Tools for Knowledge Sharing Phases among Knowledge Society: A Case Study on Indonesia Institute of Sciences (LIPI)

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Abstract

The purpose of this article is to gain a better understanding of how some tools are critical for the successful application of knowledge sharing. Knowledge sharing with some tools covers a wide range of functionalities and supports different sets of activities such as, intranet, blogger, wiki, and yahoo groups. Therefore, to achieve knowledge sharing, this work limits the field of investigation to that knowledge sharing tools such as intranet, devoted to the formalization and sharing of best practices and experiences within the organization. Usability issues are also considered when choosing the tools for knowledge sharing in order to build systems which people with limited technological skills could readily use. The paper discusses two key forms of knowledge sharing usability, interface usability and the human-computer-interaction which has helped tools that support knowledge sharing principles improve interface usability. The study covers the following phases with KS tools: (a) The tools which is quite obvious in terms of knowledge sharing from an organizational perspective such as intranet (Model I); (b) The communicative tools of knowledge sharing which is used as a means of organizing learning processes which are collaborative, cooperative and which exchange knowledge processes, such as Yahoo groups or mailing-list (Model III); (c) Knowledge sharing on certain topics, which will have major consequences on librarian's work and the structure of information transfer institutions (Model IV and V) and is exemplified by combined functions of the intranet and internet. The outcome of this empirical study indicates that the effective development and management of KS is dependent on the interactions between internal and external factors.

Keywords: Knowledge sharing; Knowledge management; Knowledge sharing tools; Intranet; Internet; Knowledge society; Indonesia

1. Knowledge Sharing

Drucker (1993) described knowledge, rather than capital or labour as the only meaningful resource in the knowledge society, and Senge (1990) has warned that many organizations are unable to function as knowledge based organizations, because they suffer from learning disabilities. Strategies to investigate knowledge management would involve increasing the level of social interaction that occurs in the organization, as only some of which may be technologically assisted (Earl and Scott, 1999). To some extent, every human process issues is a key success factor as people first formed organizations to accomplish tasks too big to be performed by individuals working alone and every one will continue to be a challenge as long as people work together.

Although knowledge management concepts have been around for a long time, the term knowledge management seems to have arisen in the mid-70s. Nicholas Henry (1974) uses "knowledge management" in a manner that resembles our current understanding of the expression. Defined broadly, "KM is the process through which organizations extract value from their intellectual assets" (Blake, 1993). Knowledge management caters to the critical issues of organizational adaptation, survival and competence in face of increasingly continuous environmental change. Essentially, it embodies organizational processes that seek synergistic combination of data and information

processing capacity of information technologies and the creative and innovative capacity of human beings" (Malhotra, 1997).

Knowledge sharing is enhanced by two tools: the first is the intranet, which includes the development of knowledge repositories (memos, reports, articles) and knowledge compilation. Another tool (such as yohoogroups) is used to manage knowledge-specific activities, that is, knowledge acquisitions, creation, distribution, communication, sharing and application (Stenmark, 2001). Knowledge management consists of the administration of knowledge assets of an organization and sharing and enlarging those assets.

Best practices should be shared within the company's network. Companies today live in knowledge ecologies where one company feeds knowledge into another. Therefore, the firm's openness to external experts and the sharing of ideas help to make knowledge sharing a success. A very important area of knowledge management is how to encourage people to share what they know. Usually knowledge is considered to be a source of power, and by not sharing, a person is increasing his or her personal value to the organization thus making him/herself indispensable. For this reason, it is important to encourage people to share instead of hoarding knowledge. To solve this, it is vital to make sure that knowledge sharing is encouraged and that the people in possession of the knowledge understand the benefits of sharing it. Coleman (1999) suggests that, "a clearer linkages between knowledge sharing and business benefits may motivate workers to take the time to share what they know".

