

Implementation of Knowledge Management System in Health Care Organisations Case Study in Pasteur Institute of Iran

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Abstract: Health care organizations (HCOs) are confronting a subtle revolution in all aspects; the drastic extension in medical knowledge and outstanding advances in applied technologies, the more concern for healthy environment and life quality and economic constraints have made the management think of a new approach to make the way smoother. Knowledge management systems (KMSs) have been proven to be extremely useful for HCOs. The core purpose of this paper is to present a framework that integrates key insights from the literature on knowledge management processes with focus on knowledge sharing and learning in conjunction with health care environments' needs and characteristics to form a closed loop model of knowledge processes in HCO. The papers will discuss the process of implementation of the KMS in one of Iranian health care organisations, Pasteur Institute of Iran and report its results as well. Statistical techniques have been applied to measure the performance of the implementation and reveal that knowledge sharing and learning behaviors are positively associated with business and social process improvement.

Key words: Knowledge management system • Health care organization

INTRODUCTION

Knowledge has long been important to organisations as they strive to gain and maintain a competitive advantage [1,2] and it allows the organisation to solve problems and seize opportunities [3-5]. In an era characterised by uncertainty, companies that consistently create new knowledge, disseminate it to all in the organisation and build it into products and services are competitive [6,7]. In other words, managing and sharing information to enhance the useful knowledge of consumers, patients, clinical, staff, managers and board members is pertinent to future competitiveness and survival of health care organisation [8]. Organisations that manage knowledge can evaluate core processes, capture insights about what they find, combine their skills and experiences and innovate and apply new ideas quickly [4]. Furthermore, a significant part of the value of the commodities or services provided depends on the underlying intangible knowledge. Indeed, it is fair to say that intangible knowledge has become the main value

driver for organisations [9]. HCOs are indicative of these organisations, in that they could be viewed as a collection of professional specialists who contribute to the delivery of patient care [10]. They need to be affective at collecting and analyzing clinical and market data, screening and organizing these data into information useful for decision making [11]. However, the health care industry has not paid a great deal of attention to formal knowledge management (KM) [12]. Since workers in the health care sector use knowledge from multiple sources, there is a glaring need for KM in the health management [13-15]. The health care workers have acquired specialized unique knowledge and this knowledge has to be shared by the different actors to improve patient care [12]. Knowledge sharing between different actors in health care has been identified as a critical factor for creating a high quality health care system [16]. Wahle *et al.* emphasize that management of knowledge in health sectors is essential as it can optimize the support and primary health processes, improve efficiencies and effectiveness and improve the learning capacity of the organisation [15].

This paper attempts to elucidate the importance and application of KM processes and elements of KMS with more focus on knowledge sharing and reusing. It will clarify the process of implementation of KMS in Pasteur Institute of Iran and discuss the strong points and weak points of it as well. Results of the implementation have been presented as an evidence of KM application value.

The paper begins with definition of KM and KMS and then discusses the knowledge for HCO and HCOs' characteristics. The second part of the paper describes a methodology which is implemented in Pasteur Institute of Iran. Paper is followed by results description and discussion. Final section concludes the paper.

Knowledge Management: In recent years, application of KM techniques has become one of important issues in management literature. There are several definitions of KM. Some of them are mentioned here.

KM can be defined as a method to simplify and improve the process of sharing, distributing, creating, capturing and understanding knowledge in a company. KM is description, organisation, sharing and development of knowledge in a firm [17]. Also, KM is a discipline focused on systematic and innovative methods, practices and tools for managing the generation, acquisition, exchange, protection, distribution and utilization of knowledge, intellectual capital and intangible assets [18]. In summary, KM is a system of actions upon knowledge, which includes the establishment of strategies and procedures, with proper utilization of technologies, so that the acquisition, storage, conversion, sharing, application and generation of knowledge can be effectively performed, with an aim to effectively use the available knowledge for problem solving and decision making [19].

