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E-Community System towards First Class Mentality Development: An Infrastructure Requirements Analysis

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Abstract

E-Community portal can be classifed as an extension of normal type of knowledge management system (KMS) development towards first class mentality. It servers varities of expects in term of capabilities and services especially for the benefits of community. Most of the community today are looking on this matter as a very important issue and try to search the best way to manage or organize this community system for sustain a high rate of continuous improvement. While e-community system (ECS) or portal is a system that related to the process of knowledge capture, re-use, searching and representation to the user in a variety of form. The role of system could be determined by looking on the issues on how knowledge can be applied at the right time in the faster ways that based on the simplest command or agent given to the system in order to get the relevant knowledge from the portal. Besides that, system also could be looked on how the best element of infrastructure requirement could be used for, in the benefits of users in order to stored and captured as well as presenting the knowledge portal. The paper presents the analysis of the ECS infrastructure requirement, and its system implementation in a community of practise (CoP) especially towards first class mentality development as well as discussing a variety issues that related to its involvement, so that it will help CoPs to increase their productivity and quality as well as to gain return on investment (ROI).

Keywords: E-Community, Community of Practise (CoP), Knowledge Management System, Information Technology

1. Introduction

The important of knowledge in a community is something that we have to think carefully. This is because of the successful of utilization of it may help community of practice (CoP) to become more powerful in term of services and products delivered to its communities mobilizing knowledge towards the first class mentality. Knowledge includes experience, values, insights, and contextual information in organization and helps them evaluate and incorporate new experiences and information. Knowledge originates and is applied by knowledge workers. People use their knowledge in making decisions. During the last several years, organizations realized they own a vast amount of knowledge and this knowledge needs to be managed. Davenport and Prusak (1998) defined knowledge as a fluid mixture of experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. They argue that knowledge originates and is applied in the minds of people who know.

In a CoP, it becomes embedded in documents and repositories, in processes, practices, and norms. There is a slightly different definition is given by Alavi and Leidner (1999). They see that knowledge as a justified personal belief that increases an individual's capacity to take action. They used Churchman's idea that 'knowledge resides in the user and not in the collection of information'. In their definition, action refers to physical skills and competencies, cognitive/intellectual activity or both (e.g., surgery involves both). Knowledge is an asset with four characteristics (McKinsey 1996); (1) *Extraordinary leverage*. It is not subject to diminishing returns. Fixed cost to create but not to manufacture or distribute. (2) *Fragmentation, Leakage*. Over time, knowledge assets become less valuable as they become more widely known. To be successful, knowledge must be refreshed to keep it as a source of competitive advantage. (3) *Uncertain Value*. Value is difficult to estimate and steady growth in knowledge may suddenly halt. (4) *Uncertain Value Sharing*. It can't predict in alliances that are will capture the lion's share. Knowledge management (KM) is a concept where it is could be used for creating knowledge repositories, improves knowledge access and

sharing as well as to communicate through collaboration, enhancing the knowledge environment and its management as an asset for an organization (Bertztiss, 2001; Satyadas *et.al.,* 2001) or in e-community system (ECS) or portal environment. Therefore, the paper presents the analysis of the ECS infrastructure requirement, and its system implementation in a CoP especially towards first class mentality development as well as discussing a variety issues that related to its involvement, so that it will help CoPs to increase their productivity and quality as well as to gain return on investment (ROI).

2. E-Community System and Its Functionality

E-Community system (ECS) is an extension of knowledge management system (KMS) that needs to be developed in the community. There are a lot of perspectives in describing the KMS. Among them is shown in Figure 1 below. The figure shows from the technical perspective has been proposed by Meso, & Smith (2000) that consists of three components that are *technology, function and knowledge* by itself. This ECS involved the processes for knowledge acquiring or collecting, organizing, disseminating or sharing knowledge among peoples in certain institution.

