KNOWLEDGE MANAGEMENT: COLLABORATIVE INFRASTRUCTURES!!!

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INTRODUCTION

“We don’t know what we know” is a common lament of any executive today in most organisations. The problem is that today’s employee is bombarded with information and does not have a proper mechanism to store it in an organised way or to retrieve it. That’s where Knowledge management comes in which forms the basis of this paper.

The paper is divided into 3 parts. The first focuses on the introduction to the topic, the second on the technologies available and the third on the future of knowledge management.

The first part of the paper introduces the concept of Knowledge Management (KM) and reasons for having such a process. Behind every such concept there is a need that lies. The paper tries to identify where would such a concept give direct benefits. History of the concept is also form’s a part of this paper.

The second part of the paper then focuses on the technologies to support knowledge Management. These technologies have been classified under 3 broad heading - Intranet, GroupWare and KM Applications.

The third part and the final part of the paper looks into the future of Knowledge Management. The concept of Knowledge warehouse is explained here. This is a revolutionary approach projected as the future of KM. The concept of KM is divided into 2 parts:- Knowledge contribution & collection and knowledge retrieval. The paper finally outlines the essentials of the new approach to KM.

WHAT IS KNOWLEDGE MANAGEMENT (KM)?

Knowledge Management (KM), as a discipline, is not new. Philosophers, especially form India, have been busy characterising KM for years, though not under the same ‘bandwagon’. But in today’s world, the relevance of KM is gaining high importance.

DEFINITION

The process by which individual learning and experience can be accessed, reflected upon, shared and utilised in order to foster enhanced individual knowledge and, thus, organisational value.

1 Colman, David and Furey, Dehorah, 1996, Collaborative Infrastructures for Knowledge Management (Part 1)
At a pragmatic level, Knowledge management is a cycle:

Where Data is raw facts out of context, Information is data in a context relevant to an individual, team or organisation, and Experience is the application of skill, insights, and the lessons learned – ideally from more than one individual – wrapped around information. This is a cycle, where knowledge evolves as new insights and experiences are brought to bear on new and existing information.

At this point it is also important to understand two commonly used phases in KM. These are tacit knowledge and explicit knowledge.²

Tacit knowledge, as the phase implies, is a knowledge that is clearly understood but may not be clearly articulated. Much of the knowledge held by individuals is tacit. In contrast, explicit knowledge is clearly articulated e.g. standard operating procedures. The other characteristic of tacit knowledge is that it is based on experience. Experience does have many components to it which could have empirical relationships not understood by the individual in perfectly scientific terms, in contrast explicit knowledge is invariably derived by first applying scientific and rational thought. The third significant characteristic of tacit knowledge is ‘Simultaneous Interactions’. Here the mind picks up and processes signals from multiple sources as and when these originate. All these inputs are simultaneously processed to get the desired output especially if trade-offs are involved. Explicit Knowledge in contrast has well defined flow-charted methods to arrive at desired output. The inputs are limited to a set of logically related activities, which are processed in sequence. Outcomes of previous steps are important to subsequent steps in the flow.

Knowledge Management is a process of using both these kinds of knowledge to organisational advantage. The basic objective of any knowledge management programme should be to convert all the existing tacit knowledge to explicit knowledge on one hand and on the other hand facilitate the development of new sources of tacit knowledge. This is a cycle. It thus becomes imperative to study the process of conversion of knowledge from one type to another. The diagram on the side shows how this conversion happens and what are the key enabler, i.e. socialisation, externalisation, combination and Internalisation, in each case³.

