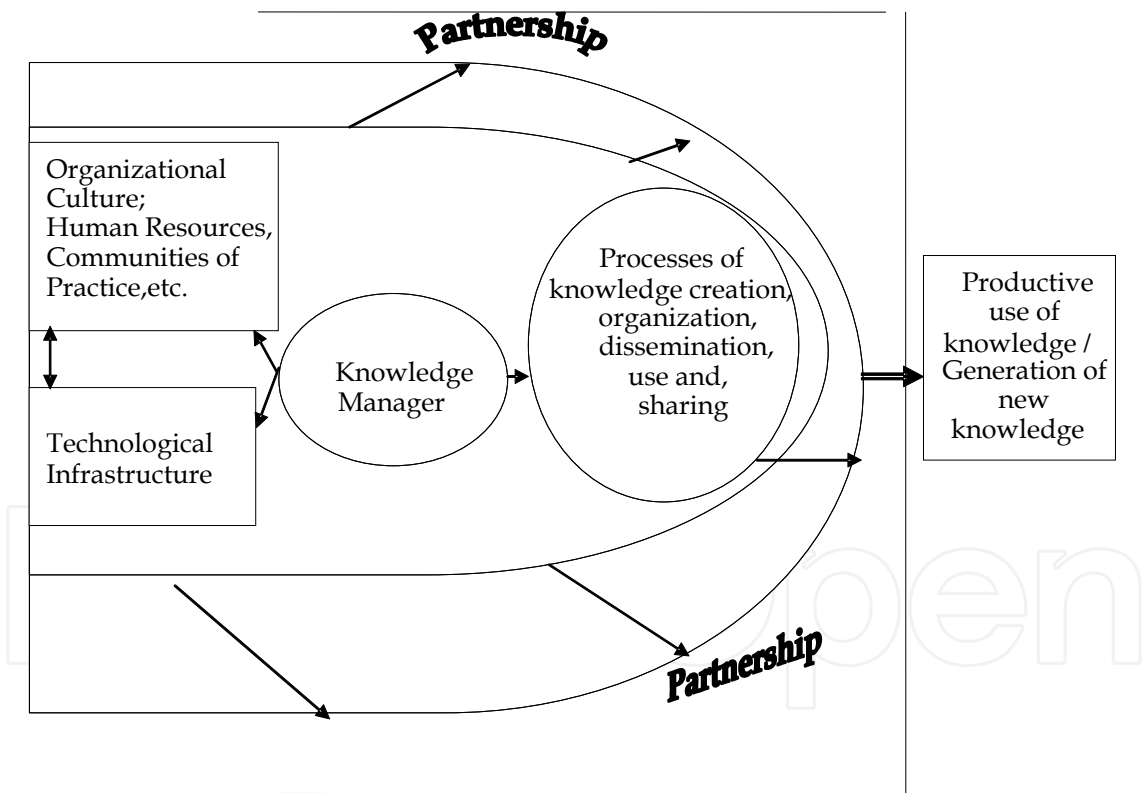


Fig. 1. Strategic model for knowledge management in libraries and information services

Therefore, the fundamental idea from which our model starts is that in contemporary society, the essential skills, based on knowledge, underlying the few activities which libraries and information services do best, are their key organizational assets. Developing unique products and services or developing them at a lower cost than competitors is based on superior knowledge of these processes. In the case of libraries and information services

these activities are knowledge organization and preservation, information search and retrieval, information dissemination and development of added value information products. To know how to carry out these activities effectively and efficiently, in ways that other organizations cannot copy is a primary source of value that cannot be purchased from external markets. Therefore, firstly libraries and information services 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, libraries and information services can create, collect, and use the knowledge necessary in these processes. Based on this knowledge, they can develop new operating procedures and improve the existing ones. Organizational learning is essential and it must be fostered and enhanced continuously.

The second fundamental element of our model is represented by the people, the human resources and the organizational culture. The chances of success in the implementation of knowledge management is almost non-existent in any kind of organization, including libraries and information services, without development of a collective culture open to change. Here learning, creativity and quality are valued and sought, where the acquisition of new skills and knowledge is an ongoing process, where investment in human capital, in the further training of employees, is essential. Developing a better strategy for communication, creating a coherent context for the systems and the people in the organization are steps that necessarily must be taken. The existence of a unified culture will reduce the barriers of communication and will lead to closer co-operation within the organization. There must be, therefore, a framework created whose components (vision, strategy, values, etc.) recognize the benefits that derive from supporting organizational learning and knowledge sharing. Communities of practice (an important source of expertise for the organization) should be encouraged, as should communication and a team culture where exchange of ideas and information leads to the creation of added value. For an increased efficiency in knowledge management an online discussion forum may be created, which certainly will improve the processes of organizational learning, sharing of knowledge and expertise. Managers must take appropriate measures so that knowledge sharing takes place, perhaps leading to the establishment of organizational changes to encourage greater use of this forum. Changes could include, for example, recording weekly statistics indicating the system users by employee. Frequent users could be rewarded. Internal procedures could also be changed to ensure the immediate capture and use of information during the various projects undertaken by the organization. A system must be set up for periodic evaluations and rewards to encourage people to contribute with their knowledge and to use the knowledge of others.

This brings us to the third fundamental element of our model, namely the technology that can underpin the process of knowledge management 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 existing in the organization. Knowledge management systems based on the new technologies may collect the relevant knowledge and experience in an organization and may make it available anywhere and anytime, thus supporting the processes taking place and decisions that are taken within the library or the information service. They can also connect these institutions to external sources of knowledge. Knowledge management systems support the processes of identification and codification, sharing and distribution of knowledge, and also the processes of generation of new knowledge and integration of this into the organization. Applications of knowledge management support libraries and information services in creating knowledge

maps, registers of the collective knowledge of employees, indicating specific areas of their expertise. It also provides support in identifying and sharing best practices, in encoding experts' knowledge so that it can be registered on the information system and used by other members of the organization. Information systems can promote organizational learning. With these systems, knowledge can be preserved in the organizational memory for the training of future employees and for helping them in making decisions. People can be directed to specific areas of expertise, can get in touch with those who possess knowledge, can easily identify experts and tacit knowledge can be shared. The role of information technology underpins the ability to raise and improve collaboration and communication among employees, and between them and practitioners and experts from outside the institution. This helps enormously in the innovation process. Technology makes available the organizational knowledge. But precisely the type of system that can facilitate information flow and knowledge management in libraries and information services must be identified. Specifically systems that help these organizations understand and respond better to the requirements of their environment. External and internal networks, databases, techniques for extracting data, and other applications based on the new technologies of information and communications can also help libraries and information services in capturing, organizing and using the knowledge base they possess.

We introduce here the fourth fundamental element of the model, networks, the partnerships with other structures of the same type or with structures with similar activities. Libraries and information services should be organized in networks, which through all the human, information, knowledge and technology resources they possess, will have more ways to use human knowledge productively and thereby will be more efficient and more competitive. By applying information and knowledge they will be able to generate new knowledge, will be able to process information and develop advanced communication tools. Also, as part of a network they will be able to focus on creating and improving the facilities and infrastructure that encourage and support learning. Designing, implementing and managing partnership programmes with other public or private organizations are necessary actions to stimulate research, innovation and new knowledge generation. Libraries and information services have to be constantly in search of new opportunities for collaboration. They must identify, develop and use the best practices in scientific co-operation, exploit the potential of information and communication technologies to help develop strategies and activities in co-operation with other organizations. Expanding partnerships, involvement in international research programmes, development of modern applications for their actions, the interconnection of all their departments, will enhance the quality of activities of libraries and information services and of the products and services they provide to users. Through partnerships and networks, libraries and information services will have more knowledge assets, and although many difficulties can appear in sharing these assets, information and communications technologies can provide solutions to overcome these difficulties.