- *Data warehousing and data mining* – Data warehouses are centralized repositories of information. Data mining refers to specialized tools that allow the organization to convert increasingly complex sets of data into useful information.
- *Document management system* – A collection of tools that facilitate electronic document management, including storage, cataloguing, search, analysis and routing.
- *Push Technologies* – Delivering of appropriate information to individual based on specific criteria.
- *Collaboration* – expert modelling and decision making analysis that lead to more collaboration, information expertise and insight sharing among knowledge workers.
- *Visualization and navigation system*- Relationship between knowledge elements and holders of knowledge.

3. Infrastructure Requirement for E-Community System

In the process of developing e-community in the country, particularly towards the developing first class mentality where all the knowledge should be accessed very quickly and easily, and also based on the research worked that has been done, we found that there are some elements and issues could be considered especially in setting up the infrastructure requirement for the ECS. These elements of requirement could be highlighted in term of network, processors, software and database. The relationship between these elements can be shown as at Figure 2 below.

3.1 Network

The networking capabilities enable us to access and process information from unknown sources around the world combined with human interaction and collaboration on a scope and scale previously not achievable. Intranets and groupware are use for knowledge sharing, from best knowledge and expertise to the point of action, from those who have it, to those who need it. It provides a foundation for the sharing of information or 'explicit knowledge' as encoded in databases and 'tacit' knowledge, as partially transmitted in email and other conversations. According to Skryme (1999), and Seufert *et al.,* (1999), information and communication technology (ICT) enhance and support knowledge processes. In the evolution of the contribution of ICT in the workplace, the focus has change over time. In 1960's to the 70's the focus was more on automating the procedures. The 1980's, it was edge towards communications notably through electronic mail. There is an increase in efficiency in the office automation of standard procedures and the software development has shifted to support less structured activities those of professionals and managers, this is what termed as the cognitive computing focus, which has the most profound effect from the internet related activities.

The Internet is an information source that has brought information directly to the end-users, without involving an intermediary such as a librarian or information professional. An improved intelligent search engines, and intelligent software agents will roam the net and bring back relevant information to the desk-top (Kulakov *et. al.,* 2001: Wagner and Prasarnphanich, 2007). Internet has been almost entirely to do with its information role. But by the time knowledge becomes encoded in a database, it is 'explicit' knowledge. In many respects effective sharing of tacit knowledge needs the face-to-face socialization process as described by Nonaka and Takeuchi (1995). This is difficult over a distance although new technologies such as video conferencing are helping. The Internet here pays the role of enhancing remote access, through making the necessary connections and enhancing global communications.

Users congregate their areas of shared interests, and start electronic conversations. Electronic mail is the main way that this happens, but computer conferencing, such as with Lotus Notes (Same-Time), is popular in a corporate setting. However, knowledge sharing across organizational boundaries is increasingly required. It is ease of use that had made the use of Internet technology, such as browsers and search engines, of interest to organization wanting to share information. The advantages in a corporate setting of using Intranets (internal Internets) are similar to those that make use of the Internet attractive in external information access and communications. End-users are familiar with browser interfaces, information can be shared across different local area networks and computer platforms, and published

information is instantly available over the whole network. Furthermore this information need not just be HTML (the Web mark-up language) documents, but can be in any number of common formats, such as word processing for documents. Increasingly Intranets are also hosting transaction and database applications with the Web browser being the universal interface to different 'back-end' systems. Information and communications technologies enhance knowledge processes and support knowledge workers in several ways (Majchrzak *et. al*, 2002: Whelan, 2007) such as:

- Ready access to organised information.
- Better communications and interaction with fellow knowledge workers (either individually or in groups)
- Access to personal knowledge support tools (such as cognitive mapping tools)
- Use of specific point solutions (e.g. risk analysis in lending)
- Group decision support system that to facilitate decision making processes.

For the purpose of development and implementation, the ECS/KMS functionality could be as shown in Figure 3 below.

