MIND MAPPING AND KNOWLEDGE MANAGEMENT: CODING AND IMPLEMENTATION OF KM SYSTEM

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ABSTRACT

Mind mapping is one of the best ways to organize your thinking on a specific theme. While a mind map is essentially a graphic organizer, there are a myriad of techniques people employ in creating one. Knowledge Management is the collection of processes that govern the creation, dissemination, and utilization of knowledge. In one form or another, knowledge management has been around for a very long time. Knowledge management is the name of a concept in which an enterprise consciously and comprehensively gathers, organizes, shares, and analyzes its knowledge in terms of resources, documents, and people skills. This paper explores the concept of KM implementation and using mind mapping, codifying the knowledge and deployment of knowledge.

Key Words: Mind Mapping, thinking, versatile tool, Drawing, Process

INTRODUCTION

Mind mapping is one of the best ways to organize your thinking on a specific theme. While a mind map is essentially a graphic organizer, there are a myriad of techniques people employ in creating one. Once you learn the basic elements of mind mapping, you
can adapt the process to fit your specific needs and learning style. Mind map drawing is a very easy task and does not require complex drawings. It can be started with a blank page by writing or drawing an idea which needs to be developed. It can be used to create a diagrammatic representation of any complex problem. Mind Maps can help businesses with thinking, change and complexity, managing volumes of information, planning, creativity and innovation. Mind Mapping is a versatile tool that can be used for educational, personal and business tasks. In this lens we'll look at how to use Mind Maps for Business Advantage. Once information or facts are represented in the form of mind maps, it becomes much easy to analyze, synthesize and generate new ideas. The power of mind mapping lies in its simplicity. There is no limit to the usefulness and utility of the mind maps. These maps help in clarifying the thinking process of individuals. Such maps can be used in planning the day to day activities of one's life, along with different uses in business, personal and family life as well.

MEANING OF KM

Knowledge Management is the collection of processes that govern the creation, dissemination, and utilization of knowledge. In one form or another, knowledge management has been around for a very long time. Practitioners have included philosophers, priests, teachers, politicians, scribes, Liberians, etc. Knowledge management is not a, "a technology thing" or a, "computer thing" If we accept the premise that knowledge management is concerned with the entire process of discovery and creation of knowledge, dissemination of knowledge, and the utilization of knowledge then we are strongly driven to accept that knowledge management is much more than a "technology thing" and that elements of it exist in each of our jobs. Knowledge management is the name of a concept in which an enterprise consciously and comprehensively gathers, organizes, shares, and analyzes its knowledge in terms of resources, documents, and people skills.

Meaning on Mind Mapping

Mind mapping is one of the best ways to organize your thinking on a specific theme. While a mind map is essentially a graphic organizer, there are a myriad of techniques people employ in creating one. Once you learn the basic elements of mind mapping, you can adapt the process to fit your specific needs and learning style. A mind map consists of a central word or concept, around the central word you draw the 5 to 10 main ideas that relate to that word. In a mind map, as opposed to traditional note taking or a linear text, information is structured in a way that resembles much more closely how your brain actually works.

They are designed to accentuate associations through their unique line structure. By clarifying associations of ideas, which are expressed as single words or pictures, Mind Maps help us to put information into our brains in a way that makes it easy for us to access it. They provide the clearest expression of the way the human mind works, as we don't think in lists or sentences, we think in images and key themes, shapes and patterns. There are four characteristics of a Mind Map:

1. The subject of attention is crystallized in the central image.
2. The main themes of the subject radiate from the central image on branches.
3. Branches hold a key image/word printed on the associated line - with details radiating out.
4. The branches form a connected nodal structure.

Knowledge an Object or a Process

The other dynamic concerns the understanding of what Knowledge is. Is Knowledge an object or a Process? The question is generally placed in the “too hard-basket” so the existing implicit paradigm that Knowledge is some kind of advanced Information is allowed to prevail. However, the question must not be avoided.