A fifth key element for the success of the knowledge management project is the creation of the position of knowledge manager. Its holder will deal with all that makes up the knowledge strategy for that organization. They will co-ordinate the technological infrastructure, human resources, the processes of creation, use and sharing of knowledge, the co-operative relationships of the organization (Figure 2). They will be responsible for the smooth running of the process of knowledge management within the library or the information service, will co-ordinate the design and implementation of knowledge management programmes and systems, will find new sources of knowledge and will identify new ways of effective use of knowledge in the organization.

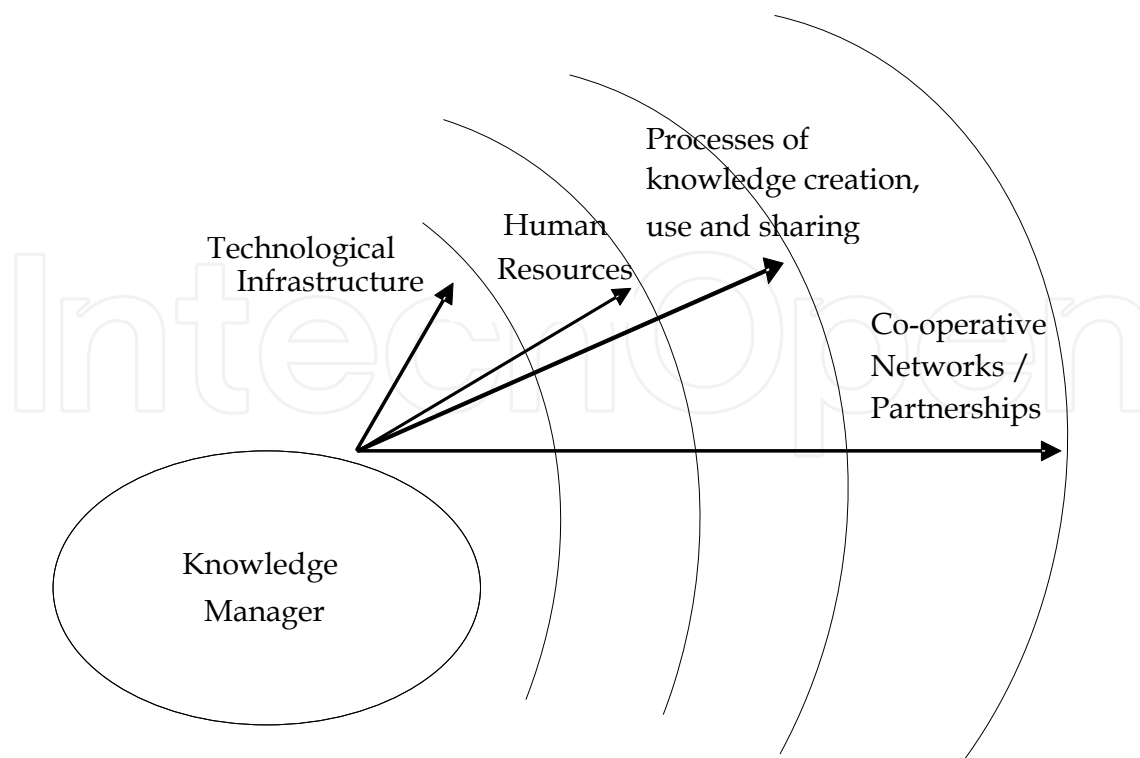


Fig. 2. The role of knowledge manager

Our model centrally places the knowledge assets of the organization (which are in the minds of people, in the organization processes, practices and activities) and those from the external environment, at organizational level where there are co-operative relationships, and is designed to support the expansion and improvement of those main activities deployed by libraries and information services: the acquisition, organization, processing, and preservation of documents; information search and retrieval; information dissemination; development of information products; provision of information services for users, etc.

The phases of the model (Figure 3) are not necessarily dependent on each other, so that we need not complete a stage and only then move to the next. They can also be addressed in a different order, not only in that set out below. These steps should rather be seen as some steps to be taken, regardless of the path chosen, each library or information service setting out on an individual basis, depending on the specific functions and resources (human, financial, time, etc.) available, the importance of these stages in order to achieve the goals and the order in which these steps must be completed. For example, developing an organizational culture open to sharing knowledge can be the first action that a library initiates, as is perhaps the most important step, but the most difficult in any project for implementation of knowledge management. Also, creating a post of knowledge manager may well be a decision that is put into practice as soon as a library has decided to implement knowledge management.

The model includes a series of relationships which should be established at library or information service level, but also at the level of the partnerships established with other organizations. The relationships within the partners should be at the knowledge managers' level for effective coordination and functioning of co-operation or directly between specialists in the libraries and information services who can co-operate in various activities in which they are engaged. These relationships are represented schematically in Figure 4.

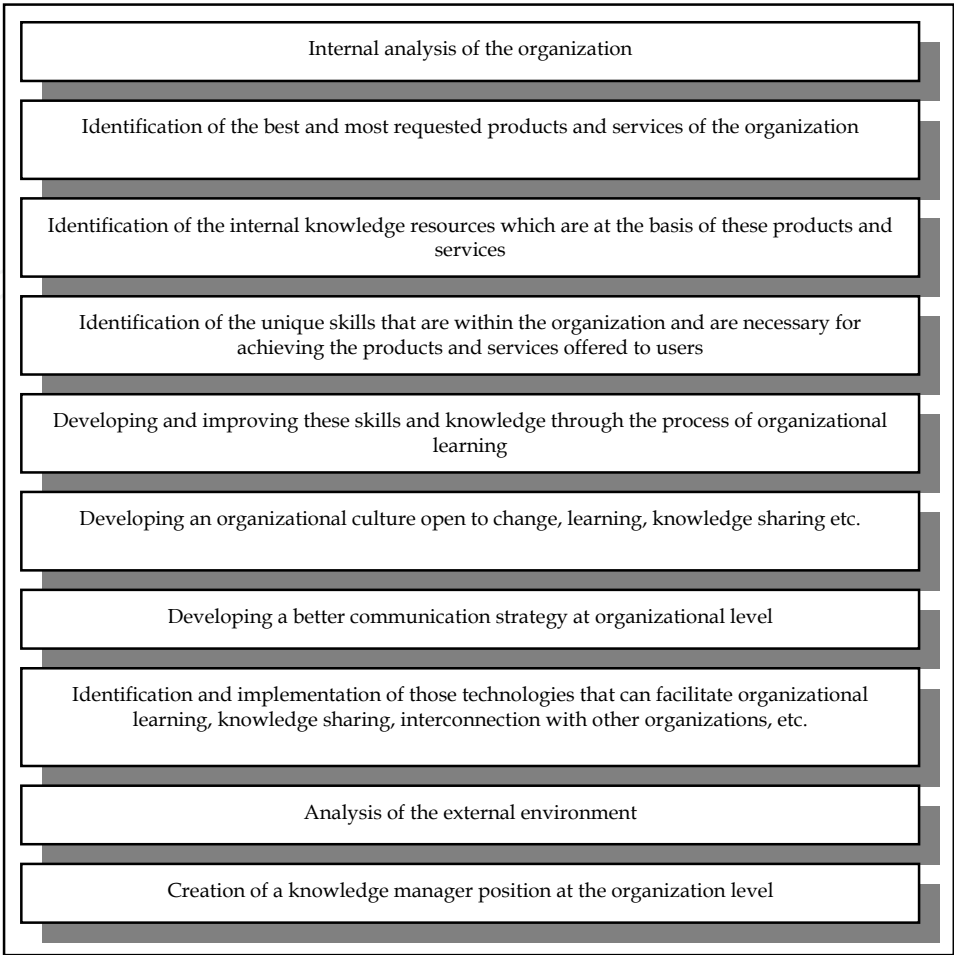


Fig. 3. Phases in implementing knowledge management in libraries and information services