3.2 Processors

These processors are aim to support the distributed of knowledge workers or experts that stay at anywhere in the campus life. This supporting could be done using the connectivity between client, servers and other peripherals like routers, gateways and intelligent hubs. This processor also used for to make sure that application of KMS could be running on time or at different time in virtual environment.

3.3 Software

Software or sometimes called tools of e-community can be categorized into four groups: tools that support knowledge sharing examples are the groupware, intranets, and the internet; tools that support knowledge distribution for example the electronics calendars, desktop databases and desktop publishing; tools that support knowledge capture and codification example are the expert systems, neural networks and intelligent agents; and tools that support knowledge creation examples are the workstation, CAD and virtual realities. Ruggles (1997) suggested three categories of KM tools that represent primary knowledge activities of most organization:

- Knowledge Generation – the creation of new ideas, recognition of new patterns, the synthesis of separate disciplines and the development of new processes.
- Knowledge Codification – the auditing and categorization of knowledge
- Knowledge Transfer – the forwarding of knowledge between individuals, departments and organizations.

According to Laudon and Laudon (2002), there is also intelligence-based of KM Tools, which can be organized into multivariate content classification schema:

- MIND: Assimilation and Interpretation Tools – Includes Mapping, Mining, Summarization, Pattern Discovery, Decision support
- CONTENT: Network and Communications – Includes Conversing, Workflow, Information Sharing, Resource Sharing (intranet)
- MEDIA: Storage and Form – Includes text-bases, image-bases, multimedia

3.4 Database

This database is also called knowledge database of ECS/KMS is used for storing knowledge that contribute by the knowledge workers. This database is also a place where data or any kind of knowledge that could generate by the people or regenerate by itself in the system. The relationship between the acquiring knowledge and knowledge disseminating of for a k-base from the ECS as KMS system environment is shown in Figure 3.

4. Infrastructure Requirements and Related Issues of Ecs/Kms

a) **Technologies ICT Involvement –**

Another useful perspective on the role of ICT in KM is the role of technology infrastructure. Figure 4 shows the layers that build together in enterprise-wide and inter-enterprise collaborative infrastructures.

Layers of functionality:

Connections - the ability to connect anyone into the network at any time.

- Communications - establishing communications facilities such as electronic distribution lists, electronic meeting places (forums and discussion lists).
- Conversations - developing techniques and skills in conversing electronically; extracting meaning from ongoing threads of conversation. There is a role here for what is increasingly called a 'knowledge editor'.

- Collaboration - developing a tool case of collaborative tools, or knowledge collaboration 'archetypes'; supplementing these with moderators who nurture the development of new knowledge through a wide range of contributions

b) **Management and User Commitment**

The management and user commitment could be looked into their role and responsibilities. This is to ensure that they could be more supported and contributed for the knowledge wealth in term knowledge repository, and knowledge sharing.

c) **Easy of use or User friendly -** The objective of this issue is to make sure that the user will use the ECS not only for the first time but also following time. This element also at the some time they will be an agent to motive the others in order to use the ECS.

d) **System Stability & Usability -** This job basically is a part of webmaster responsibilities in order to make sure that system running at anytime and allowed people to do their work also at anywhere.

e) **Support & Training -** Computer support can make the input processes more effective. This includes selecting information and knowledge that is relevant. Text summarising for, example extracts the key parts from a document, so that the reader can gain most of the sense in a fraction of the original. Data mining will be extracting the new knowledge from existing data. It can find patterns that humans cannot, but considering many more dimensions and variables. In terms of the knowledge base, there is an increasing emphasis of adding some context to the information. This might be a fuller description of the application of the information, an indication of the quality of the source, and many other little human touches that are often not found in formal databases. In dissemination and use of knowledge, Intranets and groupware have most impacts on KM. Communication method such as video conferencing or face-to-face, allow experts and knowledge workers to communicate effectively and share 'tacit' knowledge without the need to travel.

f) **Security -** This is very importance component in ECS to ensure that people can use the knowledge in a trusty environment.