If tend to believe that by investing in Information Technology you will have “implemented Knowledge Management”. It is an easy out. Unfortunately it is also an easy way to money. One as a manager believe that knowledge is more or less the same as information you will also lose late, If you, on the other hand, are convinced that

If the definition is too important for managers to be dismissed; what’s the point in having people If we accept that Knowledge is a human faculty, the purpose for Knowledge Management and it that the key to success in Knowledge Management lies in People you find yourself in a dilemma. Where do you start? unstructured symbols) and information (a medium for explicit communication). Since the dynproperties of knowledge are in focus, the notion Individual Competence can be used as a fair synonym. with lots of knowledge, but who are unable to do anything with it? What is the point in filling computers with information if the value is in the people? Concerns how the organization best can nurture, leverage and motivate people to improve share their Capacity to Act. KM becomes a strategic issue for the whole organization. I call a Knowledge-based Strategy

Mind Mapping and Knowledge management

Knowledge management involves data mining and some method of operation to push Learn More information to users. Some vendors are offering products to help an enterprise inventory and access knowledge resources. IBM's Lotus Discovery Server and K-Station, for example, are products advertised as providing the ability to organize and locate relevant content and expertise required to adddress specific business tasks and projects. They are said to be able to analyze the relationships between content, people, topics, and activity, and produce a knowledge map report.
### Figure 1: Process of KM into Mind Mapping

<table>
<thead>
<tr>
<th>This major process...</th>
<th>Includes these activities....</th>
</tr>
</thead>
</table>
| Gathering            | Data entry
|                      | OCR and scanning
|                      | Voice input
|                      | Pulling information from various sources
|                      | Searching for information to include |
| Organizing           | Cataloging
|                      | Indexing
|                      | Filtering
|                      | Linking |
| Refining             | Contextualizing
|                      | Collaborating
|                      | Compacting
|                      | Projecting
|                      | Mining |
| Disseminating        | Flow
|                      | Sharing
|                      | Alert
|                      | Push |

A knowledge management plan involves a survey of corporate goals and a close examination of the tools, both traditional and technical those are required for addressing the needs of the company. The challenge is to select or build software that fits the context of the overall plan and encourage employees to share information.

### Knowledge Codification

Knowledge codification is organizing and co-ordination knowledge before the user can access it. It must be in a form and a structure meaningful for the access at any time, from anywhere, by any authorized person. Codification is a prerequisite for knowledge transfer. Knowledge codification converts tacit knowledge to explicit knowledge in a usable form for the organizational members. Tacit knowledge is identified and leveraged through a form that is able to produce highest return for the business. Explicit knowledge is organized, categorized, indexed and accessed. The organizing often includes decision trees, decision tables etc. Codification must be done in a form/structure which will eventually build the knowledge base. The resulting knowledge base supports training and decision-making areas. Among the Important ones are Diagnosis, Training/Instruction, Interpretation, Prediction, and Planning/Scheduling.
Knowledge developer has to conduct a knowledge need analysis, which helps the knowledge worker, within the organization and becomes the basis for knowledge codification (Natarajan and Shekhar, 2001). The knowledge developer should note the certain constraints before initiating knowledge codification. A knowledge developer should plan carefully. Sometimes, the recorded knowledge is often difficult to access because it is either fragmented or poorly organized. Knowledge is not shared, but hoarded; Diffusion of new knowledge is too slow and often knowledge is neither found in the proper form, nor available at the correct time when it is needed. It is also not present in the proper location where it should be present and often the knowledge is found to be incomplete.

Modes of Knowledge Conversion

Conversion from tacit to tacit knowledge produces socialization where knowledge developer looks for experience in case of knowledge capture. Conversion from tacit to explicit knowledge involves externalizing, explaining or clarifying via analogies, models, or metaphors. Conversion from explicit to tacit knowledge involves internalizing or fitting explicit knowledge to tacit knowledge. Conversion from explicit to explicit knowledge involves combining, categorizing, reorganizing or sorting different bodies of explicit knowledge to lead to new knowledge. The literature also looks at tacit and explicit knowledge as two major types of knowledge and combines them into four modes of knowledge conversion as shown in the Figure No: 1.