Modes of action must be decided at organizational level by each manager because each institution has a specific environment, the characteristics of organizational culture being different in all structures. As a whole each organization will react in a specific way differently from other structures, even if they are the same type. For example, for operational changes to the organizational culture, each structure must identify the best ways to motivate people to share and use knowledge.

The consequences of the implementation of a knowledge management project can be manifested in different ways. Results of actions may occur faster or slower depending on the circumstances in each library or information service. Acting in the same way in two different organizations, we will not achieve the same results.

In the case of libraries, partnerships for knowledge management can be established through existing networks at public, school and university level by the interconnection of all these institutions, then a partnership at national level could be constructed through the participation of these structural networks, but also of others (Figure 5). In the case of academic libraries, for example, co-operation at the level of the field / discipline can lead to expansion both in breadth and depth.

The model of implementation of knowledge management in libraries and information services allows:

- identification of the most important processes, products and services of libraries and information services and their evaluation;

- identification of knowledge resources and skills in the organization in order to exploit these resources;
- identification of the potential external partners for collaboration.

Implementing knowledge management in libraries and information services will lead to the improved ability of these organizations to learn, identify and use knowledge from internal and external resources in their processes and activities. It will also lead to the generation of new knowledge, to the development of new procedures and practices to optimize integration and sharing of knowledge within organizations. A knowledge management programme tailored to the specific conditions in libraries and information services, once put into practice, can reduce costs, increase revenue, increase staff efficiency, improve the activities, products and services offered to users, in short improve the performance of libraries and information services and secure a good position for them in the knowledge market.

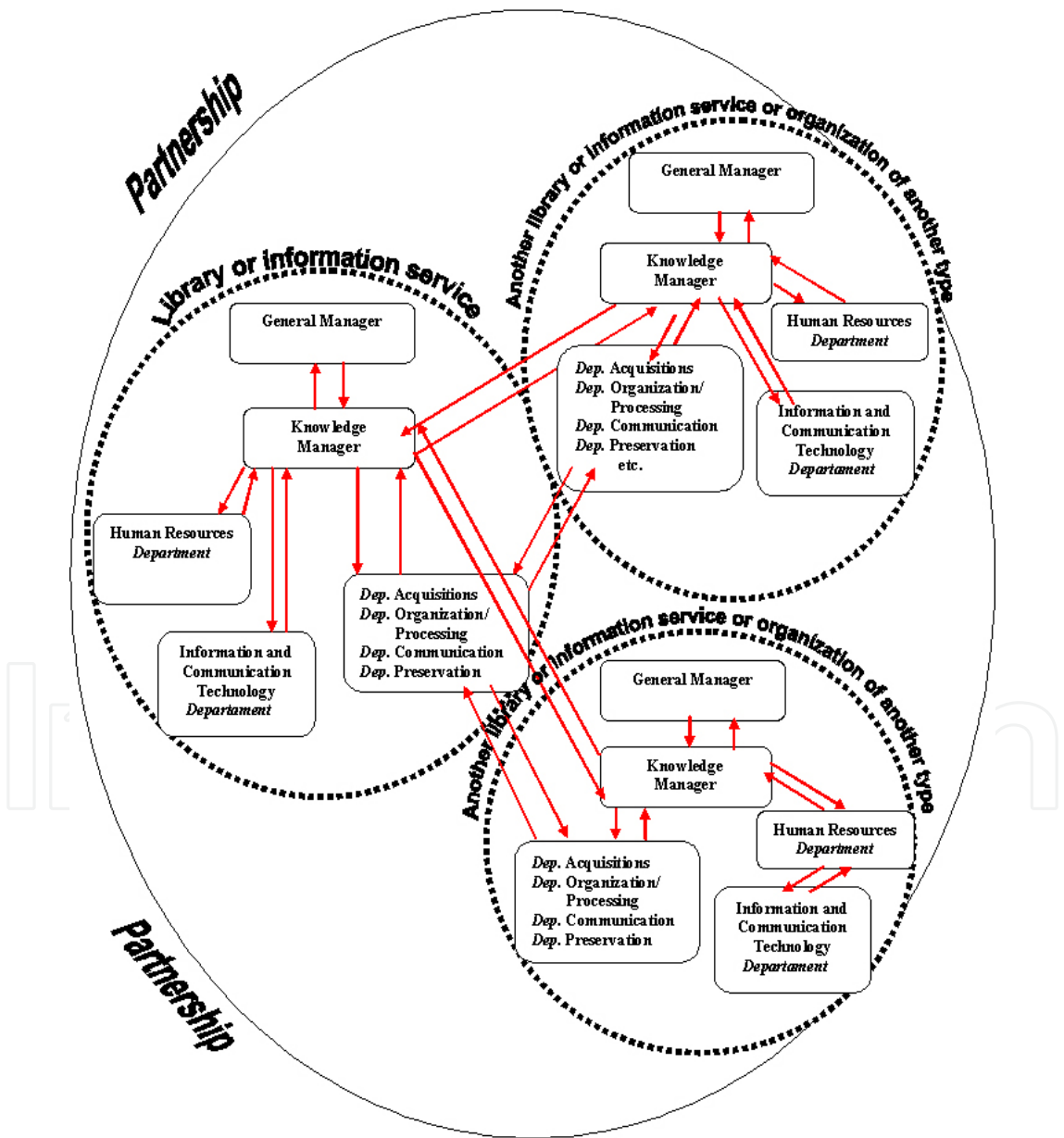


Fig. 4. Relationships at the library or information service and at partnership level

6. Framework for creating a learning and knowledge sharing culture in libraries and information services

Orientation of organizational culture towards learning and knowledge sharing will help ensure success and long-term development of organizations, including libraries and information services. If the knowledge manager or the chief knowledge officer is generally considered to have three major responsibilities which involve creating a knowledge management infrastructure, creating a knowledge culture and making these structures pay off economically (Lester & Kohler, 2003), we believe that in libraries and information services and in the context of the strategic model that we proposed, the knowledge manager should firstly focus his efforts and start his approach of managing the knowledge resources strategy from issues related to building an adequate organizational culture. Such an organizational culture should support libraries and information services in the future in order to adapt to the globalized environment by reinventing themselves continuously. This could allow them to respond creatively to change and maintain an important position on the market of information transfer.