5. Discussion and Recommendation

In this paper, we are going to look at the extension of IT infrastructure contributes to the implementation of successful EC towards developing the first class mentality. As a practitioner of KM, one should do non-stop discovery on the latest issues of EC, the perspectives of the field, including other essential aspects such as technology, business, organization, and information technology. Our interest is on the role of IT as one of the core enabler towards the implementation of the KM in the community of practice (CoP). But still the role it plays is not really sufficient to direct to the sense-making enabling processes as well as to increase the organizations' collective intellect, although it is a necessity. We have seen the rapid growth of IT evolution since early 1990's until today. The development of IT has been spreading its wings when technology such as email, groupware, web technology emerged as powerful tools, which empower the IT environment (Beckett *et. al.,* 2000; Durcikova and Everard, 2002). We have also witnessed the convergence of IT to link knowledge workers and individuals by using these tools. There are ongoing debates about the role the IT can play for EC.

According to Borghoff and Pareschi (1998), IT is used pervasively in organizations, and thus qualifies as a natural medium for the flow of knowledge. Either we realized it or not, the most important key to make the organizations work is the knowledge. Thus, a comprehensive understanding of the tacit and explicit knowledge is required in order to understand the knowledge creation of EC at the individual level. As we have mentioned previously, Nonaka and Takeuchi (1995), have proposed four EC of knowledge interactions that build on the distinctions between tacit and explicit knowledge, which was described by Polanyi (1966). Tacit knowledge is that which is implied, is not actually documented; something an individual 'knows' from experience, other people, or from a combination of sources. Whereas, explicit knowledge is externally visible; it is documented tacit knowledge. The IT facilities provided in each interaction is summarized in Figure 5.

5.1 Tacit to tacit knowledge

The most basic element in tacit knowledge is sharing experiences. GroupWare is known for its capabilities to facilitate users with its application software, which helps to provide a 'place' where people can work together in groups or teams. This technology has a great impact, which is to some extent, it may support all four of the facets of interactions shown above. The 'place' here means the virtual space or a synthetic environment, within which participants of the interaction activities can share their experiences, documents, or even conduct meetings and discussions. Another richer form of shred experiences (such as online meetings) can be greatly supported by more sophisticated technology like video and text-based conferencing, as well as synchronous communications and chats. We can see that most of the organizations today have already applied these kinds of technologies and the numbers are keeping increasing day by day. And so with

the 'village wells' where the existence of this technology has embarked to a more virtual environment, where all conversations take place virtually, and even synchronously, both inside organizations and totally outside the walls of organizations. This leads to the existence of virtual community. But there are also some limitations of groupware for tacit knowledge. Based on the literatures, videoconferencing was almost as food as face-to-face meetings, whereas audio conferencing was less effective and text chat least so. This result might suggest us that video conferencing is the most suitable knowledge exchange medium in the socialization process so far.

5.2 Tacit to explicit knowledge

To convert tacit into explicit knowledge, it means documenting shared experiences into visible mediums such as white paper, reports and tapes. This conversion is called the externalisation process. According to Nonaka and Takeuchi (1995), the conversion of tacit to explicit knowledge involves forming a shared mental model, then articulating through dialog. This kind of interaction can be supported by technologies such as the collaboration systems, and GroupWare software. Online discussions are a method of interaction which allows a group of people to communicate to each other virtually, share experiences and knowledge and other group activities. Unlike typical team discussions, newsgroup is one form of technology, which is slightly different. It differs from the aspect of participants of the newsgroup, which they are typically strangers. But still, they are willing to share advices, knowledge, and assistance and so on. We should also consider some barriers experienced on Internet newsgroups such as faming, personal abuse, and irrelevant postings.