![Figure-2: Modes of Knowledge Conversion](image)

<table>
<thead>
<tr>
<th>FROM/TO</th>
<th>TACIT</th>
<th>EXPLICIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>TACIT</td>
<td>Socialization</td>
<td>Externalization</td>
</tr>
<tr>
<td>EXPLICIT</td>
<td>Internalization</td>
<td>Combination</td>
</tr>
</tbody>
</table>

**Source:** Marwick. A. D, Knowledge Management Technology, IBM System Journal, vol. 40, no.4,2001, pp.815

Codifying Knowledge

Knowledge creation has its basic assumption that individuals create knowledge and that organizational knowledge creation is the amplification of the knowledge created by organizational members. Knowledge capture is viewed as part of knowledge creation. In knowledge capture, usefulness is often more important than originality and must be followed by codification and adaptation to the organizational needs. It needs group work recognition of the value of tacit knowledge and support socialization and internalization. Knowledge creation also requires experience, which over time leads to expertise³. Codifying tacit knowledge in a knowledge base or repository is often difficult because it is usually developed and internalized in the minds of the human experts over a long period of time. An organization must focus on the certain points before codification i.e., whether the codified knowledge will serve the business goals of the organization, identification of the existing knowledge, to the appropriate goals and usefulness and its
appropriateness for codified knowledge, the medium for codification and distribution. Codification is a lengthy and important process. If a company decides to use codification as its primary strategy, it should direct, i.e., 80% of its efforts towards codification and the remaining 20% towards personalization.\(^4\)

**Codification tools or procedures**

There are several tools or procedures of encoding facts to codify the existing knowledge. Some of them are.

**Knowledge Maps:** Knowledge Map can represent explicit/tacit, formal/informal, documented/undocumented, internal/external knowledge. It is not a knowledge repository. It is a sort of directory that points towards people, documents, and repositories. It may identify strengths to exploit and missing knowledge gaps to fill. Knowledge Mapping is very useful when it is required to visualize and explore complex systems. Knowledge Mapping is a multi-step process. Keys can be extracted from database or literature and place it in tabular form as a lists of facts. These tabulated relationships can then be connected in networks to form the required knowledge maps.

**Decision Table:** It is another technique used for knowledge codification. It consists of some conditions, rules, and actions. Decision table has two parts. One is while satisfying the condition and another if it goes detrimental. A list of conditions with their respective values matched against a list of conclusions.

**Decision Tree:** It is also a knowledge codification technique. A decision tree is usually a hierarchically arranged in semantic network. It is composed of nodes representing goals and links that represent decisions or outcomes.

**Frames:** A frame is a structure for organizing knowledge. It handles combination of declarative and operational knowledge and makes the current problem domain easier to understand. It represents knowledge about entity in the real world and catalogs the membership requirements of certain elements of a knowledge scheme. A frame is used as a codification scheme for organizing knowledge through previous experience.

**Production Rules:** They are conditional statements specifying an action to be taken in case a certain condition is true. They codify knowledge in the form of premise-action pairs. In case of knowledge-based systems, rules are based on heuristics or experimental reasoning. Rules can incorporate certain levels of uncertainty. A certainty factor is synonymous with a confidence level, which is a subjective quantification of an expert's judgment. The premise is a Boolean expression that should be evaluated to be true for the rule to be applied. The action part of the rule is separated from the premise by the keyword THEN. The action clause consists of a statement or a series of statements separated by AND's or comma's and is executed if the premise is true.

In case of knowledge-based systems, planning involves in the areas such as breaking the entire system into manageable modules, considering partial solutions and liking them through rules and procedures to arrive at a final solution, deciding on the programming language(s), deciding on the software package(s), testing and validating the system, developing the user interface, promoting clarity, flexibility; making rules clear, and reducing unnecessary risk.
Case-Based Reasoning: Case based reasoning is a methodology that records and documents previous cases and then searches the relevant cases to determine their usefulness in solving a current problem. Computer systems solve new problems by analogy with old ones. It is reasoning from relevant past cases in a way similar to human's use of past experiences to arrive at conclusions. Case-based reasoning is a technique that records and documents cases and then searches the appropriate cases to determine their usefulness in solving new cases presented to the expert. The aim is to bring up the most similar historical case that matches the present case. Adding new cases and reclassifying the case library usually expands knowledge. A case library may require considerable database storage as well as an efficient retrieval system.