The quest for each organization is therefore to value contributions from its individual. By doing so, more contributions will be encouraged since it will become clear that sharing knowledge does not imply losing it but will only generate new knowledge and increase the value of the organization as well as its individuals. On this matter, Agren, Olofsson and Persson (2001) point out that "real competitiveness stems from being willing to share, and not the other way around, and that it is crucial to get this point across to the people who are supposed to do the sharing".

Agren, Olofsson and Persson (2001) also identify the prerequisites for knowledge sharing. These prerequisites are an encouraging environment, motivating and sharing relevant information and making it accessible. As a means to motivate people to share their knowledge, many organizations use incentives. Fitzek (1991) referring to Kleiner and Roth (2000), brings forward another important aspect in relation to the incentive system. They state, that people who become aware of being evaluated would seek to satisfy the evaluation criteria instead of improving their capabilities. The intrinsic motivation, which drives learning and knowledge transfer, is then supplanted by the desire to succeed. Yet evaluation is vital to learning as the feedback process involves the transformation of internalized explicit knowledge to externalized tacit knowledge (Figure 1).

2. Knowledge Sharing Phases

Knowledge sharing phases (which is a combination between Internet and Intranet), that model an integrated approach to identifying, capturing, evaluating, retrieving, and sharing all of an enterprise's information assets. These assets may include databases, documents, policies, procedures, previously uncaptured expertise and experience in individual workers.

In this phase, major emphasis is put into trying to capture knowledge and to *treat knowledge* from the researchers at LIPI (Indonesian Institute of Sciences) who create and use the knowledge. According to Davenport et al. (1998), "there are three types of

knowledge repositories: external knowledge, structured internal knowledge and informal internal knowledge". To capture external knowledge, competitive intelligence systems are used. These systems can filter, synthesize and add context to information from the external environment to make it become more valuable, including the kind of knowledge, referred to as tacit, which is not structured as a document and is therefore not easily converted.
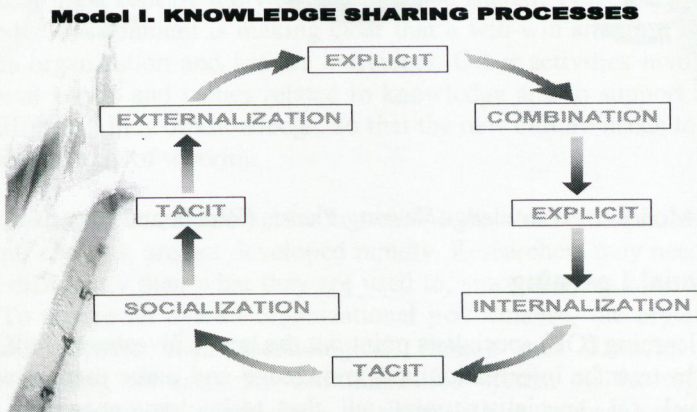
Model I. KNOWLEDGE SHARING PROCESSES

Figure 1: Model I - Knowledge Sharing Processes (Nonaka and Takeuchi, 1995)

Improving knowledge access and transfer, involves activities providing access to knowledge or facilitating its transfer between researchers and users. One aspect of this is difficulty in finding the person with the desired knowledge and then effectively transferring it from that person to another. One activity of this kind is a community of practice, which can be either online-communities or face-to-face communities. A community of researchers in LIPI is a group of people sharing, learning and creating knowledge. The community of researchers in LIPI frequently helps each other to solve problems and develop new approaches for their field (Setiarso, 2005). Figure 2 indicates researchers at LIPI which using Intranet for communication pattern of knowledge sharing. Other examples of activities to improve knowledge access and transfer are workshops, seminars and different kinds of networks. Desktop video conferencing system, document scanning and other sharing tools are examples, which support the communication of knowledge between researchers who would not otherwise work together, and hence, improve knowledge transfer (see Figure 3).
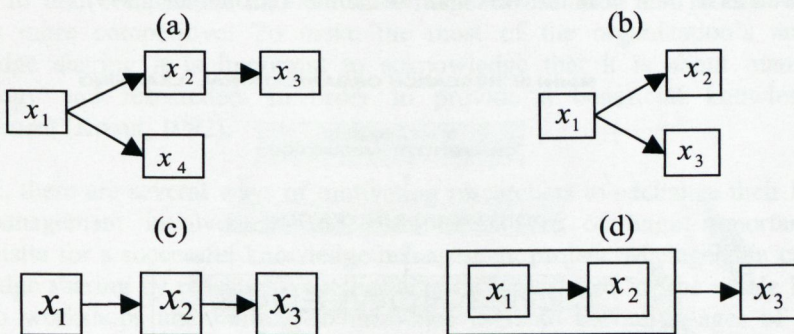

