Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 3, Issue, 11, pp.134-137, October, 2011

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

KNOWLEDGE MANAGEMENT SYSTEM IN SOFTWARE INDUSTRY

[1]Naveen Rathor*, [2]M.P Thapliyal, [3]Vijay Kumar Gupta and [4]Ajay Gupta

[1, 4]Assistant Professor, Department of Computer Science, CET-IILM-AHL Greater Noida India
[2]Associate Professor, Department of Computer Science, HNB Garhwal (UK), India
[3] Project Manager, Orange Business Services, Gurgaon, India

ARTICLE INFO

Article History:
Received 14th July, 2011
Received in revised form
15th August, 2011
Accepted 23rd September, 2011
Published online 15th October, 2011

Key words:
Knowledge management system, explicit & tacit knowledge, knowledge environs, software quality.

ABSTRACT

The key asset of any software organization is knowledge, because the whole process of software development is very much knowledge intensive. Knowledge is dynamic and evolves with technology, organizational culture and the changing needs of organization's software development practices. One way to capture organization's knowledge and make it available to all their team members is to induce the concepts of knowledge management systems within the organization. Here in this paper we frame our research by discussing the importance of knowledge management and we also present a knowledge environs to deal with knowledge management in software industry for the production of better products that can meet all the qualities measures & market requirements.

INTRODUCTION

Though the software industry is so young in compare to other existing industries, but has become nucleus of almost all industries in today's computer based world. This leads the demands of software products with better quality and better productivity that can achieve goals like market competitiveness & client satisfaction. To meet these requirements, software organizations have tried to make better use of its all resources. Knowledge is one of its most important resources for any software industry. In past practice, this knowledge has been stored on paper or in people's mind. Unfortunately, paper has limited accessibility and it is difficult to update. Knowledge in people's mind is lost when individuals leave the company. Moreover, in a large organization, it can be difficult to localize who have the better knowledge regarding some issue so, knowledge has to be systematically collected, stored in a corporate memory, and shared across the organization. To put knowledge sharing in practice, organizations should acquire knowledge from their members and formalize it to make it available on an organizational level. In this perspective, knowledge management systems (KMS) can be very useful. Knowledge management system involves "human resource, enterprise organization and culture, as well as the information technology, methods and tools that support and enable it". KMS can facilitate creation, access and reuse of knowledge, and its main goals are to promote knowledge growth, communication, preservation and sharing. KM can be used to capture the knowledge and experience generated during the software development process. Although every software development project is unique in some sense, similar experiences can help developers to perform their activities. Reusing knowledge can prevent the repetition of past failures and guide the solution of recurrent problems. So, to be effective, a knowledge management system should be integrated to the software process.

***Corresponding author:** rathor.naveen@gmail.com

PRIOR RELATED WORK

Knowledge management has shown it's important in almost every field that why most organizations agree that knowledge is an essential asset for success and survival in an increasingly competitive and global market. Several works have exploited the use of KM systems to support software engineering tasks, such as Borges et al. store and share the experience obtained in software process definition. In order to facilitate the storage and sharing of the experience, they built Pro Know How, a tool that supports the standard software process tailoring procedure for each project, providing KM support. Markulla describes an initiative at ICL Finland to promote software engineering knowledge sharing and reuse. The focus is on supporting development tasks, such as planning, design and coding. A framework has been developed for creating, capturing, storing, sharing and applying tacit and explicit knowledge in project and organizational levels. Althoff *et al.,* 1989 defend that continuous reuse of software engineering experience can be supported by an organizational memory that is capable to manage all kinds of software engineering

experiences. They propose a generic, scalable architecture and an underlying methodology for reuse of all kinds of software engineering experience. Abecker *et al.,* 1989 defined a knowledge management approach with an organizational memory at the core of the KM system. Arranged around such an organizational memory, knowledge-management services provide actively knowledge to users. Finally, several researches pointed out the benefits of software agents for several purposes in knowledge management.

RESEARCH APPROACH

Knowledge management can help software development organizations in myriad ways, KM can be used to capture the knowledge and experience that the employees accumulate during the software development process. KM can help software engineers to improve their efficiency, and managers to capture the domain knowledge that software developers acquire during their work. In this paper, we propose a knowledge management environs to enable knowledge management in software industry, the environs considers knowledge capture, store, retrieval, dissemination, reuse and maintenance and moreover the one step ahead from the rest we also provide repository for future vision.

KNOWLEDGE MANAGEMENT PROCESS

A knowledge management system should support the activities that comprise a knowledge process, it must be capable to distinguish between data, information and knowledge & also recognize what kind of knowledge is required for the particular process.