Once the objective of knowledge management is clear, the next step is breaking it down into components. Knowledge Management can be

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³ Nonaka & Takeuchi
effectively broken down into 4 components, as described below. Next to each one of these components is a list of essentials in each component:

1. External News and Data Feeds :- Topical, Project Based, Intelligent Filters
2. Expertise Database :- Answerline, Discussion Forums,
3. Knowledge Bases :- Topical, Project base, Document attachments / Links
4. Discussion Forums: - Topical Document Management, Process based document management (e.g. workflow), Insight Annotations

Each of these interact with each other with the help of links, agents or search mechanisms, to form a complete framework of Knowledge management. Each of these components play a different role when going towards the final action. The diagram below\(^4\) shows as to which component is useful at which level in the process of decision making. The above also emphasis the fact that KM is basically a collaborative tool.

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\(^4\)Colman, David and Furey, Dehorah, 1996, Collaborative Infrastructures for Knowledge Management (Part 1)

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According to Lotus and IBM’s KM framework, four basic business goals that lead to improvement through KM are: innovation, responsiveness, productivity and competency.

- **Innovation**: In businesses characterised by rapid technological changes and compressed cycle times, innovation is often the primary source of sustained competitive advantage. The challenge for many companies is bringing employees together across the boundaries of time and geography to brainstorm, share ideas, and co-create new products and services. Innovation has been a key objective of collaborative technologies for many years.

- **Responsiveness**: Decades of technology investments have helped companies build systems that manage well-known and well-understood business events. But today’s business environment seems to present more unanticipated events – such as the recent turbulence in Asian financial markets, dramatic changes in technology, or the sudden appearance of non-traditional competitors – for which traditional information is necessary but insufficient. KM technologies often confer the greatest benefit when they help a company sense weak signals.

- **Productivity**: Today’s employees are forever re-creating the wheel, failing to leverage on learned lessons, best practices and expertise that exist elsewhere in the company. Most KM efforts concentrate on effectively documenting, cataloguing and distributing such corporate knowledge assets. What organisation would not benefit from tapping the expertise and knowledge that resides in its individuals and systems for use in everyday decision? Or from reusing the knowledge created in one business process in another business process altogether? Clearly, productivity depends on how well the knowledge created by individuals and groups can be captured and package for resume by others inside (and outside) the company.

- **Competency**: A company that wants to remain competitive must develop its people – both new hires and existing employees. New hires need to learn not only new skill, but also “how things get done around here.” To do so they read as much as they can, get ‘on the job’ training, uncover resources through browsing the corporate web, enrol in a course of study, and even apprentice with mentors and other colleagues. Just as important is building the skill and expertise of existing employees. Anything a company can do to support and accelerate such learning is successful KM.

### TECHNOLOGIES TO SUPPORT KNOWLEDGE MANAGEMENT

As already mentioned, technology is curtail to the success of a KM programme. In analysing technologies, I’ve broken key technologies into 3 categories

1) **KM applications**: Applications targeting knowledge access, filtering, capture and overall management functions.

2) **GroupWare**: LAN base client/server

3) **Intranet**: These include technologies that provide information stores and collaborative function on intra/internet.

The diagram below shows the currently available application and the present KM Technology environment.

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5 The lotus corporation, 1999, Dataquest March15 1999

6 Colman, David and Furey, Dehorah, 1996, Collaborative Infrastructures for Knowledge Management (Part 1)
The following sections provide a brief overview of these technologies.

**KM APPLICATIONS**

KM Applications are centred around Brainstorming. These tools help conversion of tacit knowledge to explicit knowledge. These end user applications help categorise, organise and identify resources and are therefore useful knowledge creation tools. Help-Desk applications also form a part of KM applications. The idea is to provide a center for responding to both internal and external requests for information. Data warehouses and data mining tools are used to optimise relationships and discover new ones between customers. Suppliers and internal process also form a part of this suit. These technologies include RDBMS and ERP.

**GROUPWARE AND WORKFLOW SYSTEMS**

Organisations use GroupWare systems when users in workgroups or departments need to communicate and collaborate. GroupWare allows formal and ad hoc conversations in cases when the participants cannot communicate in real time. This makes GroupWare an important technology for enhancing the exchange of tacit information. However, like other applications, GroupWare databases become knowledge silos (isolated knowledge sources) that must be integrated into the enterprise knowledge architecture.