Generally, knowledge can be categorized as either explicit knowledge or tacit knowledge [20]. Most organisations focus on managing explicit knowledge well and try to capture tacit knowledge embedded in the experienced and skilled people as much as possible. Many approaches have been developed to help organisations create, capture, store, share and apply knowledge. Often knowledge sharing is the core intent of a KM initiative, so it has become an important theoretical and practical subject [21].

Some examples of knowledge management applications are listed below [22]:

- Document and Content Management systems
- Knowledge Maps
- Intelligent Agents
- Web Browsers
- Business Intelligence Tools and Data Warehouses
- Workflow Applications
- E-learning and Collaboration tools

Knowledge Sharing System: Knowledge sharing involves the transfer or dissemination of knowledge from one person, or group to another [23]. Organisational knowledge sharing can be named as the backbone of organisational learning and brings enormous benefits to an organisation [24-26]. It also connects organisational members with external knowledge sources [25]. They benefit from networking with external knowledge sources for new information, expertise and ideas that may not be obtained inside the organisation [27,28].

Many authors have pointed out that sharing knowledge among employees would lead to faster responses to customer requirements at a lower cost in operations. Many have linked knowledge sharing to the learning and market orientations of firms. Thus, sharing knowledge is an integral part of an organization's learning activities, leading to improvements in market sensing and innovation activities [29].

The means by which knowledge is shared within organisations and the factors that facilitate knowledge sharing/transfer are core issues in KM [30]. In this paper some of them with their application will be mentioned.

Knowledge in Health Care Organisation: In the health care sector a doctor is a human retainer with personalized knowledge about certain concepts e.g. diseases, medical equipment and treatment protocols. However, databases and documents are codified as knowledge retainers which contain different concepts e.g. information about patients or infections. In general, personalized knowledge retainers contain tacit knowledge whereas codified knowledge retainers contain the different types of explicit knowledge. To effectively manage knowledge in an environment, it is important to understand the relevant knowledge retainers and knowledge items and the different aspects of knowledge embedded in the retainers [12]. Moreover, the health care sector requires the retention of critical knowledge as a primary requirement for managing knowledge in the knowledge sharing platforms [31].

In these organisations declarative knowledge (know what), procedural knowledge (know-how), social knowledge (know-who) and contextual knowledge (know why) are considered to be the more important in managing knowledge [15].

In addition, Information in a health care organisation can be divided into 3 types according to the content: patient information, management information and medical information [32]. Although there is an overlap; these information have fundamental differences in the way they are created or applied. So KMSs are constructed with the aim of suitable integration of the information towards organisation vision.

Health Care Organisations' Characteristics: The term 'health care organisation' includes the vast variety of places such as hospitals, emergency rooms, RandDs, laboratories and pharmacies. Deep understanding of these characteristics will help the process of implementing KM systems successfully. Some of them are mentioned here:

- Medical staff have the most crucial role in the organisation. Although IT specialists and medical engineers play a significant role in creating modern and effective equipment; medical staff are the last part of service chain. In other words they are the ones who are always seen and evaluated, so they should be as expert as possible [33].
- The service given to the patients is a mixture of what the doctor (or other medical staff) has learnt as academic education and what he/she has learnt from his/her experiences as well [34]. This illustrates the importance of an organisational plan to save the priceless experiences within an organisation.
- Health care organisations are dealing with human lives and their wellness. And this is the reason why they should possess the latest medicine findings. Without an appropriate strategy and facilities for acquiring and interchanging knowledge this cannot be achieved [33].
- These organisations confront extreme resource limitations. They have limited specialists, equipment, time and money. A system with the capability of managing the resources in a way that the best feasible performance is resulted is of a great value in organisation [33].