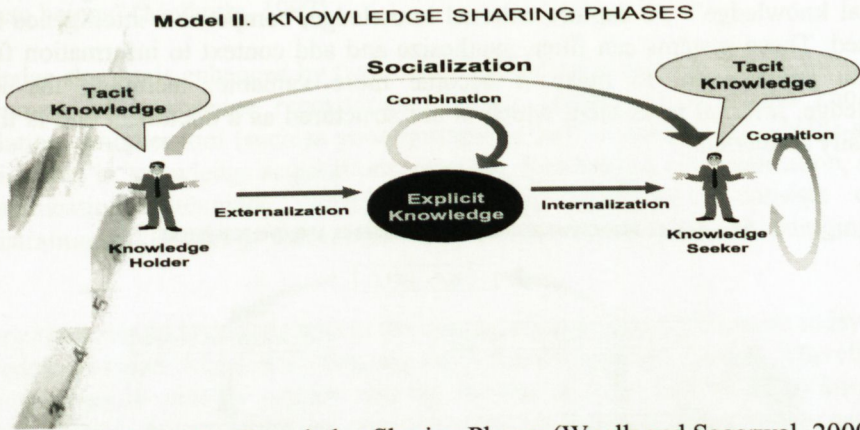Figure 2: LIPI Intranet Pattern for Knowledge Sharing

Model II. KNOWLEDGE SHARING PHASES

Figure 3: Model II - Knowledge Sharing Phases (Woelk and Sagarwal, 2000)

3. Organizational Learning

Organisational learning (OL) specialists point out the heavy investment in ICT (Internet) by institutions to transfer information and knowledge and make them available at the institutional level. OL specialists point out that technology approach is a purely mechanistic solution to information issues. Technological solution promotes software and hardware packages to resolve KM problems. OL experts claim that information technology has never addressed the tacit knowledge, which includes not only the actions, expertise, and ideas of staff, but also the values and emotions of staff. OL emphasizes that the efficiency and effectiveness of knowledge workers depends mostly on how workers communicate and collaborate in their efforts and expose themselves to communities of practice within the institution as well as outside the institution (Cohen and Levinthal, 1990).

In terms of a general model for KS and OL, a descriptive model is proposed integrating explicit knowledge, tacit knowledge, and the infrastructure (Figure 4). Explicit knowledge and tacit knowledge have a symbiotic relationship whereby tacit knowledge contributes to explicit knowledge. Some examples of explicit knowledge are found in the following: commercial publications, organizational business records: web, groupware: intranets, databases, and self-study material. Similarly, some examples of tacit knowledge are reflected in: formal and informal face to face conversation; formal and informal telephone conservations; the knowledge that individuals possess in their heads as well as in their desk drawers and file cabinets (Coleman, 1999).