Knowledge transfer processes often occur on an ad hoc basis when the need for specific knowledge arises somewhere in the organisation, but organisations also have a large number of formalised processes that regulate the flow of information. Workflow systems enable users to codify knowledge transfer processes when they require a more rigid method of dissemination.

**INTRANET**

Next after the GroupWare technologies, came the Intranet technologies. The major change from earlier Intranet to today’s has been more in terms of content rather than technology. It represents the future of KM technologies. The concept of “full service Intranet” as described by Forrester Research is

“The full service Intranet takes advantage of the family of open standards and protocols that have emerged from the Internet. These open standards make possible applications and services like email, GroupWare, security, directory, information sharing, database access and management that are as powerful, and in many
cases more powerful, than traditional proprietary systems, such as Lotus Notes or Microsoft BackOffice. Because of the full service Intranet is built on these open standards, customers reap flexibility and vendor independence. They also gain the ability to leverage the innovative and products created by an entire industry, not just a single vendor.”

In conclusion, one must say that KM is a process of well-planned evolution in an organisation. There is no standardised mechanism to go about it. A combination of the above three technologies, as per organisational needs and resources would have to be used to achieve success in the process of KM, but the following key features should always be present in any KM system:

1) It should be open and distributed
2) It should be customised to fit organisational requirements
3) The efforts put into such an effort should be measurable so as to strike a right balance between organisational and technological changes
4) It should be secure and should be able to generate confidence regarding its security.

FUTURE OF KNOWLEDGE MANAGEMENT

With such variety of applications available and such a lot of development in this field still left, it is imperative that we look at the direction in which this field is moving on and what would soon be the demands and needs because of this process.

KNOWLEDGE WAREHOUSE

First RDBMSs, then GroupWare systems and now web servers. All of these systems have aimed to replace the organisation’s knowledge silos with a single application. However, stand-alone applications are too feature rich to make it practical or even desirable. The goal of knowledge warehouse – the core component of the knowledge management system – is to preserve the creation and processing functionally inherent in knowledge silos, while offering all users access to the knowledge contained in the silos. In addition, a knowledge warehouse allows users to submit valuable knowledge even when they are not frequent contributors and...
therefore don not work through an established knowledge silo. This eliminates the need for all end users in the organisation to install and maintain complex client software for all the application silos.

KNOWLEDGE CONTRIBUTION AND COLLECTION

End users should be able to easily add content to a knowledge warehouse through their web browsers. The knowledge warehouse must support all the various desktop document formats as well as graphics and other multimedia enhancements.

Some knowledge assets benefit from a more structured approach than that provided by a simple document. For example, if all an organisation’s knowledge workers were asked to contribute skill profiles as word processor documents, they will probably produce thousand of variations in format. However, if they fill out a web-base form instead, they will submit this information in a consistently organised way. Administrators should be able to easily create such forms to allow users to enter such structured knowledge. This not only allows the user to perform fielded searches on the class of knowledge assets, but also enforces a uniform presentation of the resulting information.

To enable or increase the accuracy and speed of information retrieval, knowledge assets need to be associated with categories from the corporate taxonomy or knowledge map. This categorisation can be accomplished by the end user on submission or by a content manager. The knowledge warehouse must incorporate categorisation into submission process, yet be flexible enough to adapt to each organisation’s process.

KNOWLEDGE RETRIEVAL

The other half of a KM system concerns itself with access to the organisation’s knowledge assets regardless of the weather they were contributed to the knowledge warehouse by end users, or to a knowledge silo liked to the knowledge warehouse by the administrator. This section discusses some of the knowledge revival features that make it easier for end users to find the specific knowledge assets they require.