5.3 Explicit to explicit knowledge

According to Marwick (2001), there can be little doubt that the phase of knowledge transformation best supported by IT is combination, because it deals with explicit knowledge. Although the most common way to capture knowledge by far is to write a document, technology has made the use of other forms of media feasible. Technologies such as digital audio and video recordings are now easily made and available. Unlike the conventional methods of disseminating knowledge, the experts are no longer have to document or write the knowledge, they only have to speak to a camera or microphone instead. Furthermore, it is also now relatively easy to distribute audio and video over networks. Speech recognition is another technology used in the combination interaction type. Based on the journal written by the same author mentioned above, he has also highlighted several other technologies, which are important in dealing with explicit knowledge. They are search, portals, and meta-data, summarization and taxonomies and document classification approaches and techniques.

5.4 Explicit to tacit knowledge

From documentation type of knowledge to the understanding the knowledge, is really a challenge to the KM practitioners. A good KM should have the ability to facilitate the understanding of the information in the organizations. Practically speaking, this conversion type of knowledge is not as easy as it seen. This process requires a set of technology, which is called the visualization application. Methods include text-based category trees, exemplified by the current Yahoo! user interface. There are also several graphical visualizations for better understanding of the explicit knowledge. The best way of applying information technology to KM is probably a combination of two factors: on the one hand, the awareness of the limits of IT, and of the fact that any IT deployment will not achieve much, if it is not accompanied by a global cultural change toward knowledge values; on the other hand, the availability of information technologies that have been expressly designed with KM in view (Burghoff and Pareschi, 1998). Whatever it is, the application or the use of IT possesses quite a great impact on KM. It is assumed to be an essential enabler or key to the successful implementation of KM although some claimed it is just a part of it.

6. Conclusion

E-community is a good concept which can be used for creating knowledge repositories, improves knowledge access and sharing as well as to communicate through collaboration, enhancing the knowledge environment and managing knowledge as an asset. In term of the infrastructure requirement, the highest facilities that provided for ECS functionality is much more better. By using the capabilities of infrastructure such network, processor, and others, we could produce the best work and deliver it in any time and at the right place, while achieving the good quality and productivity as well as the return of investment (ROI) in an organization.

Of course, in the process of developing and implementing ECS towards the first class mentality in the community, there are a lot of issues that might be considered. Among the issues that could be considered are as follows:

- To determine the best practice for approaching and managing knowledge effectively including motivating members in community to share knowledge and access through the system.
- To determine the good metrics for evaluating efficient EC.
- To determine the best way to perform a knowledge audit.
- To determine how people create, communicate and use knowledge.

- To determine more inclusive, integrated ECS software packages.

Knowledge is a valuable asset to any individual and organizations. It is a key to enabling the existence of knowledge world. Its value should be treasured and shared by all levels. Trusting culture in knowledge environment should be built upon one purpose, which is to get to know how much value the knowledge possesses, is to know how much we trust the person whom we shared the knowledge with. It is also proved by researches that successful companies reward employees for seeking knowledge. Less successful communities by contrast is pushing knowledge to where it is needed. This kind of way is known as top –down approach. We have been to several seminars, which talked about the reasons why some communities tend to fail in implementing the knowledge environment. According to their surveys and studies, they identified that top-down approach is one of the causes to the failure. Goals, incentives and participations are identified as most reliable approaches to attract people seeking, creating and sharing knowledge. Each approach has a significant role in the aspect of ECS/KMS. They have great potential as essential enablers to implement successful ECS/KMS for CoPs to support knowledge sharing processes.