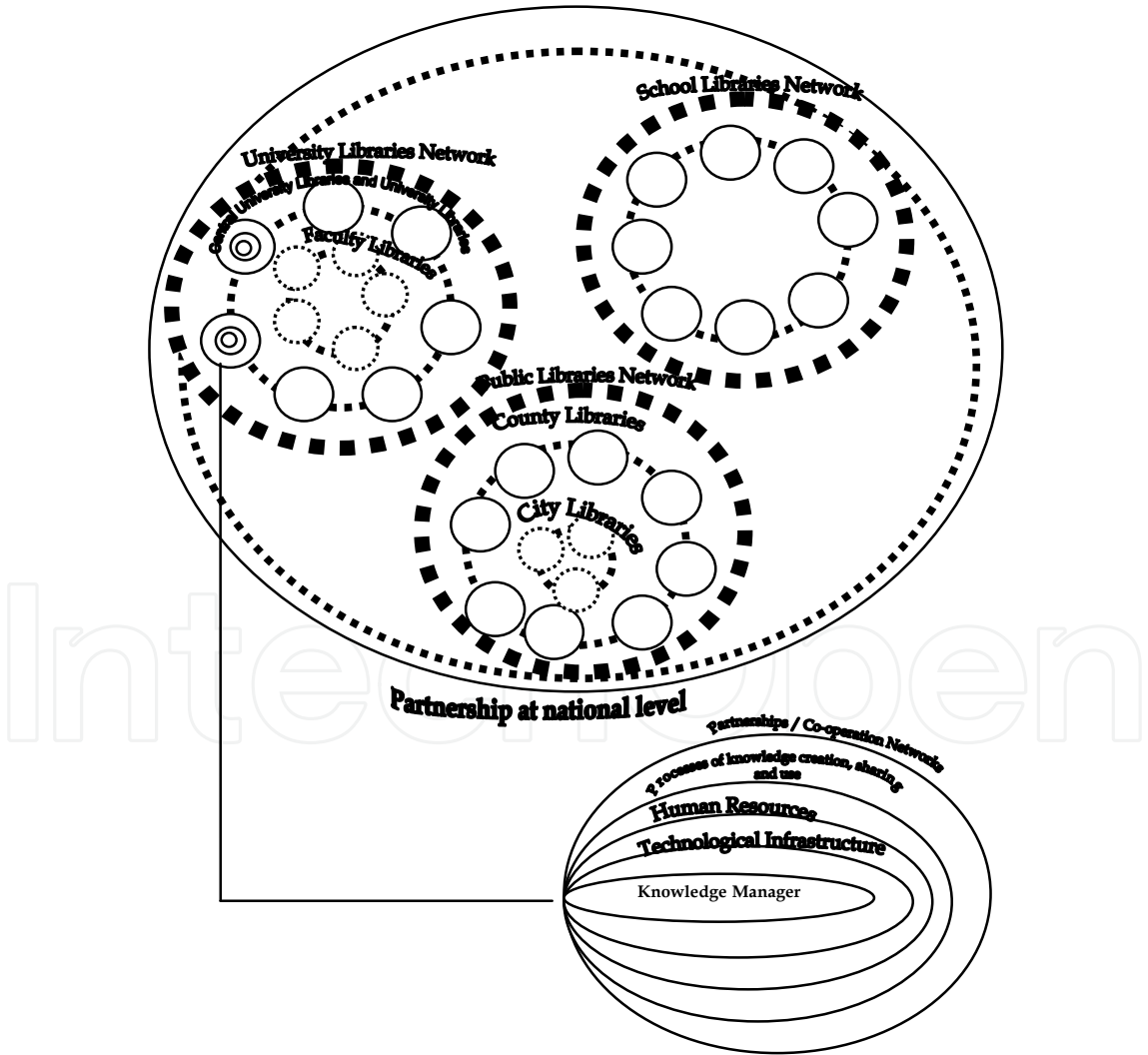


Fig. 5. Partnership for knowledge management at national level in libraries and information services

In the specific context of libraries and information services as key players in this market, everything must be designed taking into account the challenges which the information and knowledge society has brought in their domain, the impact it has had on the role of librarians and on the information needs of users, the fast development of information and communication technologies and the explosion of digital information resources to which libraries have increasingly turned and which have led to significant changes of the way in which information services are provided to users (Hornby & Clarke, 2003; Limb, 2004). Libraries must use to their advantage all these changes regarding digital resources and networks.

The importance of organizational culture comes also from the fact that it has influence on so many organizational levels: mission and objectives, policies and procedures, decision making, communication process, continuing professional development of employees, employee attitudes and behavior, values promoted by the organization, management style, the position libraries and information services occupy in their domain, relationships with the external environment, employee motivation, performance etc.

According to our model, the knowledge manager tasks and responsibilities are (Figure 6):

- to identify necessary changes at the organizational culture level and to find ways to implement these changes;
- to support and promote organizational learning;
- to work for building a culture that fosters open communication, experts networking, etc., in short a culture oriented towards learning and knowledge sharing;
- to work for developing forms of co-operation;
- to design the knowledge strategy at the level of the whole organization;
- to work for building a knowledge management infrastructure (design, implementation, monitoring, evaluation of human, library, and technological resources, etc.);
- to handle the identification, acquirement, organization, protection, distribution, and sharing of knowledge resources;
- to coordinate knowledge management programs and systems;
- to coordinate the process of creating and using knowledge (development of new products and services, market research etc.);
- to coordinate the relationships with external partners and providers of information and knowledge.

Vision and leadership are essential for this whole approach because they will support achievement of these tasks and responsibilities.

For creating a culture of learning and knowledge sharing in libraries and information services we believe that action must be taken in four major directions (Figure 7) aimed at:

- the communication process at organizational level;
- the motivation and reward system for employees;
- the policy on training and continuing professional development of employees;
- the system of the values promoted at organizational level.

Communication plays a vital role in the efficient functioning of any organization. The existence of a shared vision depends on how communication occurs in the organization. It is not possible to know and understand very good the library mission, its objectives, and policies etc. without effective communication. Participation, involvement, dialogue, expressing new ideas, empowering employees should be encouraged, but this is not possible without creating conditions for effective communication and facilitating multidirectional communication

channels. Development of a strategy that reflects the shared vision of the employees in that library must be based on a process of open and effective communication.

The communication process is also crucial in terms of employee perception of their organization, the values promoted within that organization and how this is perceived by the external environment. Benefits that new information and communication technologies currently offer can be exploited to create fast, open and multidirectional communication channels. A communication strategy that takes into account support for learning, knowledge sharing, and in fact knowledge management systems, should consider creating the necessary conditions for developing communities of practice and an interactive environment within the library. In promoting and facilitating learning opportunities, the knowledge manager can play a key role by encouraging communities of practice and developing teams to learn and generate knowledge (Abell & Oxbrow, 2002; Lester & Kohler, 2003).