Model III. RESEARCH ORGANIZATIONAL LEARNING

Figure 4: Model III – Research Organizational Learning (Setiarso and Nazir H, 2005)

Knowledge is created invisibly in the human brain and only the accurate organizational climate can influence researchers to create, reveal, share and use this knowledge. Such an environment can be nurtured through activities that build awareness and cultural attention and eliminate reluctance to share knowledge. Such activities would change behaviour and attitude within the organization where researchers feel that they are part of the knowledge network and learn to trust colleagues in a new way. Knowledge, which has previously been kept by individuals, would be shared. Therefore, part of enhancing the knowledge environment is making clear that a win-win situation will be the result, both for the organization and for the individual. Other activities involve changing the organizational norms and values related to knowledge and to support and promote the re-use of different kinds of knowledge, so that the new culture needs to be developed to become a natural way of working.

Many of the features in enhancing the knowledge environment of an organization, such as behavioral changes, are not developed rapidly. Researchers may need to learn how to work a bit differently than what they are used to, since sharing does not always comes naturally. To ensure an overall organizational performance, the organization needs to manage and measure their technological, human and financial resources. One knowledge learning consists of a communication system on the organization's both intranet or internet, which is linked to a database. In this database researchers may share for instance repair tips, which they all may access from their laptops. When many researchers are traveling on the job, this means they will not have to miss out on any information that normally may have been shared among them, as a learning process. To encourage knowledge sharing the organization observes and encourages active involvement. Some organizations use incentive systems, others post lessons learned and success stories to motivate knowledge sharing among researchers (Skyrme, 2000).

4. Organizational KM Systems

Organizational Knowledge Management/Sharing Systems (Figure 5) are applications of knowledge management which are created to support communities of shared interest and information need. Current knowledge management thinking is almost entirely about establishing the structure and the climate to enable and encourage those who have knowledge to share it. Knowledge management is in essence an organizing principle, which lays foundation for capturing the potential of the possessed knowledge within an organization. The knowledge content of products and services is increasing and there is a need to add competence and the knowledge surrounding the product in order to become more competitive. To make the most of the organization's and enhance knowledge sharing it is important to acknowledge that it is about managing both technology and researchers in order to provide a beneficial knowledge-sharing environment (Kogut, 1992).

At LIPI, there are several ways of motivating researchers to exchange their knowledge. Top management involvement and commitment are of huge importance and a prerequisite for a successful knowledge management project. Management can promote knowledge sharing by repeatedly emphasizing its importance for the whole LIPI. There are also workshops and training to introduce users to the advantages of knowledge sharing. It is vital that researchers understand that knowledge sharing is important. One needs to understand this, not only for efficiency's sake, but also to increase the essential humanization of social environment. One way of encouraging knowledge sharing is, when working in different systems, letting a researcher accumulates points, which can be for a variety of knowledge-related events.

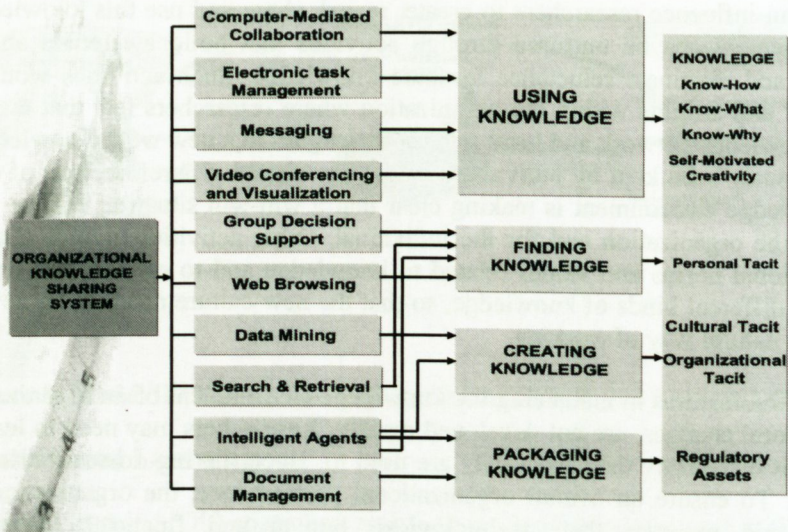**Model IV. RESEARCH ORGANIZATIONAL KNOWLEDGE SHARING SYSTEM**

Figure 5:   Model IV – Research Organizational Knowledge Sharing System
(Meso and Smith, 2000)