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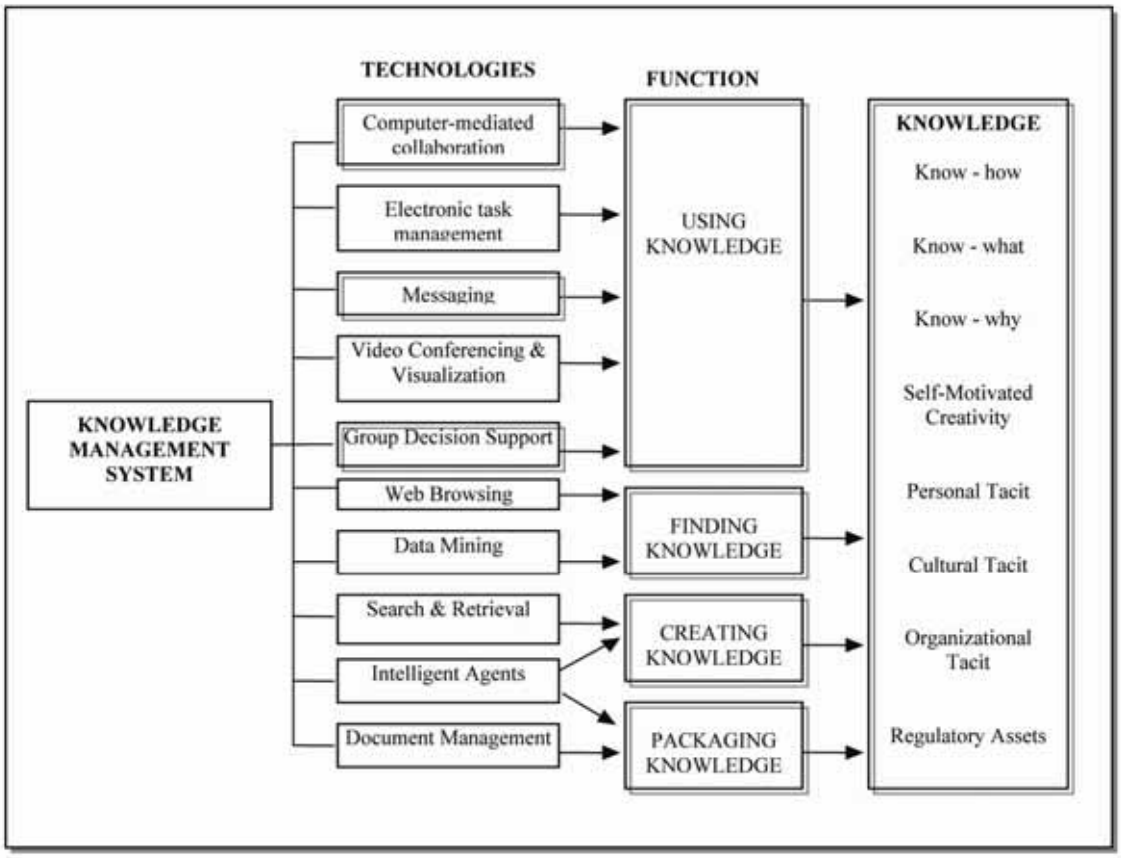