- There is no appropriate system for evaluating service quality in most of the organisations. According to the statistics 30-60 percent of health care organisations' cost turns to wastage [35]. These losses of cost can be because of weaknesses in the given service, repeated or unnecessary service, failure in documentation, wrong resource estimation, lack of knowledge or inappropriate transfer of it, etc.
- These organisations are rich in the amount of data and information but poor in converting them to knowledge [36]. Hospitals' information banks are full of patient reports, financial reports, staff information, etc; nevertheless, organisations rarely organize this information to create new useful knowledge.

Broadly speaking, in order to omit the medical failures and reach the desirable quality of services it is essential to use an organized system for coding and sharing knowledge. KM infrastructures can facilitate saving patient information and acquiring knowledge from it, changing tacit knowledge to explicit, mobile treatment and prescribing and managing equipment.

Methodology: Application of KMS in Pasteur institute of Iran: Pasteur Institute of Iran was established more than 80 years ago to combat diseases and promote health in the country. Pasteur Institute of Iran is governed by the board of trustees and is affiliated to the Iranian Ministry of Health. Also, there is a close relationship and active cooperation with international organisations like WHO and the Network of Pasteur Institutes worldwide.

The aims and objectives of Pasteur Institute of Iran are the expansion of applied research on biological products, expansion of research on basic sciences with underlying aim of introduction and optimization of new techniques and methods for use in applied research with special emphasis on infections [37].

Regarding to knowledge goals of the Institute the project of implementing KMS was defined and carried out in 14 months. The system consists of 8 subsystems which are described in this section. As a simplification, Figure 1 shows the flow diagram in the knowledge cycle system.

Knowledge Cycle System: Health care organisations, like other organisations, are confronted to the constant creation of new knowledge (by knowledge workers or new discoveries) and exit of it (by losing an expert). KMS with the capability of saving, sharing and reusing individual knowledge in different domains lets the users to take advantage of it and avoids repeated failures [38].