Data, Information & knowledge

According to Russell Ackoff, a systems theorist and professor of organizational change, the content of the human mind can be classified into following categories:

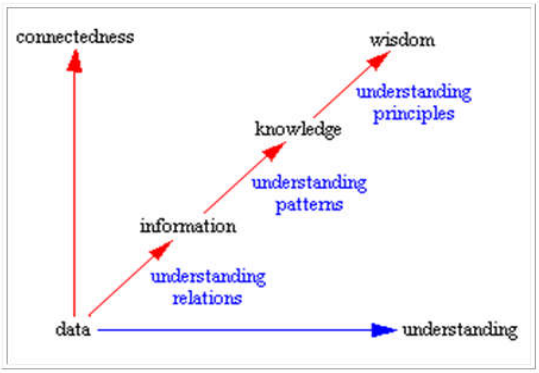
Data: Data is raw facts. It can exist in any form, usable or not. It does not have meaning of itself. In computer parlance, a spreadsheet generally starts out by holding data.

Information: Information is data that has been given meaning by way of relational connection. In computer parlance, a relational database makes information from the data stored within it.

Knowledge: Knowledge is the appropriate collection of information, it is a deterministic process. When someone "memorizes" information then they have amassed knowledge. In computer parlance, most of the applications we use (modeling, simulation, etc.) exercise some type of stored knowledge.

Understanding: Understanding is an interpolative and probabilistic process. It is cognitive and analytical. It is the process by which one can take knowledge and synthesize new knowledge from the previously held knowledge. The difference between understanding and knowledge is the difference between "learning" and "memorizing".

Wisdom: Wisdom is an extrapolative and non-deterministic, non-probabilistic process. It calls upon all the previous levels of consciousness, and specifically upon special types of human programming (moral, ethical codes, etc). Wisdom is therefore, the process by which we also discern, or judge, between right and wrong, good and bad. The following diagram represents the transitions from data, to information, to knowledge, and finally to wisdom, and it is understanding that support the transition from each stage to the next. Understanding is not a separate level of its own. It is knowledge management that can help in getting exact knowledge and discern it from data & information. That is why KM can help software industry in countless ways. Before proceeding further we must understand the knowledge process how it works. According to Staab *et al.*, a knowledge process involves the following steps:



Creation: The contents need to be created or converted, so that they fit the conventions of the company. Creation of computer-accessible knowledge typically moves between the formal and informal knowledge. It is also possible to import knowledge.

Capture: Once you create knowledge items, the next step is to capture their essential contents. Knowledge items have to be captured in order to determine their importance and how they mesh with the company's vocabulary conventions

Retrieval and access: This step satisfies the searches and queries for knowledge by the knowledge worker and dissemination of knowledge in a proactive manner.

Use: The knowledge worker will not only recall knowledge items, but will process them for further use. However, the way to use knowledge from the organization's collective memory becomes quite involved. A "knowledge-friendly" culture is one of the most important factors for the success of knowledge management.

KNOWLEDGE MANAGEMENT & ITS ENVIRONS

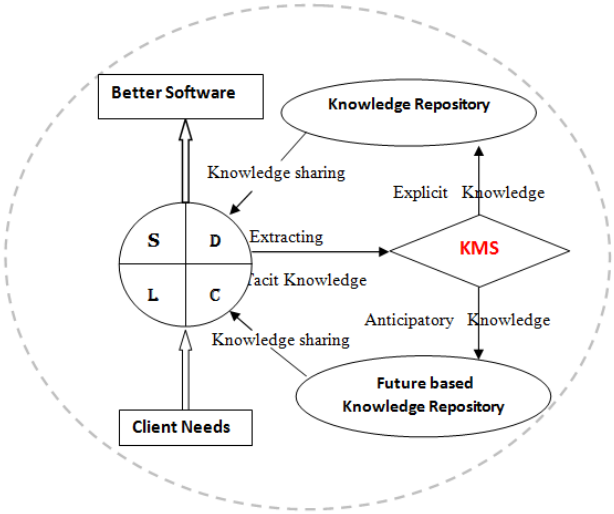
Knowledge management has been defined by various experts in their own words but they all agreed upon on a single theme. According to our opinion: it's best to think of KM in the broadest context. Succinctly put KM is a "*set of systematic approaches that enables the knowledge to amass, nurture, and surge to create values in organization*." It involves collection of data, converting it into information and then sieves the knowledge from it and locates it accordingly. The knowledge what makes the assets of any organization can be broadly categorized into tacit & explicit knowledge.

"*Tacit knowledge* is individual's expertise what he gain by working experience", it reside in individuals brain and in acts. It is not described or documented anywhere. While e*xplicit*

knowledge is well documented and systematically stored in physical form available to everyone in organization. Though the explicit knowledge repository is available to all when it is needed, but it lacks the innovation and expertise of person's mind what he obtained during execution of task assigned, tacit knowledge bridges the gap here. Knowledge management implies the transfer of knowledge from people to physical form through development of reports and manuals or answering queries with the use of technologies like word processing documents, presentation tools and email and then transfer of knowledge from physical form to actionable knowledge in people through video, audio or text presentations and also with the use of technologies like multimedia technologies, word processing and presentation tools. One goal of the knowledge management is to capture the tacit knowledge & convert into explicit term up to possible degree and to make it widely available for all.