Search

Knowledge workers now demand searching tools that are sophisticated yet easy to use. Some of the more useful advance searching features for knowledge warehouse includes:

- Natural language searching
- Automatic root expansion
- Numeric searching
- Thesaurus integration
- Metadata fields searching
- Boolean searching
- Proximity searching
- Term weighted searching
- Object type searching
- Concept searching

Knowledge Mining

Internet information seekers are familiar with entering a seemingly precise query, only to be presented with thousands or tens of thousands of hits, with no easy way to navigate them. To solve this exasperating problem, search results should be clustered or categorised using knowledge map categories. This enables the user to quickly drill down to or mine the most relevant knowledge assets without having to learn complex query languages. No one such search method is best for all people at all times. Weather users prefer to browse or
search knowledge warehouse, knowledge assets should only be clustered by other methods including physical system source, content type, author or other metadata field.

**ESSENTIALS OF THIS APPROACH**

Since this approach is a comprehensive approach towards knowledge management, the following should be kept in the picture and should be continuously updated. These features should actually be continuously updated in any KM system.

**THE KNOWLEDGE DIRECTORY**

Finding ‘who knows what’ in an organisation has always been a time-intensive process. A knowledge management system allows users to quickly access people’s skill and areas of expertise through an integrated knowledge directory. The knowledge directory should allow queries by taxonomy area (for example, who are the experts on marketing?) and return a list of experts ranked by experience. In addition, directory should be able to be queried directly or accessed from a document view or result list. A key aspect of knowledge directory is the ability to include administrator – defined rules.

**KNOWLEDGE CATEGORISATION**

Many techniques exist for categorising knowledge, ranging from manual, human-centric approaches to completely automated processes based on artificial intelligence methods. While fully manual processes are time and labour intensive, fully automated approaches do not yield accurate enough results. However, a categorisation server that automates a first-level classification of knowledge assets by using knowledge map categories saves a good portion of the labour required to fully classify information. The organisation can then incorporate the final classification as part of editorial or content management process.

**KNOWLEDGE AGENTS**

After finding a collection of relevant knowledge assets, users need to know when similar assets appear, regardless of the individual knowledge silo in which they reside. Users should be able to set up agents for monitoring the knowledge warehouse base on full text searches, knowledge map categories, author names and other metadata files. They should be able to set up profiles for filtering news feeds and other dynamic sources. Notification frequency (by time and / or quantity) and method (by e-mail or personal web page) are important parameters that should be selectable by the end user.

**DISTRIBUTED SYSTEMS**

Bandwidth limitations and other concern will move large organisation to install more than one knowledge warehouse across the enterprise. To keep an integrated approach to finding knowledge, organisations require a query broker that distributes searches across one or more knowledge warehouse and then returns an integrated set of results. Knowledge assets are not merely contained within the knowledge warehouse or within the corporation itself, but also exist on the Internet. A query broker should also provide integrated searching of other repositories, including popular Internet search services.

**CONTENT MANAGEMENT**

A knowledge management system that leaves content management up to end users quickly succumbs to “information pollution”. Successful knowledge management implementations appoint knowledge managers or content editors whose job is to evangelise knowledge management processes and to validate and edit content in there or expertise. Without a content manager to ensure that information is categorised appropriately and that the content is useful and understandable, users quickly begin to have difficulty finding what they are looking
for. The system soon overflows with knowledge assets for questionable value. A knowledge warehouse should be flexible enough to meet the organisation’s content policies and to operate either with or without editorial approval, or with a combination of end user and content manager supervision. In additions, the administrator should be able to tie the editorial process to particular areas of taxonomy or particular types of documents.

In conclusion, as human resource becomes a asset in the organisation, Knowledge management starts to play a more and more important part in the organisation. Organisations, irrespective of the kind of business they are in, gain a substantial competitive edge because of KM and only these organisations which are ready to dispense more and more of knowledge in an organised way could ensure their survival. Though one model of KM does not fit all needs, the new approach to KM highlighted in this paper or one of its variants seem the most likely path for future.