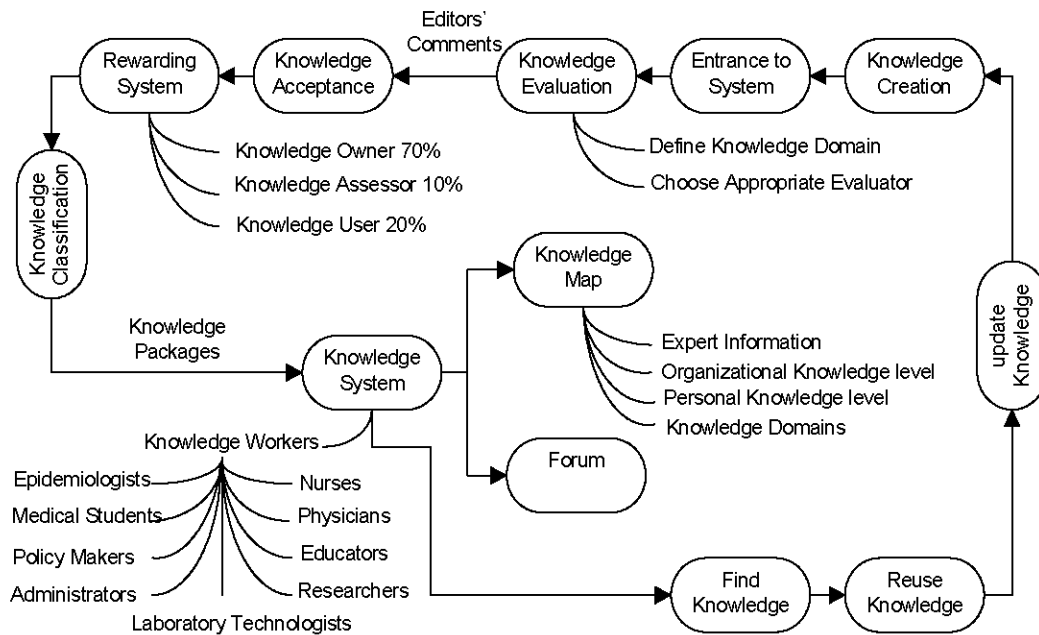


Fig. 1: Flow diagram in the knowledge cycle system

KMS in a health care organisation, by having a number of knowledge-bases, can be as an intermediate in order to sharing information and knowledge in different levels and different users. For example, this memory is able to transfer the working process to management, patient information to doctors and new findings to the public [33] in this case many of the information which were only archived before can be used in many useful ways. Each user can enter his/her knowledge into the system anywhere anytime. Information is accessible in the form of audio, video and text files. Even if a staff is hesitant to use computer system there are standard paper forms which can be filled by the person and then entered to the computer system by an operator. After entering the new knowledge, the system automatically and by using special mechanisms sends it to the experts in related topics who are chosen automatically. The experts, without knowing the knowledge creator, evaluate it. Knowledge can be accepted, conditionally accepted or rejected. Accepted knowledge will be loaded to the knowledge-base and other users (regarding to their access limit) can use it.

The system is equipped to an advanced search engine which with the least key words can show acceptable results.

Knowledge Evaluation System: Without evaluating knowledge, only a wide extension of knowledge, maybe

with low quality, may be entered into KMS [39]. These kinds of knowledge not only will not lead to organisational improvement but also will cause error, because their accuracy and effectiveness are not investigated [40].

That is why knowledge evaluation has been considered specifically one of the vital stages of success for performing KM [41].

Owing to the fact that health care organisations are dealing with health and safety of human beings, delicacy and accuracy of input knowledge to the KMS impacts the patient treatment and even can threaten it. So the level of accuracy and suitability of any new knowledge should be evaluated before entering to the knowledge base and classification step [42].

The evaluating system devised for Pasteur institute of Iran has the ability to evaluate organisational knowledge, unit knowledge and individual knowledge according to knowledge measuring standards. Also it can present charts to show knowledge growth in all forms of explicit, tacit, personal and organisational to the management.

Rewarding System: There was a need to use motivators to make staff interested in using the system and sharing their knowledge. Using an awarding system is one the successful methods in this area [43]. Financial and non-financial rewards are granted in knowledge sharing

systems to increase personnel trust on the system and develop sharing culture of the organisation. Compensation process applied for knowledge users can really enhance knowledge cycle processes [44].

The applied system automatically awards knowledge creators, evaluators and knowledge users by using special formulas and according to their base score and then send the report to the financial unit. The awards belong to all three groups who have contributed in knowledge cycle with a weight that can change in future: those who have entered the new knowledge who win the most portion (70%), knowledge assessors (10%) and also knowledge users (20%). Moreover, many mechanisms have been devised to put an end to any abuse and the management has the maximum control on the process of reward determining, paying and coefficients; thus the system is working with the high social and technical security limits.

Knowledge Packaging System: Knowledge classification, in a way that covers all micro and macro fields, has shown many advantages; for example great growth in recognition of weak points or acceleration in knowledge measurement as a result of fully-distinguishable domain have led to improvements in knowledge goals and towards complete implementation of KM and its measurement. So the mass knowledge entered into the system must be automatically coded and classified according to the standards. The packages are coded according to their content. For example, a knowledge package relating to a serum contains all the information and knowledge about it. This provides the possibility of obtaining required knowledge from the knowledge base.

Knowledge Map System: knowledge maps indicate who people, where and with how much degree of cooperation have what knowledge, experiences and skills in which levels (expert, specialist, beginners). It also illustrates the degree of existing knowledge and their procedures in specialized organisation's fields of action. These maps are drawn in developed knowledge sharing systems automatically and through analyzing system's inputs on behalf of experts and it also minimize difference of opinion possibility [45].

With this subsystem, users, regarding to their access limit, can see the three-dimensional map including organisational knowledge, unit knowledge and personal knowledge. This map shows whoever has any knowledge and experience in any field, shows his educational degree and his operations [43].

In this case, this system can assist managers in forming project teams by suggesting the most suitable members for any task.