Knowledge Environs in a software Industry

In a software organization the whole process revolves around SDLC (software development life cycle), it consists of several phases that cover all the activities of a software product development. And if the SDLC phases are executed at the best level of knowledge it can assure about the development of quality software. Here our idea is just to introduce knowledge management system in SDLC. Below given picture represent our model of knowledge management system & also indicate how it can be weaved with software development.



Picture 1: Knowledge Environs in software industry

In above model we have SDLC in middle, where many teams are busy in doing their assigned task. The knowledge managemnt system extract the tacit knowledge of employee involves in development at various phases then it is converted into explicit knowledge and stored it so that it can be disseminate to the needy person accordingly. This knowledge can be used to solve many problems. One step ahead from the previous work done in this field is the new term i.e. anticipatory knowledge; there are always some outstanding employees in an organization who have long experience and they can sense the future vision so using their knowledge we can create another knowledge repository related to futuristic problems & issues, this repository is named as anticipatory knowledge repository. This can helps the organization a lot when the market goes through changes.

How the Knowledge environs helps software industry

Some benefits of this approach can be pointed out:

- With KM integrated to a software industry, it is easier for developers to create new knowledge. In this way, the organizational memory is not closed. It is always evolving.
- A major concern for knowledge management in software industry is to capture information during the software process without developers' extra effort. Thus, the KM system is actively integrated into the work process. An isolated KM system, on the other hand, can be a barrier to innovation, because it does not let workers share new ideas with their peers.
- Closed systems do not give organizations control over their own knowledge, since there is a gap between knowledge creation and integration. Innovations happen outside the KM system, and then it contains information that is chronically out of date and that reflects an outsider's view of work.
- Knowledge management users are no longer passive receivers of knowledge, but are active researchers, constructors, and communicators of knowledge. Knowledge can be constructed collaboratively in the context of the work. Attention to knowledge requires attention to people, including their tasks, motivation, and interests in collaboration. The heart of intelligent human performance is not the individual human mind but groups of minds interacting with each other and with tools and artifacts.
- A KM system must provide the information workers need, when they need it. KM system can play an active role in knowledge dissemination. Software agents monitor the actions of users as they work, and inform them about potentially relevant knowledge for the task at hand.
- The anticipatory knowledge repository can help the management to sense the market mood in advance so that they can make changes in their strategies to meet the requirement.

CONCLUSION

Knowledge management systems facilitate access and reuse of knowledge typically by using several emerging technologies. At the core of this infrastructure there is an organizational memory. Around it, there are knowledge management services supporting KM activities, such as knowledge capture, retrieval, search, dissemination, maintenance and reuse.

Software Companies need to recognize that knowledge is an important asset. Knowledge is gathering over time and will assist the organization to be successful. A survey by Reuters found that 90 per cent of companies that deploy a Knowledge Management (KM) solution benefit from better decision-making, while 81 per cent say they notice increased productivity. Though our proposed model also suffers with some barriers of knowledge management implementation, but

beside from these the model will surely boost up the positive offshoot.

REFERENCES

Abecker, A., Bernardi, A., Hinkelman, K., 1998. Toward a Technology for Organizational Memories. IEEE Intelligent Systems, Vol. 13., No. 3, pp. 40-48, May/Jun.

Ackoff, R. L., 1989. From Data to Wisdom. *Journal of Applies Systems Analysis,* 16, p 3-9.

Bechhofer S., Horrocks, I., Goble, C., Stevens R.,2001. "OilEd: a Reason-able Ontology Editor for the Semantic Web", Proc. of KI2001, Joint German/Austrian conference on Artificial Intelligence, Vienna. Springer-Verlag LNAI Vol. 2174, pp 396--408. 2001. Davenport, T., Laurence, P., "Working Knowledge: How Organizations Manage What

Borges, L.M.S., Falbo, R.A., 2002. Managing Software Process Knowledge", Proc. of the CSITeA'.

Duarte, K.C., Falbo, R.A., 2000. Uma Ontologia de Qualidade de Software", Anais do VII Workshop de Qualidade de Software, WQS'2000, João Pessoa, Brasil, Outubro 2000.

Falbo, R.A, Guizzardi, G., Natali, A.C.C., Bertollo, G., Ruy, F.B., Mian, P.G., 2002. Towards Semantic Software Engineering Environments", in Proc. of the 14th Int. Conference on Software Engineering and Knowledge Engineering, SEKE'02, Ischia, Italy.

O'Leary, D., 1998. Using AI in knowledge management: Knowledge bases and ontologies. IEEE Intelligent Systems, May/June.

O'Leary, D.E., Studer, R., 2001. Knowledge Management: An Interdisciplinary Approach, IEEE Intelligent Systems, January/February, Vol. 16, No. 1, 2001.

Pressman, R.S., 2000. *Software Engineering: A Practitioner's Approach"*, 5th Edition, New York: McGraw-Hill, 2000.

Staab, S., Studer, R., Schurr, H. P., Sure, Y., 2001. Knowledge Processes and Ontologies. IEEE Intelligent Systems, January/February, Vol. 16, No. 1, 2001.

Uschold, M., 1998. Knowledge level modelling: concepts and terminology. *Knowledge Engineering Review,* Vol. 13: 1.

****