Researchers are awarded with conference facilities through website, telecommunication equipment, depending on the number of shared knowledge accumulated during a year. The number of shares given to the contributor depends on the re-use feedback of the taker of knowledge, thus rewarding the usefulness of the transferred knowledge. Based on this feedback, knowledge of lesser quality can be removed from the share-net, whereas high-quality knowledge can be highlighted and further developed. This process leads to a constantly improving quality of the available knowledge. The purpose of implementing knowledge sharing among research center is to take advantage of the available research results and improving its transfer between individuals.

The majority of the participating research organizations have established some kind of technological platform to facilitate knowledge sharing. The structured document storage appears on a majority of organizations, and is usually databases with document where documents may be shared. Another common activity among research center at LIPI is that the implemented systems facilitate communication between researchers from various locations of the LIPI organizational community of researchers (both Intranet and Internet), or discussion databases, in which researchers may contact each other and share their experiences. To be able to locate the right person at the right time is a paramount issue when trying to take advantage of the knowledge embedded in the LIPI organization. There are also face-to-face communities, work shops and seminar held in order for researchers from various parts of the LIPI organization, as well as externally, to get together and share experiences on various topics (Setiarso, 2005). Figure 6 presents the social network mapping at LIPI Intranet discussion forum and Table 1 presents the total number of Intranet discussion groups at LIPI.
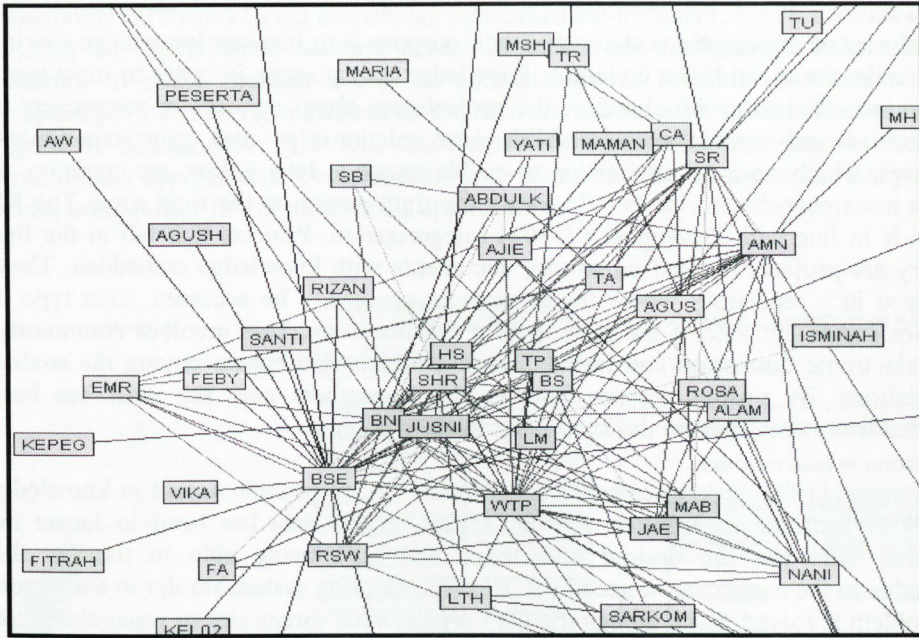
Figure 6: Social Network Mapping at LIPI Intranet Discussion Forum

Table 1: The Number of Discussion Groups (Intranet) at LIPI

Data	Symbol	Value
Articles number	M	481
Users number for constributor	$n(U)$	70
The number of comments	c_x	640
The number of link	l_x	151
The number of individual impacts	$j_{p \to q}$	17943
The value impact of LIPI intranet	I	19285

5. Sustainable Competitive Advantage.

Knowledge Management is generally understood as a means of having better control over the production and usage of explicit and tacit knowledge in organizations of any kind, preferably business, but also public administration or research center. Using and applying tacit and explicit knowledge to solve the problem as well as handling the results of the communication processes, can be called the network or communications approach to knowledge sharing.