The system changes dynamically only when a new knowledge is entered to the system so there is no manipulation possibility. Knowledge map is connected to the knowledge cycle and dynamic connection which eases the process of finding experts and specialist in different fields of health care organisation.

Forum: Despite the fact that knowledge-bases are of great use, there are occasions that a user cannot find his answer in them. To eliminate this weakness question cycle is devised. Users enter their question in it; the system diagnoses its specific field; and sends it to an appropriate expert to answer. The system is also equipped to forums to provide doctors and other users with discussion possibility. This system also provides online and offline discussions between doctors, specialists and other experts under the name of *Dynamic Connecting System*, automatically sends unanswered questions to the appropriate experts and even sets physical meetings. Personnel can form virtual teams there. The implementation of this system is a summation of theoretical, software and managerial activities which is done consequently.

Documentation: In addition to knowledge cycle and related subsystems a documentation facility can be utilized to create a neat collection of knowledge and will increase the use of system.

Managerial Report System: Managers, according to their access limit, can get different reports from knowledge transmission in personal, sectional and organisational levels. They can also see the level of knowledge creations, or strategic and critical knowledge. They can get the reports of each member or teams separately.

Another capability of our KMS is Organisational Knowledge Evaluator. This ability lets the managers see and evaluate the level of organisational knowledge. They can assign standards to measure knowledge level dynamically, know the weak points in any realm and evaluate the quality of entered knowledge.

RESULTS

The project success was measured by two groups of measures. The first group included the measures which just needed to be altered and applied. They measured the improvements In organisation which were driving

Table 1: Organizational improvement measures

Human (culture)	Eliminating personal taste of knowledge assessors in evaluating new knowledge
Structure	Developing knowledge vision and strategy as a first step of implementation Distinguishing micro and macro fields of knowledge to form knowledge packages Assigning required financial resources for awarding system
Technology	Knowledge classification

Table 2: KMS effects in human (culture) area

Human (culture)	Change percent
Organisational esteem to the knowledge of staff	39.23
Being informed of colleagues' knowledge	28.67
selecting the best expert to answer the question	16.12
between sections Knowledge exchange	16.23
Admiring acquisitive knowledge	14.60
Uplift in personal knowledge as a result of working in the organisation	13.25
Team working	8.51

Table 3: KMS effects in Technological area

Technology	Change percent
Effective connection with organisational experts	32.50
Cognition of weakness points in knowledge fields	20.60
Recognizing old created knowledge and banning recreation	18.50
Improving work process by using knowledge bases	23.1

ambitions to implement KMS, while the second one would compare the condition of organisation before and after the implementation of KMS to show the level of project's effectiveness. The first group of measures in all aspects of human, structure and technology are determined in Table 1.

Measuring the effectiveness of the project needed statistical tests. Here, the T test was adopted to make a comparison between the averages of two groups of data. For data gathering, 45 questions sheets were distributed among the personnel in a section where KMS was implemented completely, before and after the implementation. Reliability rate of the question sheets was 0.981 and 0.976. the multiple answers are designed in licert and have been changed from qualitative to quantitative by assigning a number to each one: 1- very little, 2- little 3- average 4- much 5- very much.

P-value of the test was 0.05 and the hypothesis was that the percents of change have been raised. The hypothesis was accepted in all the measures except for the one which measured Reliance on self experiences.

Table 2 demonstrates change percent and their growth in human area and Table 3 demonstrates change percent in technology aspect.

DISCUSSION

During the implementation of KMS in Pasteur Institute of Iran, project team confronted many challenges which most of them occurred because of the specific characteristics of the institute. Here the challenges, their solutions and the strong points of the plan will be demonstrated.