Knowledge-Based Agents: An intelligent agent is a program code, which is capable of performing autonomous action in a timely fashion. They can exhibit goal directed behavior by taking initiative. They can be programmed to interact with other agents or humans by using some agent communication language. In terms of knowledge-based systems, an agent can be programmed to learn from the user behavior and deduce future behavior for assisting the user.

Thus, the work of knowledge codification involves more than codification schemes or tools i.e., planning the codification phase, planning the use of specific tools within the framework of a programming environment, and making the most efficient use of the knowledge developer’s and the expert’s time and talent.

System testing and deployment

Knowledge Management system reliability is one of the most important issues in knowledge based systems. Reliability means how well the system delivers information with consistency and accuracy and integrity. The prime emphasis beyond reliability is quality assurance and maintainability of the system. The most important part of system building is testing. Testing Knowledge Management system calls for informal, subjective, time-consuming, and often arbitrary creation and execution of test cases.

The Knowledge Management system should meet user expectations. Performance usually depends on the quality of explicit/tacit knowledge stored in the knowledge base. For the expert, quality relates to a reasoning process which produces reliable and accurate solutions within the KM system framework. For the user, quality relates to the systems ability to work efficiently. For the knowledge developer, quality relates to how well the knowledge source is and how well the user’s expectations are codified into the knowledge base.

Knowledge Testing

Knowledge testing is the most challenging part of Knowledge Management system. The aim of testing is, compliance with user expectations, human expertise, and system functioning. When a Knowledge Management system is built via prototyping, each phase of the building process can be properly tested during building instead of waiting till the end. It is required to control performance, efficiency, and quality of the knowledge base.
Types of testing

The two types of testing are Logical Testing and User Acceptance testing. Logical testing helps to make sure that the system produces correct results. User Acceptance Testing follows logical testing and checks the system's behavior in a realistic environment. There is no standardization, no specific tools, or no methodologies in guiding the testing in a knowledge management system. There are several issues to be considered in knowledge-based testing. They are subjective nature of knowledge (tacit), lack of reliable specifications, verifying correctness/consistency, negligence in case of testing, time limitations for knowledge developers to test the system and complexity in case of user interfaces.

Logical Testing Approaches: In logical approach there are two approaches, one is to verify the knowledge base formation and the other is to verify the knowledge base functionality. While verifying knowledge base formation, the structure of the knowledge as it relates to circular or redundant errors is verified and consistency, correctness and completeness of knowledge base rules are also verified. While verifying the knowledge base functionality, it deals with confidence and reliability of the knowledge base. Attributes of logical testing approaches are circular errors, completeness, confidence, correctness, consistency, inconsistency, redundancy errors, reliability, and Subsumption errors.

User Acceptance Testing Approaches: The Steps involved in user acceptance testing approaches are selecting a person/team for testing, deciding on user acceptance test criteria, developing a set of test cases, maintaining a log on different versions of the tests and test results, and Field-testing the system.

Test Team/Plan: A testing plan indicates who is to do the testing. Commitment initiates with management support and a test team with a test plan. The team is expected to be independent of the design/codification of the system, expected to understand systems technology/knowledge base infrastructure and be well versed in the organization's business.

While deciding on user acceptance test the criteria to be considered are accuracy, adaptability, adequacy, appeal and availability, performance, and face validity, robustness, reliability and operational/technical test, and ease of use.

Managing Test Phase: During the test phase management the following tasks are included i.e., deciding what, when, how, and where to evaluate the knowledge base, deciding who will be doing the logical and user acceptance testing and deciding about a set of evaluation criteria and deciding about what should be recorded during the test.