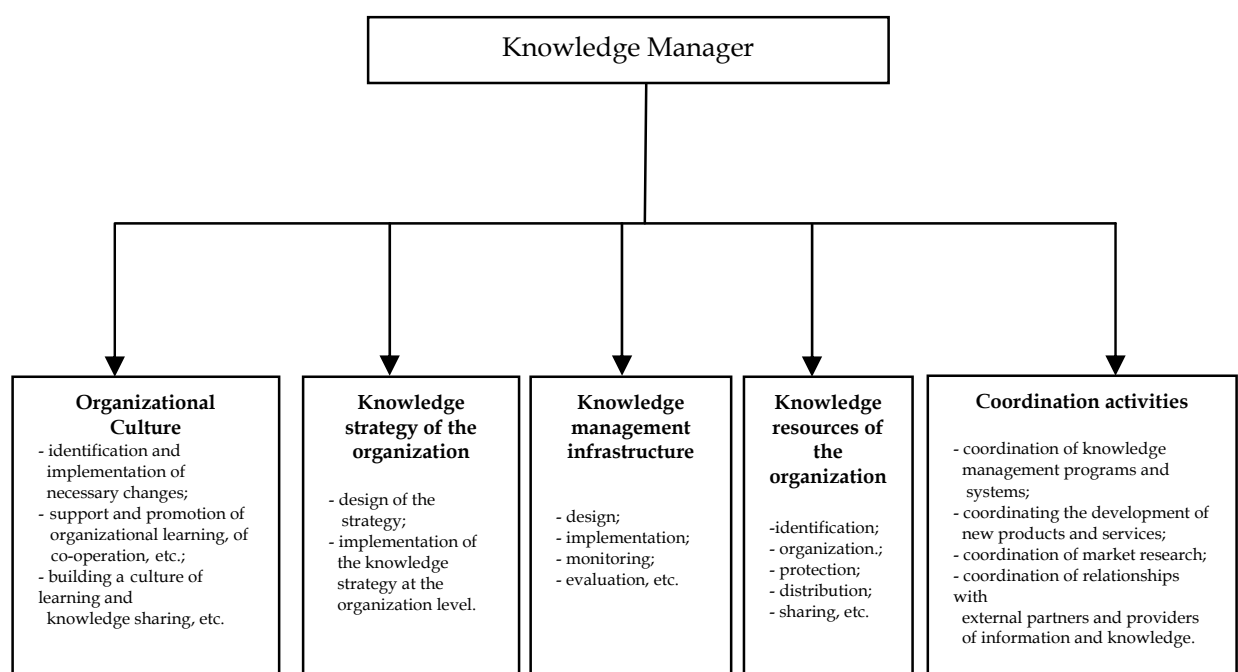


Fig. 6. Tasks and responsibilities of the knowledge manager

In the action of improving communication process in libraries and information services, both formal and informal communication together with their related channels should be considered. Informal communication, face to face, group and team meetings must be encouraged because people communicate and learn better in an informal context. Informal communication also contributes to the confidence that library staff develops in each other. Managers should also not neglect the barriers of various types that may occur in communication and also the complexity of this process that can take place in so many ways and forms (Condon & Yousef, 2002).

The values and attitudes promoted in libraries and information services, their encouragement and development at the employee level have a major influence in supporting processes such as learning and knowledge sharing. Among the values with a key role in the success of organizations on the globalized knowledge market which should be promoted (Figure 8), libraries and information services should give great importance to

the following: open communication, knowledge sharing, learning, collaboration, dialogue, performance, creativity, flexibility, change, responsiveness to new ideas, teamwork, professional co-operation, exchange of experience, transparency, empowerment, participation, etc.

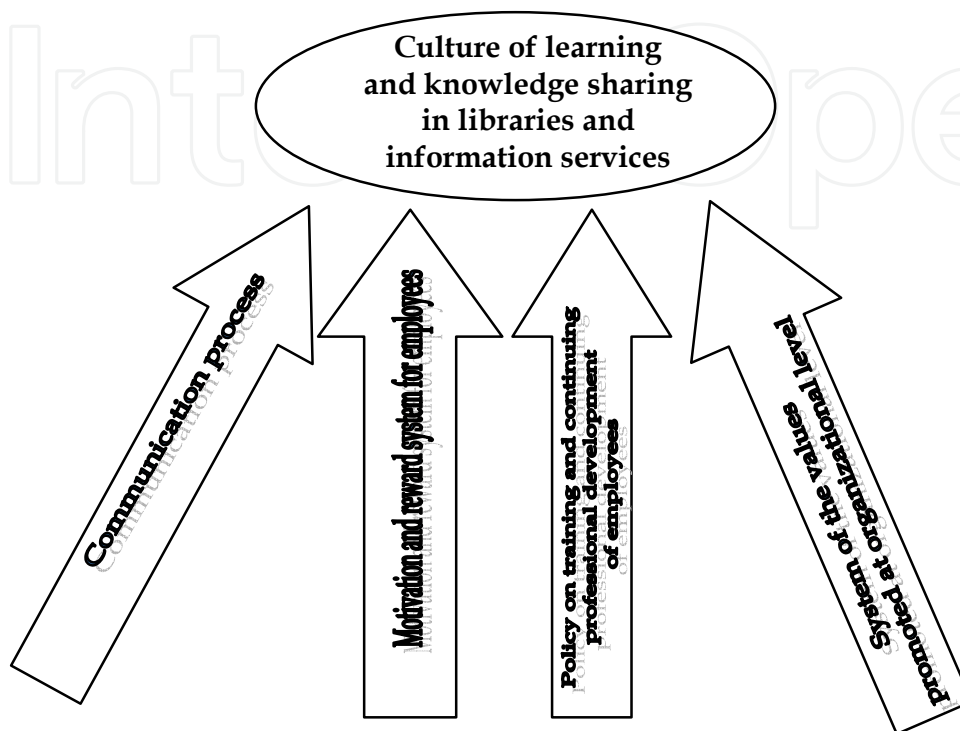


Fig. 7. Major directions of action for creating a culture of learning and knowledge sharing in libraries and information services

But in the field of libraries and information services, we can also talk about professional values specific to these organizations (Roberts & Rowley, 2004) which should not be overlooked by managers: the value of information, accessibility to information and services, user orientation, social inclusion, providing selective information, that is evaluated, validated, directly exploitable, current and quickly obtained information, etc. Promoting these values which facilitate and stimulate learning and knowledge sharing among employees is very important in libraries.

The policy of training and professional development of employees in libraries and information services strongly influences the learning process. Libraries have the advantage of various tools for continuing professional development: reading and updating, coaching or mentoring, job exchanges or job shadowing, conferences, distance education, training others, meetings, networking, learning from others, etc. (Roberts & Rowley, 2004). How employees will pertain and respond to growth and improvement of their speciality knowledge, their involvement in various forms of training and professional development, their active/passive attitude towards these aspects of professional development are influenced by the organization policy and the importance libraries and information services give to these issues. Building programmes of training and professional development at internal level, encouraging employee participation in external training and professional

development programmes, offering them material support to participate in such programmes, encouragement of their participation in conferences, and preparation of communications and articles, their involvement in research concerning the library’s activity should be taken into consideration because learning and increasing employee knowledge are supported by such actions.

In libraries, learning at individual, group/team and organizational level and also knowledge sharing need to take into account the existing types of groups and teams in these organizations, namely: operational team, strategic team, multi-skill teams, virtual teams, networks and communities of practice, etc. (Roberts & Rowley, 2004).