- Pasteur Institute of Iran is a research organisation where specialists in many fields of biology are working in teams. Academic atmosphere in the institute has caused the specialists to be more acquainted with science rather than experience. So during the implementation, there was a demand to magnify the significance of self experience and skill as important aspects of knowledge in educational sessions. Besides institute specialist admitted that there are many elegant point that are not mentioned in any book or papers but are learnt from experience or skills.
- Another challenge was the sensitivity on knowledge ownership and knowledge evaluation. The staff was interested to know how a new knowledge is named and who and how evaluates and score new knowledge. To solve knowledge ownership problem a complete regulation was drew up which includes all necessary rules about knowledge workers' rights, knowledge ownership, knowledge use permission and like this.
- In the issue of knowledge evaluation system was designed in a way that the process be done by qualified knowledgeable experts and it was essential that we have the staff trust on the system and the evaluators.
- The next issue was team working structure of the institute. Teams are formed when a new project is defined and after finishing it the teams will dissolve. In this way, although during the project knowledge is shared within team members; after ending the project there is no structure to gather this knowledge and make available for reuse on other project or other teams.

Lack of attention to knowledge operations by some staff, knowledge measurement [43] and the quality of new knowledge were the most crucial challenges in implementation of KM in the institute.

In relation of knowledge quality, at first, there was a misunderstanding of what is accepted as knowledge for organisation and this was reduced by 11 workshops. For knowledge measurement it was necessary to define a thorough structure on the basis of an appropriate measurement model and with regards to organisational condition.

Moreover, there is still a need to alter some of higher structures like payment rules, employment rules, personnel promotion rules which are long-term goals and because of the fact that the organisation is governmental they will not be done in near future.

It is worth mentioning that the factors below have tremendous effects on projects improvement:

- Management belief in the essence and importance of the plan
- Defining appropriate motivation methodology
- Problem definition in different organisational levels
- Implementing workshops and conferences for personnel
- Proper definition of regulations and good acceptance of personnel
- Noticing to gradual effectiveness of the project

CONCLUSION

Knowledge is massively created and used in organisations and businesses yet the need for new knowledge is increasing every day. To manage this wave there is a need to have an especial plan for each organisation according to what the organisation is doing, what are its culture and structure and how the current situation is. According to what was mentioned as HCO characteristics, KM implementation was one of the appropriate methodologies to control this intangible asset (knowledge) in them. KMS using IT findings let HCO make the best use of their documented information and learn new and applicable knowledge as well.

Choosing the proper orientation in KM implementation, the organisation can avoid repeats in creating a single knowledge or buying the one with little priority but concentrate on desired knowledge fields. In this way it can reduce resource loss. Besides, good knowledge will lead to the best decisions in the least time which can be of great merit in rescuing people's health and the organisations' being successful in the competition.

This paper discussed the literature of KM and the way it can positively affect the health care organisations'

processes as whole and Pasteur Institute of Iran as a case. A model was adopted which had been altered to match with the organisation's demands and the results demonstrated that notable improvements had been achieved. The offered model can be applied in any other health care organisation and even other ones with a little amend.

ACKNOWLEDGEMENTS

The authors acknowledge the management of Pasteur Institute of Iran and all the personnel of the Institute. They also wish to thank the colleagues in project.

REFERENCES

1. Evans, P.B. and T.S. Wurster, 1997. Strategy and the new economics of information, *Harvard Business Rev.*, 75: 70-82.
2. Rayport, J.F. and J.J. Sviokla, 1995. Exploiting the virtual value chain, *Harvard Business Rev.*, 73: 75-85.
3. Earl, M.J. and I.A. Scott, 1999. What is a chief knowledge officer? *Sloan Management Rev.*, 40(2): 29 [Online]. Available: <http://proquest.umi.com/pq-dweb>.
4. Parlbay, D. and R. Taylor, 2000. The power of knowledge: a business guide to knowledge management[Online]. Available: <http://www.kpmgconsulting.com/index.html>.
5. Zack, M.H., 1999. Managing codified knowledge. *Sloan Management Rev.*, 40(4): 45 [Online]. Available: http://web4.infotrac.london.galegroup.com/itw/infomark/430/644/72715798w3/purl_1/4rc1_GBIM.
6. Earl, M.J. and I.A. Scott, 1999. What is a chief knowledge officer? *Sloan Management Rev.*, 40(2): 29 [Online]. Available: <http://proquest.umi.com/pq-dweb>.
7. Young, C., 2001. Reaping value from knowledge and innovation. GartnerGroup report, January 26. [Online]. Available: <http://gartner4.gartnerweb.com:80/gg/purchase>.
8. John van Beveren, 2003. Does health care for knowledge management?, *J. Knowledge Manage.*, 7(1): 90-95.
9. Wu, L.C., *et al.* 2007. Knowledge-based organisation evaluation, *Decision Support Systems*, doi:10.1016/j.dss.2007.06.013, 2007.