System Deployment

The primary aim of every Knowledge Management system development is deployment. Physical transfer of the technology to the organizations operating unit is called deployment. If deployment concerns are not considered, even the best system may fail. It is all based on the higher involvement of the knowledge developer who coordinates the deployment with the end user. Regardless of what organizational aspects are being
changed, deployment means change and people in general resist change. Deployment can be promoted in a number of ways. The aspects of deployment are the transfer of the Knowledge Management system from the knowledge developer to the organization's operating unit and the transfer of the Knowledge Management system's skills from the knowledge developer to the organization's operators. Factors affecting the Deployments are technical, organizational, procedural, behavioural, political, and economic. There are some issues related to the deployment related to the selection. Some of the important issues are:

**Selection of KB Problem:** The success of the KM system greatly depends upon the way the knowledge-based problem is selected and it can be assured to be successful if the users have prior experience with systems applications. The user should actively involve in defining/identifying the specific systems functions and acceptance testing and the final system evaluation. It is possible to implement the system in the working environment without interrupting the ongoing activities. The champion is selling the user's staff on the potential contributions of the system.

**Ease of Understanding the System:** Reliable documentation especially during user training plays a key role during deployment. Name of those reliable documentation are including examples, illustrations, and graphics may reduce training time. Successful Knowledge Management system deployment depends, on user's level of motivation, technical background of the user, level of trainer's communication skills, time availability/funding for training, location of training, ease and duration of training, accessibility and explanatory facilities of the KM system ease of maintenance and system update, payoff to the organization and champion's role.

**Knowledge Transfer:** Two Approaches are used for transferring KM system technology in implementation: The system is actually transferred from the knowledge developer directly to the working unit in the organization and installing the system on the resident hardware.

One way is abrupt, i.e., one time transfer resulting in a permanent installation. The other way is a gradual transfer over a given time period often, through rapid prototyping, a receiving group becomes the part of the developer's team. Implementation can also be approached as a stand alone installation or as a fully integrated application that can interface with other applications/databases. Knowledge Management systems should be designed on platforms which are compatible with other Knowledge Management systems in the organization.

**Integration Alternatives:** Technical Integration occurs through the organization's LAN environment, the resident mainframe, or existing IS infrastructure. Knowledge Sharing Integration often requires the up gradation of the LAN, the mainframe, or lines. Decision Making Flow Integration suggests that the way the KM system assesses a problem situation should match the user's way of thinking. Workflow reengineering is considered when implementation of the new Knowledge Management system can propose changes in the workplace.

**Maintenance:** Maintenance implies the way of making the required corrections which can continue to meet user's expectations. Systems maintenance procedure can be improved if the knowledge base is organized into a set of well-defined modules, so that one can correspond to a specific module and make the necessary changes. To Succeed,
the knowledge based systems deployment must facilitate easy/effective maintenance in the ways as; the system should allow changes as needed, should be capable of identifying and conflicting should be inconsistent and redundant errors. The system's help facilities satisfies the user's requirements, The availability of the appropriate personnel/team that ensures the fact that the maintenance is carried out effective and on schedule.

**Champion's Role:** Champion is the person who, because of his/her position, influence, power, or control, is capable to acquire and secure organizational support for the new system from inception to deployment. He/she needs to be at the executive level to act as a member of the project's board of directors. He/she needs to be aware of the fact that politics, budgetary problems or conflict of interest can stand in the way of deployment.

**CONCLUSION**

Mind mapping is the latest concept and buzzword which has taken several organizations by storm. Mind map displays information in a graphic, visual form and emphasizes the use of color and creativity in construction. Though the original mind mapping technique designed by **Tony Buzan** can be distorted as the individual requires, mind maps in general follow a set of guiding principles that render the general technique effective. Mind Mapping is a versatile tool that can be used for educational, personal and business tasks. In this lens we'll look at how to use Mind Maps for Business Advantage. Mind mapping is the versatile tool while implementation of KM system. The knowledge process is more complicated for which is identified and codifying the process, knowledge transfer and deployment. In this stages mind mapping given to proper way and cleat picture view about the Knowledge implementation process.

**REFERENCE**