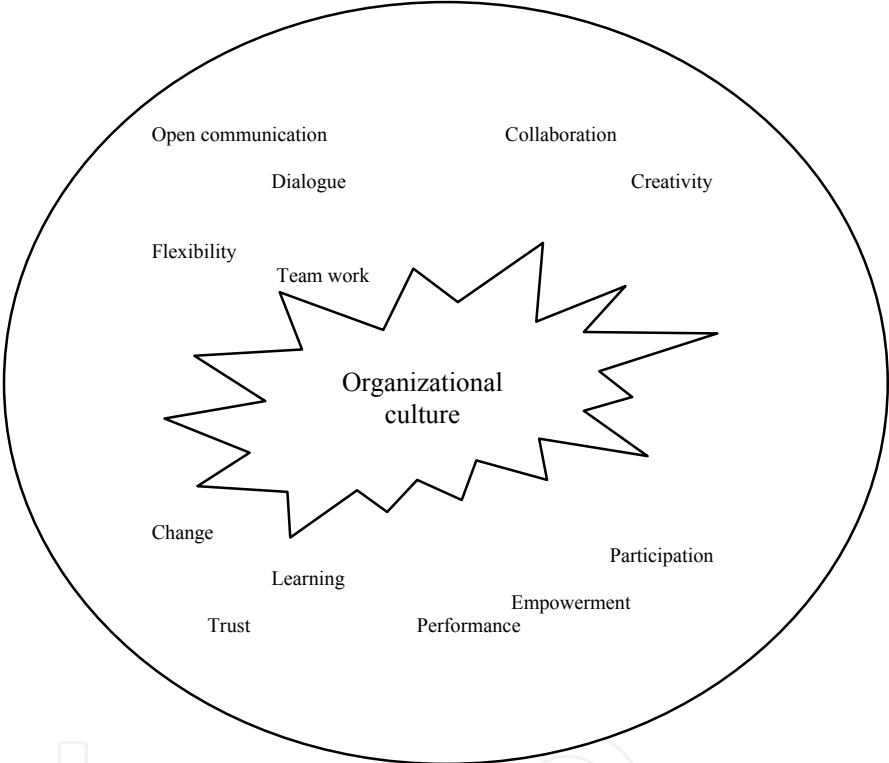


Fig. 8. Values which should be promoted by the organizational culture in libraries and information services

The motivation and reward system for employees is very important in the process of sharing knowledge. Staff should be motivated to learn, develop professionally, enhance their expertise, be active professionally. Rewarding employee performance may be at material level or by promoting their career, by supporting their participation in various professional events, etc. In libraries and information services, for increasing employee satisfaction we have at hand specific approaches, namely creation of new roles, of new teams, introduction of various new practices and patterns of work like flexible working, job sharing, etc. (Roberts & Rowley, 2004). The factors that motivate the staff and which impact on their activities, and the management practices and methods that support performance

among employees have been investigated (Tampoe, 1996). But the motivation and reward system for employees must be well developed and be based on the analysis and the specific situation of each organization and its employees.

The data collected between 2004-2009 in our research and the results from these data analysis sent us to the conclusion that for creating a culture of learning and knowledge sharing in libraries, all these issues should be considered and action is needed in these four directions.

The model and framework which we propose offer a possible solution to implement knowledge management and create a culture of learning and knowledge sharing in libraries and information services (Figure 9). Their novelty, importance and usefulness stay in that they are general, allowing adjustments depending on the peculiarity and scale of each library. They are flexible and can be used in any library with the necessary adaptations, they will certainly lead to obtaining high performance and are a starting point for developing other specific models.

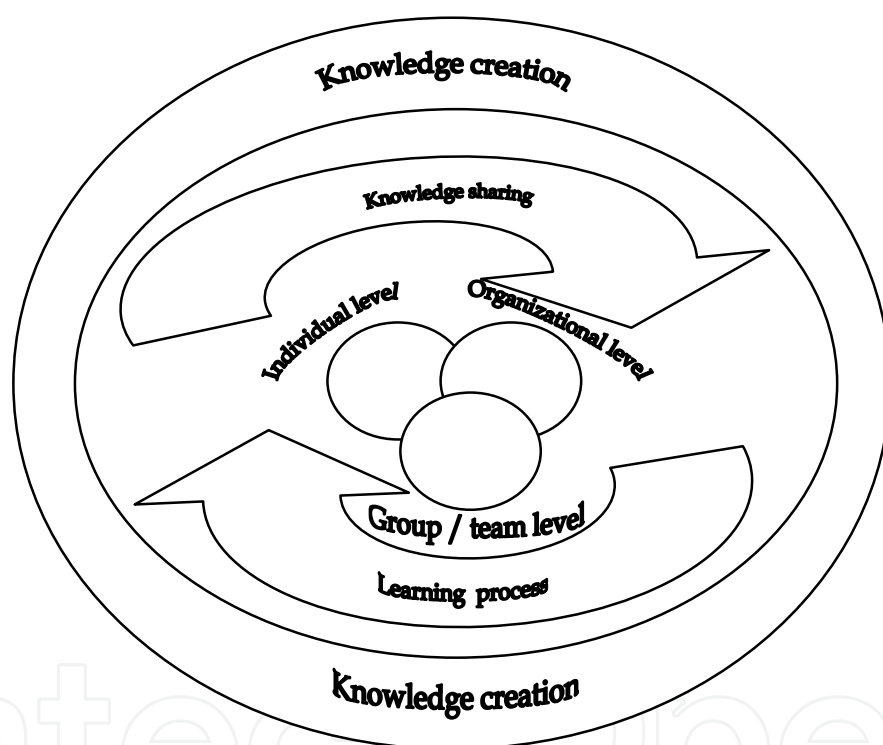


Fig. 9. Learning and knowledge sharing in libraries and information services

Even if the design of the model has in view large libraries which develop well defined workflows and have employees with higher skills and training, its elements can keep up their validity till the smallest libraries. The model can lead to a successful implementation of knowledge management in libraries and information services through a strategic vision of a knowledge manager and the systemic relationship which include the organizational assets, the new technologies and the human resources in the context of networks (Stoica, 2006).

Though, in very distinct contexts things may be different from the situation in the libraries examined by us and our model may appear incomplete or unsatisfactory. Also, some may see a weakness in that it does not go into details, in depth and offers only general guidelines, outlining the general directions of action to follow.

We believe, however, that this openness provides general application and it is an advantage. The model and framework designed by us can be adapted and completed, just from the fact that each library applying knowledge management process should develop a suitable way to implement it according to its own activities, practices and circumstances.

7. Future research

Together with other studies in literature, our research contributes to a deeper understanding of a category of organizations that occupies a special place in the knowledge-based society, namely libraries and information services, which are involved the most in knowledge management. Implementing knowledge management in any organization should start from understanding the context in which it operates, its mission and objectives, its activities and its characteristic elements and the external factors that influence it.

In literature, approaches to knowledge management application in libraries and information services are fragmentary. Our study provides a starting point for future research to explore in greater depth and go in more details about the elements of the model and framework and answer questions such as How should be developed a system to motivate staff in libraries? How communication can be improved at the library level? etc. The model and the framework we designed starting from our research offer the basis for understanding the context of libraries and for creating a culture of learning and knowledge sharing in these structures. Future research should develop more systematic and detailed approaches and ways to manage and improve knowledge sharing in libraries. This could bring great advantages by increasing the efficiency of these organizations in the globalized knowledge-based society.