10. John van Beveren, 2003. Does health care for knowledge management?, *J. Knowledge Manage.*, 7(1): 90-95.
11. Pavia, L., 2001. The era of knowledge in health care. *Health Care Strategic Manage.*, 19(2): 12-13.
12. Mansingh, G., *et al.* 2008. Issues in knowledge access, retrieval and sharing-Case, studies in a Caribbean health sector, *Expert Systems with Applications*, doi:10.1016/j.eswa.2008.01.031.
13. Sharma, S.K., N. Wickramasinghe and J.N.D. Gupta, 2005. Knowledge management in health care. In N. Wickramasinghe, J.N.,
14. Gupta, D. and S.K. Sharma, (Eds.), 2005. Creating knowledge-based health care organisations. IDEA Group Publishing.
15. Wahle, A.E. and W.A. Groothuis, 2005. How to handle knowledge management in health care: a description of a model to deal with the current and ideal situation. In N. Wickramasinghe, J.N.D. Gupta, and S.K. Sharma, (Eds.), *Creating knowledge-based health care organisations*. IDEA Group Publishing.
16. Richardson, W.C., *et al.* 2001. Committee on quality of health care in america, institute of medicine. crossing the quality chasm: A new health systems for the 21st century. The National Academic Press.
17. Gottschalk, Petter. 2005. Strategic knowledge management technology. Idea Group Publishing.
18. Montana, J.C., 2000. The legal system and knowledge management. *The Information Management J.*, pp: 54-57.
19. Iat Long Alex Lai, 2005. Knowledge management for Chinese medicines: a conceptual model, *Information Management and Computer Security*, 13(3): 244-255.
20. Nonaka, H. Takeuchi, 1995. *The Knowledge Creating Company*, Oxford University Press, New York.
21. Scholl, W., C. König, B. Meyer and P. Heisig, 2004. The future of knowledge management: an International Delphi Study, *J. Knowledge Manage.*, 8(2): 19-35.
22. Rajeev K. Bali, 2005. Clinical knowledge management: opportunities and challenges, IDEA Group Publishing. pp: 120-121.
24. Argote, L., 1999. *Organisational learning: creating, retaining and transferring, knowledge*. Norwell, MA: Kluwer.
25. Garvin, D.A., 1993. Building a learning organisation. *Harvard Business Rev.*, 71(4): 78-91.
26. Liebowitz, J. and Y. Chen, 2001. Developing knowledge-sharing proficiencies: building a supportive culture for knowledge-sharing. *Knowledge Management Rev.*, 3(6): 12-15.
27. Hamel, G. and C.K. Prahalad, 1993. Strategy as stretch and leverage. *Harvard Business Review*, 71(2): 75-84.
28. Wasko, M.M. and S. Faraj, 2005. Why should i share? examining social capital and knowledge contribution in electronic networks of practice. *MIS Quarterly*, 29(1): 35-57.
29. Law, C.C.H. and E.W.T. Ngai, 2007. An empirical study of the effects of knowledge sharing and learning behaviors on firm performance, *Expert Systems with Applications*, doi: 10. 1016 /j.eswa. 2007. 03. 004.
30. Birgit Renzl, 2008. Trust in management and knowledge sharing: The mediating effects of fear and knowledge documentation, *Omega*, 36: 206-220.
31. Dwivedi, A.N., R.K. Bali and R.N. Naguib, 2003. Organisation current knowledge design (OCKD): A knowledge management framework for health care institutions. *IEEE*, pp: 1236-1239.
32. Sorthon, F., J. Braithwaite and N. Loremzi, (n.d.), 1997. Strategic constraints in health informatics: Are expectation realistic?, *International Journal of Health Planning and Manage.*, 12: 3-13.
33. Cheah Yu, N. and Syed Sibte Raza Abidi, 2002. Evaluating the Efficacy of Knowledge Management Towards Health care Enterprise Mod.,
34. Zafar, I., Hashmi, Syed S.R. Abidi and Yu-N Cheah, 2002. An Intelligent Agent-based Knowledge Broker for Enterprise-wide Health care Knowledge Procurement.
35. Anthony Manos, Mark Sattler and George Alukal, 2006. Make Health care Lean", *Quality Progress*, 39, 7; Research Library pp: 24.
36. Syed, S. and R. Abidi, 2001. Knowledge management in health care: towards 'knowledge-driven' decision-support services, *International J. Medical Informatics*, 63: 5-18.
37. Pasteur Institute of Iran, [Online]. Available: <http://www.pasteur.ac.ir>.
38. Andreas Abecker, 1998. Ansgar Bernardi, Knut Hinkelmann, Otto Kühn and Michael Sintek. Toward a Technology for Organisational Memories. *IEEE Intelligent Systems*, 13(3): 40-48.
39. Mohammad, S., M. Jalali, K. Shafieezadeh, N. karimi and Payani, 2008. An Algorithm for Evaluating Risk of Knowledge Management Projects, In the proceeding of The 2008 World Congress in Computer Science, Computer Engineering and Applied Computing, Las Vegas, USA.,