Knowledge sharing in the communicative paradigm would have major consequences for librarians work and the structure and information transfer institutions, so that the paradigm shift is quite obvious with respect to knowledge sharing from an organizational perspective. The paradigm shift towards communicative knowledge sharing has also consequences from an Indonesian cultural perspective as a means of organizing learning, collaborative, cooperative, and exchanges of the knowledge processes. KS dramatically changes the current way of producing, exchanging and organizing knowledge in the scientific environment.

The majority of organizations states that their purpose is to increase knowledge sharing and to make the most of the collective knowledge they possess in order to meet users needs more efficiently. As of today, the projects are about connecting researchers in communities and networks to establish new relationships and gain experiences. Databases, which store documentation to enable re-use at later points, are common, as well as researcher-directories to help locate the right person at the right time. The KS studied is in line with Davenport's (1993) categorization. Projects that fall in the first category are projects focused on storing documents with knowledge embedded. These are stored in a repository where the documents can easily be accessed. This type of activities stands out among the participating organizations. This involves community-based electronic discussion and lessons learned, which also appear among the studied organizations. By posting lessons learned, the researchers may see what has been generated from taking part in the knowledge sharing process.

In Davenport (1993) second category are projects, which provide access to knowledge as well as facilitate its transfer. Earlier, a problematic area has been to locate the researcher who has the desired knowledge and then being able to transfer this knowledge to the researcher in need of it. By implementing system similar to a directory this problem is solved. Even though the LIPI organization directories of researchers take slightly different form, for instance handling complete researcher profiles, they all aim to keep track of who knows what within the LIPI organization in order to provide the competency of a specific researcher at the right time and place.

Davenport's (1993) third category are activity focusing on changing behaviour and attitudes as well as organizational norms and values. In order to be able to take advantage of the knowledge embedded in the organization, there is the implication that individuals must feel comfortable sharing what they know. Also, apart from being willing to share what they know themselves, it is also important that they feel comfortable using somebody else's solution to a problem. When studying the participating organizations from this perspective there are a few differences that stand out. The LIPI organizations mention a lack of focus on sharing knowledge in the organizational culture, even though it is about to change. This reluctance may stem from researchers' feeling that they could be easily replaced if they do not have some kind of unique knowledge which makes them irreplaceable. There is also general encouragement to knowledge sharing, as well as efforts to introduce the benefits of knowledge sharing to researchers by having workshops and seminars (Setiarso, 2005). These activities are vital in order for researches to begin, and then continue to share what they know (Figure 7)

From previous discussion in this paper, it is clear that a knowledge networked society will have profound impacts in different walks of life and there is a distinct possibility of the life style to change completely. The promise made to the common man by the knowledge networked society can be stated as "A" raised to the power of five: *anyone, anytime, anywhere, any knowledge, and any format.*

A full-fledged knowledge networked society implies that every researcher have access to the network. Network connectivity to homes would become an essential infrastructural facility. The situation also implies researchers who are accessing knowledge as well as for the knowledge resources being accessed. A knowledge networked society should pose no trans-border barriers and be able to communicate knowledge in any format.