8. Conclusion

Knowledge management is a way of thinking and action, it is not based solely on the use of knowledge, but becomes at the same time, an instrument of its development. "By implementing knowledge management organizations gain intelligence, learn, adapt, change themselves and change the environment, produce not only specific performance, but a special kind of tacit performance that penetrates gradually deep into the organizational fiber and gene. And all these through general awareness and participation" (Stoica, 2006). Recent literature is rich in researches that analyze, present and underline the benefits of applying the knowledge management process in organizations, the need to change the organizational culture and improve the organizational learning. The importance of these issues is evident for the future of organizations in the knowledge-based society.

Various studies have dealt with the libraries and information services domain too. But things are far from clear. Researchers agree that it is necessary to create a culture of learning and knowledge sharing and it is the best way for libraries and information services to follow, but how to do this as well is not completely understood. Aspects of organizational culture, organizational learning and knowledge sharing should be considered when approaching implementation of knowledge management in libraries. However, research has focused so far on the importance of culture and less on creating a framework for building such a culture.

This study is just one of the researches that focus on knowledge management in libraries and information services, it provides a model for implementing knowledge management in these organizations and highlights the directions on which library managers should

concentrate when they operate changes at the organizational culture level. Future research on organizational culture in libraries and information services and on the learning and knowledge sharing processes can help deepen this field and provide a stronger basis to be useful to libraries and information services and their managers.

9. References

- Abell, A. & Oxbrow, N. (2002). *Competing with Knowledge. The Information Professional in the Knowledge Management Age*, Library Association Publishing, ISBN 1-85604-339-8, London, UK
- Addleson, M. (2000). Organizing to Know and to Learn: Reflections on Organization and Knowledge Management, In: *Knowledge Management for the Information Professional*, T. K. Srikantaiah & M. E. D. Koenig, (Eds.), pp. 137-160, Information Today, Inc., ISBN 1-57387-079-X, Medford, USA
- Ali, I., Warne, L. & Pascoe, C. (2006). Learning in Organizations, In: *Encyclopedia of Knowledge Management*, D. G. Schwartz, (Ed.), pp. 561-568, Idea Group Reference, ISBN 1-59140-573-4, Hershey, USA
- Barrett, W., Lau, L. M. S. & Dew, P. M. (2000). Facilitating Knowledge Transfer in an R & D Environment: A Case Study, In: *Internet-Based Organizational Memory and Knowledge Management*, D. G. Schwartz, M. Diviniti & T. Brasethvik, (Eds.), pp. 147-169, Idea Group Publishing, ISBN 1-878289-82-9, London, UK
- Brown, J. S. & Duguid, P. (2000). Organizational Learning and Communities of Practice: Towards a Unified View of Working, Learning, and Innovation, In: *Knowledge and Communities*, E. L. Lesser, M. A. Fontaine & J. A. Slusher, (Eds.), pp. 99-121, Butterworth-Heinemann, ISBN 0-7506-7293-5, Boston, USA
- Condon, J. C. & Yousef, F. S. (2002). Communication Perspectives, In: *Managing Knowledge. An Essential Reader*, S. Little, P. Quintas & T. Ray, (Eds.), pp. 214-237, The Open University and Sage Publications, ISBN 0-7619-7212-9, London, UK
- Cope, M. (2000). *Know Your Value? Manage Your Knowledge and Make it Pay*, Prentice Hall, ISBN 0-273-65032-7, London, UK
- Davenport, T. D. & Prusak, L. (1998). *Working Knowledge. How Organizations Manage What They Know*, Harvard Business School Press, ISBN 0-87584-655-6, Boston, USA
- Firestone, J. M. & McElroy, M. W. (2003). *Key Issues in the New Knowledge Management*, Butterworth Heinemann, ISBN 0-7506-7655-8, Boston, USA
- Gregory, V. L. (2000). Knowledge Management and Building the Learning Organization, In: *Knowledge Management for the Information Professional*, T. K. Srikantaiah & M. E. D. Koenig, (Eds.), pp. 161-179, Information Today, Inc., ISBN 1-57387-079-X, Medford, USA
- Hofstede, G. H. (1996). *Managementul Structurilor Multiculturale: Software-ul Gândirii*, Editura Economică, ISBN 973-919-801-5, București, Romania
- Hornby, S. & Clarke, Z. (Eds.). (2003). *Challenge and Change in the Information Society*, Facet Publishing, ISBN 1-85604-453-X, London, UK
- Kanter, R. M. (1996). When a Thousand Flowers Bloom: Structural, Collective, and Social Conditions for Innovation in Organizations, In: *Knowledge Management and*

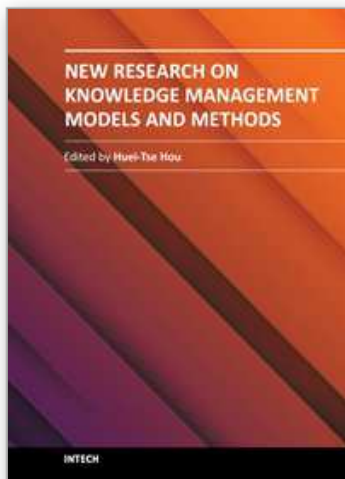
- Organizational Design*, P. S. Myers, (Ed.), pp. 93-131, Butterworth-Heinemann, ISBN 0-7506-9749-0, Boston, USA
- King, W. R. (2006). Knowledge Sharing, In: *Encyclopedia of Knowledge Management*, D. G. Schwartz, (Ed.), pp. 493-498, Idea Group Reference, ISBN 1-59140-573-4, Hershey, USA
- Jacobson, C. M. (2006). Knowledge Sharing between Individuals, In: *Encyclopedia of Knowledge Management*, D. G. Schwartz, (Ed.), pp. 507-514, Idea Group Reference, ISBN 1-59140-573-4, Hershey, USA
- Lester, J. & Koehler, W. C. (2003). *Fundamentals of Information Studies. Understanding Information and its Environment*, Neal-Schuman Publishers, Inc., ISBN 1-55570-474-3, New York, USA
- Limb, P. (2004). *Digital Dilemmas and Solutions*, Chandos Publishing, ISBN 1-84334-039-9, Oxford, UK
- Lindsey, K. L. (2006). Knowledge Sharing Barriers, In: *Encyclopedia of Knowledge Management*, D. G. Schwartz, (Ed.), pp. 499-506, Idea Group Reference, ISBN 1-59140-573-4, Hershey, USA
- Lorino, P. (2001). A Pragmatic Analysis of the Role of Management Systems in Organizational Learning, In: *Knowledge Management and Organizational Competence*, R. Sanchez, (Ed.), pp. 177-209, Oxford University Press, ISBN 0-19-924028-0, Oxford, UK
- Madge, O. L. (2010). Managementul Cunoașterii în Biblioteci / Knowledge Management in Libraries. *Studii de Biblioteconomie și Știința Informării / Library and Information Science Research*, No. 14/2010, Editura Universității din București, pp. 85-98, ISSN 1453-5386
- Madge, O. L. (2011). Knowledge Management in Medical Libraries in the Web 2.0 Age, *Proceedings of the International Symposium The Book. Romania. Europe 3rd Edition*, pp. 151-160, ISSN 2068-9756, Bucharest, Romania, September 20-24, 2010.
- Porumbeanu, O. L. (2006). *Managementul Cunoașterii și Structurile Infodocumentare*, Editura Universității din București, ISBN (10) 973-737-203-4, București, Romania
- Porumbeanu, O. L. (2008). Identifying the Implications of the Use of Electronic Resources and New Technologies in Academic Medical Libraries, *Proceedings of MLA 08 Connections: Bridging the Gaps*, p. 32, Chicago, USA, May 16-21, 2008, 30. 08. 2011, Available from: http://www.mlanet.org/am/am2008/pdf/08_abstracts.pdf
- Porumbeanu, O. L. (2009a). The Impact of Electronic Resources and New Technology in Academic Medical Libraries in Romania. *Health Information and Libraries Journal*, 26, pp. 152-155, ISSN 1471-1834
- Porumbeanu, O. L. (2009b). Is Electronic Always the Right Choice?, *Proceedings of Positioning the Profession: the Tenth International Congress on Medical Librarianship*, Brisbane, Australia, August 31-September 4, 2009, 30.08.2011, Available from: http://espace.library.uq.edu.au/eserv/UQ:179724/n2_5_Wed_Porumbeanu_160.pdf
- Porumbeanu, O. L. (2009c). Model Strategic pentru Implementarea Managementului Cunoașterii în Structurile Infodocumentare / Strategic Model for Implementing