40. Shafieezadeh, M., S. Mohammad Jalal and M.R. Khaji, 2008. A Practical Methodology for Validating Shared Knowledge from Strategic Perspective, In the proceeding of The 2008 World Congress in Computer Science, Computer Engineering and Applied Computing, Las Vegas, USA.,
41. Nezafati, N., S. Mohammad Jalali, Ehsan Afarideh and Mahdi Shafieezadeh, In the proceeding of 15th Annual International Conference on Advances in Management, Boston, USA.,
42. Daniel, E. O'Leary, 1998. Enterprise Knowledge Management". IEEE Computer, 31(3): 54-61.
43. Mohammad, S., Jalali, F. Afrazeh and N. Nezafati, 2007. Design and Implementation of Comprehensive Knowledge Management System Software in I.R.Iran Ministry of Road and Transportation, In the proceeding of 5th International conference on Industrial engineering, Tehran, Iran.
44. King. W.R., P.V. Marks Jr, 2008. Motivating knowledge sharing through a knowledge management system. Omega, 36: 131-146.
45. Schwartz, D., 2006. Encyclopedia of knowledge management. Idea Group Reference.
00. Hsu, I.C., 2007. Knowledge sharing practices as a facilitating factor for improving organisational performance through human capital: A preliminary test, Expert Systems with Applications, doi:10.1016/j.eswa.2007.08.012.
00. Law. C.C.H. and E.W. Ngai, 2008. An empirical study of the effects of knowledge sharing and learning behaviors on firm performance. Expert Systems with Applications, 34: 2342-2349.
00. Yang, H.L. and T.C.T. Wu, 2007. Knowledge sharing in an organization, Technol. Forecast. Soc. Change, doi:10.1016/j.techfore.2007.11.008.
00. Lin, W.B., 2008. The effect of knowledge sharing model. Expert Systems with Applications, 34: 1508-1521.
00. Ackerman. M.S., V. Pipek and V. WulfSharing, 2003. Sharing Expertise: Beyond Knowledge Management. The MIT Press.