Network personal computers or simply NetPCs are based on advanced microprocessors and are especially architectured using hardware and software techniques to provide

maximum efficiency in the knowledge networked environment. NetPCs would support a variety of sophisticated network access protocols and navigation mechanisms in an attempt to make network access as user-friendly as possible. Network computing implies powerful server machines on the network instead of powerful client or end-users systems. Multimedia PCs will have specially designed configuration to handle multimedia applications. The emphasis on multimedia PCs is to provide adequate local computing power to run multimedia applications.
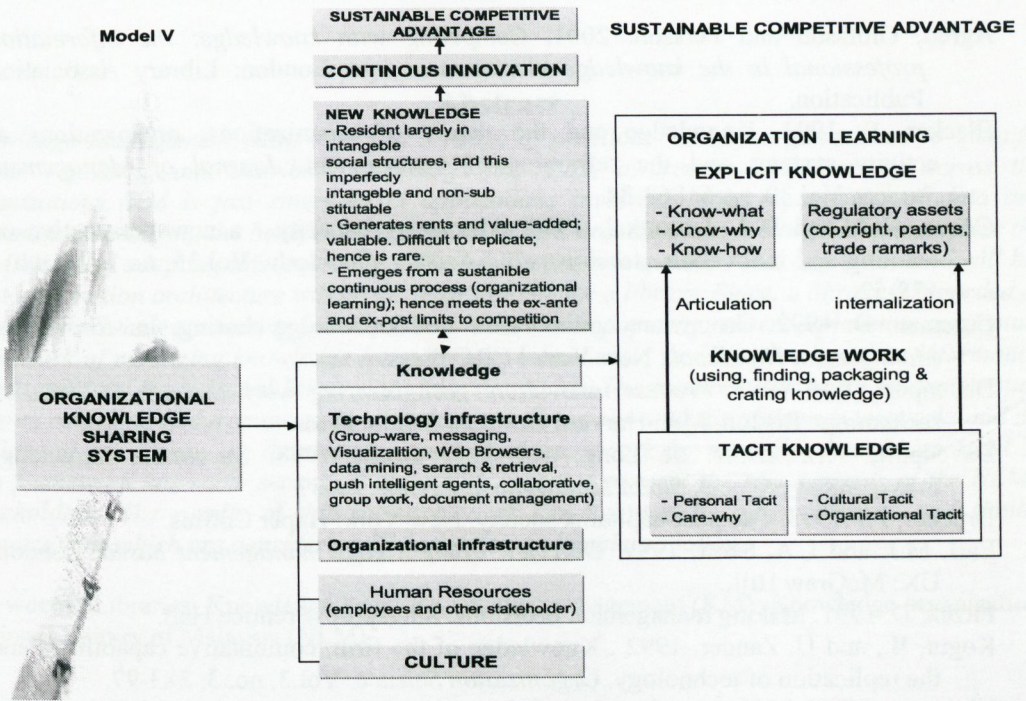

Figure 7: Model V – Organizational Knowledge Sharing System
(Meso and Smith, 2000)

Communication infrastructure and powerful personal computers tell only one half of the story of the knowledge networked society. Other important components include data, information and knowledge bases and the associated knowledge management techniques and the navigation mechanisms required for accessing these databases. In order to substantiate the view point of knowledge explosion, one tends to quote the annual publication figures such as one million journal issues, hundred thousands monographs, one million patents and tens of thousand of reports and dissertations. Apart from the current knowledge, the world has been accumulating knowledge over millions of years which are stored in different forms in different parts of the world. This knowledge, when digitized would perhaps run into several million terabytes. Perhaps, a large knowledge of the researchers would spend its time in evolving effective and efficient knowledge management techniques.

6. Summary

Knowledge Management is in essence an organizing principle, which lays foundation for capturing the potentials of the possessed knowledge within an organization. To make the most of the organizations resources and enhance knowledge sharing it is important to acknowledge that it is about managing both technology and people in order to provide a

beneficial knowledge sharing environment. Knowledge sharing tools aims to do something useful by structuring people, information technology and knowledge content. Some of the projects are based on IT-systems, while others put emphasis on relationships and communications based on networks. However, a majority of the KS projects emphasize activities for managing, sharing, creating and distributing knowledge within an organization.

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