- Knowledge Management in Libraries and Information Services. *Studii de Biblioteconomie și Știința Informării / Library and Information Science Research*, No. 13/2009, Editura Universității din București, pp. 71-105, ISSN 1453-5386
- Porumbeanu, O. L. (2010). Implementing Knowledge Management in Romanian Academic Libraries: Identifying the Elements that Characterize their Organizational Culture. *Journal of Academic Librarianship*, Vol. 36, No. 6, (November 2010), pp. 549-552, ISSN 0099-1333
- Prusak, L. (1996). Introduction to Series - Why Knowledge, Why Now?, In: *Knowledge Management and Organizational Design*, P. S. Myers, (Ed.), pp. IX-X, Butterworth-Heinemann, ISBN 0-7506-9749-0, Boston, USA
- Pucik, V. (1996). Strategic Alliances, Organizational Learning, and Competitive Advantage: The HRM Agenda, In: *Knowledge Management and Organizational Design*, P. S. Myers, (Ed.), pp. 151-165, Butterworth-Heinemann, ISBN 0-7506-9749-0, Boston, USA
- Quintas, P. (2002). Managing Knowledge in a New Century, In: *Managing Knowledge. An Essential Reader*, S. Little, P. Quintas & T. Ray, (Eds.), pp. 1-14, The Open University and Sage Publications, ISBN 0-7619-7212-9, London, UK
- Roberts, S. & Rowley, J. (2004). *Managing Information Services*, Facet Publishing, ISBN 1-85604-515-3, London, UK
- Sanchez, R. (2001). Managing Knowledge into Competence: The Five Learning Cycles of the Competent Organization, In: *Knowledge Management and Organizational Competence*, R. Sanchez, (Ed.), pp. 3-37, Oxford University Press, ISBN 0-19-924028-0, Oxford, UK
- Senge, P. M. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organization*, Doubleday, ISBN 0-385-26094-6 New York, USA
- Skyrme, D. J. & Amidon, D. M. (2002). The Learning Organization, In: *Managing Knowledge. An Essential Reader*, S. Little, P. Quintas & T. Ray, (Eds.), pp. 264-271, The Open University and Sage Publications, ISBN 0-7619-7212-9, London, UK
- Stacey, R. D. (2001). *Complex Responsive Processes in Organizations. Learning and Knowledge Creation*, Routledge, ISBN 0-415-24918-8, London, UK
- Stamps, D. (2000). Communities of Practice: Learning is Social. Training is Irrelevant?, In: *Knowledge and Communities*, E. L. Lesser, M. A. Fontaine & J. A. Slusher, (Eds.), pp. 53-64, Butterworth-Heinemann, ISBN 0-7506-7293-5, Boston, USA
- Stoica, I. (2006). Cuvânt înainte, In: Porumbeanu, O. L. (2006). *Managementul Cunoașterii și Structurile Infodocumentare*, pp. 7-12, Editura Universității din București, ISBN (10) 973-737-203-4, București, Romania
- Sydänmaanlakka, P. (2002). *An Intelligent Organization. Integrating Performance, Competence and Knowledge Management*, Capstone, ISBN 1-84112-048-0, Oxford, UK
- Tampoe, M. (1996). Motivating Knowledge Workers - The Challenge for the 1990s, In: *Knowledge Management and Organizational Design*, P. S. Myers, (Ed.), pp. 179-189, Butterworth-Heinemann, ISBN 0-7506-9749-0, Boston, USA
- Teece, D. J. (2002). *Managing Intellectual Capital. Organizational, Strategic and Policy Dimensions*, University Press, ISBN 0-19-829541-3, Oxford, UK

- Tschaitchian, B., Abecker, A., Hackstein, J. & Zakaoui, J. (2000). Internet Enabled Corporate Knowledge Sharing and Utilization, In: *Internet-Based Organizational Memory and Knowledge Management*, D. G. Schwartz, M. Diviniti & T. Brasethvik, (Eds.), pp. 25-41, Idea Group Publishing, ISBN 1-878289-82-9, London, UK
- Webb, S. P. (1998). *Knowledge Management: Linchpin of Change. Some Practical Guidelines*, Aslib, ISBN 0-85142-414-7, London, UK

IntechOpen

IntechOpen



New Research on Knowledge Management Models and Methods

Edited by Prof. Huei Tse Hou

ISBN 978-953-51-0190-1

Hard cover, 426 pages

Publisher InTech

Published online 23, March, 2012

Published in print edition March, 2012

Due to the development of mobile and Web 2.0 technology, knowledge transfer, storage and retrieval have become much more rapid. In recent years, there have been more and more new and interesting findings in the research field of knowledge management. This book aims to introduce readers to the recent research topics, it is titled "New Research on Knowledge Management Models and Methods" and includes 19 chapters. Its focus is on the exploration of methods and models, covering the innovations of all knowledge management models and methods as well as deeper discussion. It is expected that this book provides relevant information about new research trends in comprehensive and novel knowledge management studies, and that it serves as an important resource for researchers, teachers and students, and for the development of practices in the knowledge management field.

How to reference

In order to correctly reference this scholarly work, feel free to copy and paste the following:

Octavia-Luciana Porumbeanu Madge (2012). Creating a Culture of Learning and Knowledge Sharing in Libraries and Information Services, New Research on Knowledge Management Models and Methods, Prof. Huei Tse Hou (Ed.), ISBN: 978-953-51-0190-1, InTech, Available from: <http://www.intechopen.com/books/new-research-on-knowledge-management-models-and-methods/-creating-a-culture-of-learning-and-knowledge-sharing-in-libraries-and-information-services>

INTECH
open science | open minds

InTech Europe

University Campus STeP Ri
Slavka Krautzeka 83/A
51000 Rijeka, Croatia
Phone: +385 (51) 770 447
Fax: +385 (51) 686 166
www.intechopen.com

InTech China

Unit 405, Office Block, Hotel Equatorial Shanghai
No.65, Yan An Road (West), Shanghai, 200040, China
中国上海市延安西路65号上海国际贵都大饭店办公楼405单元
Phone: +86-21-62489820
Fax: +86-21-62489821

© 2012 The Author(s). Licensee IntechOpen. This is an open access article distributed under the terms of the [Creative Commons Attribution 3.0 License](https://creativecommons.org/licenses/by/3.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

IntechOpen

IntechOpen