Figure 1. The technical perspective of KMS for E-community system

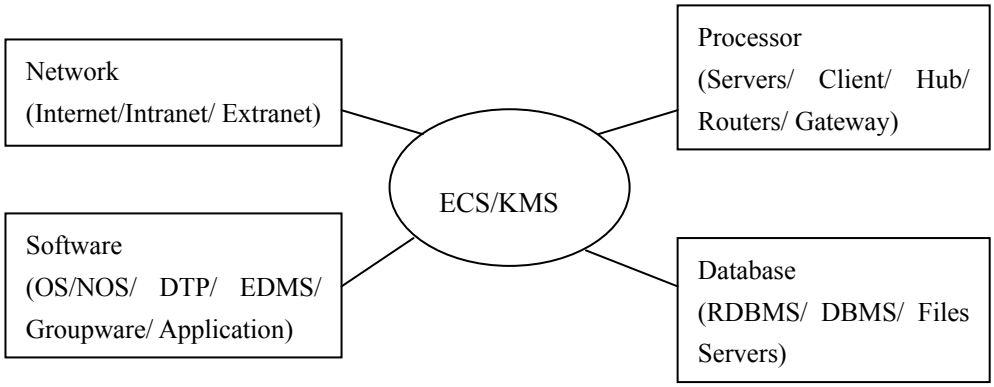

Figure 2. The infrastructure requirement of ECS

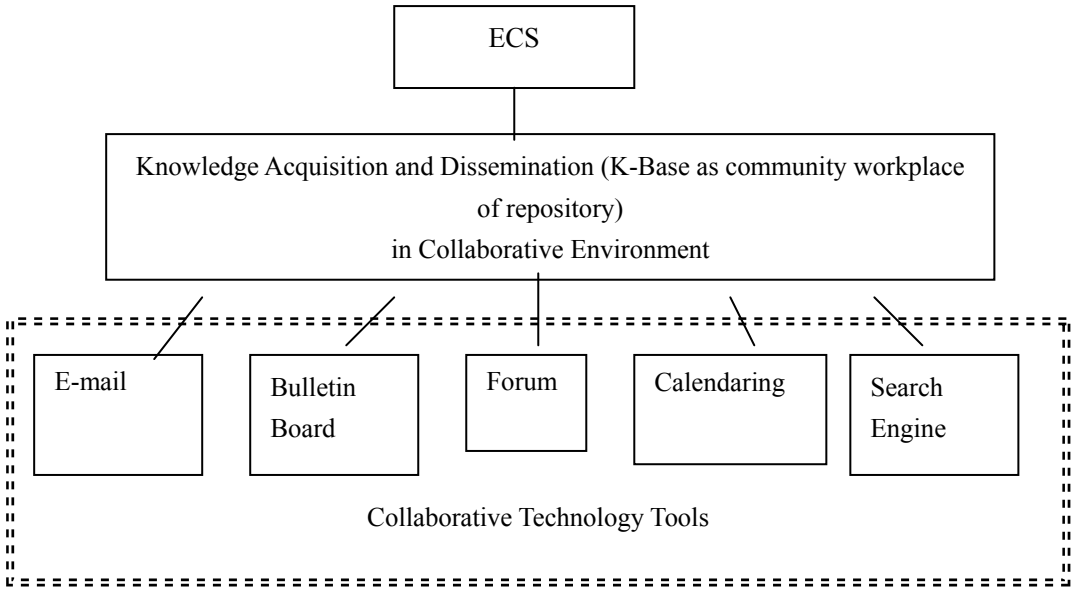

Figure 3. The EC System Functionality

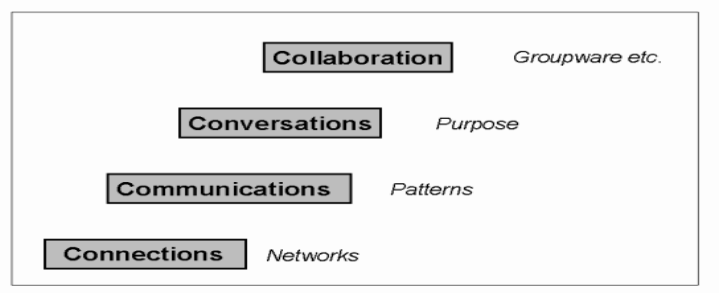

Figure 4. Layered elements of a collaborative technological infrastructure

Tacit to tacit knowledge	**Tacit to explicit knowledge**
Knowledge exchange: one-to-one, one-to-many, many-to-many Traditional knowledge exch. Medium: same place/same time, face to face meetings Technologies: teleconferencing, desktop video conferencing tools, E-meetings, chatting, synchronous collaboration	Knowledge exchange: one-to many Traditional knowledge exch. medium: created periodic reports, white papers Technologies: Electronic mail (E-mail), broadcasting information via distribution lists, answering questions, annotation
Explicit to tacit knowledge	**Explicit to explicit knowledge**
This form of knowledge creation depends on an individual's ability to make sense out of explicit information Today technologies: visualization	Today technologies: E-mail, GroupWare, Homepages

Figure 5. Summarization of the EC Infrastructure for knowledge Interactions