Knowledge Management System: A Systematic Approach to Data Mining

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Abstract:

Knowledge management is recognized as an important weapon for sustaining competitive advantage and improving performance. The evaluation of knowledge management (KM) performance has become increasingly important since it provides the reference for directing the organizations to enhance their performance and competitiveness. This paper provides an understanding of factors that involved in implementing knowledge management concept to enhance organizational performance. It states tools used for implementing KMS successfully and types of knowledge has also been discussed in detail. This paper aims to help research community to understand basic of KMS and its outcomes. A KMS which will serve as an ultimate solution to any educational institute has been proposed in the paper.

Keywords: Knowledge Management System, KM, Learning Management System, Decision Support System, Organizational Knowledge, Tacit Knowledge, Explicit Knowledge

I.   Introduction

We are in recent technological era which teaches us how to do smart work rather than the hard work. We use several technologies and its specification for our basic needs and smart deeds. For people, who understands data and the hidden information that is mined thru the enormous data collected, would definitely be assured of the concept of Knowledge Management System (KMS). KMS usually talks about technology with smart work. KMS is a methodology used by various organizations for making their knowledge; obtained from set of information; useful to the organization's aspects. To make this obtained knowledge functional for the organization, different kinds of management operation is applied. Hence in order to understand the operational use of KMS, first one need to get aware about KM which refers to knowledge management and it is based on a perspective that relates to information systems, database connection, knowledge hierarchical structure and its implementation techniques (Assegaff 2012).

The KMS has been adopted by institutions and academics for the enhancement of their teaching approach and to stay in the community with a very positive impact (Kumar 2012). The KMS involves several basic modules of business activities. For example, Data Analysis, Intelligence services, Business productivity, and many other modules which can be more productive for growth and development of any organization with additional features and functionalities to makeover knowledge as per the requirement of the organization. It helps with the staff training, orientation, support for the sales, marketing and users as well. It can give a good idea to take the crucial decisions for the leaders.

After the commencement of technological era, data management and centralized management services were found to be dilemmatic between computer and its applications. The researchers and techno-savvy minds, wanted to find the substitute way to manage their data, employee details, programs carried out by an organization, marketing and branding strategies as well as other activities occurring within the organization. This is exactly where the KMS comes into picture. A centralized data management service provides application which manages all the basic requirements which an organization require on a daily basis. With the help of KMS modules, employees can get connected with their customers and even the service provider executives can solve queries more swiftly. Secondly, systematize processes makes work more efficient, which is also an added advantage of KMS. Moreover, Decision Support System (DSS), obtained thru KMS, aids in prior decisions and the successive decisions requirements. Thus, enhancement of an organization's productivity is the outcome of acquired knowledge thru KMS. It helps in optimizing the knowledge of an organization very rapidly and in a short period of time.

Generally, it can be inferred that the Knowledge Management System is capturing, processing and distributing the information. Various companies use KMS for their efficient reduction of workload and effective work-flow (Xu 2008). Even many of the education institutes are currently using KMS for connecting with students and the faculty together on a single platform to work unanimously. The advantage obtained due to KMS, in education sector, is that the connection is established between faculties to the students, faculties to the faculties and scholars to the community (Ibrahim 2008).

The Knowledge Management System generally works as the basic work-flow of an organization. Several phases are involved in making it work within the organization and number of steps is carried out for this purpose. The steps are: (I) Determining the organization's issue to knowledge management and its objectives (II) Defining and preparing the structure and modules for the KMS (III) Selecting the trainers for training program (IV) Developing the manual guide for the users and lastly, (V) Taking the initiative for implementation.

The implementation process usually takes much time to execute but as soon as it is implemented, the work and the process flow goes very smoothly. For acquiring KMS in an optimized way involves all the above steps inherently. The system would work according to the objectives and perceptions of an organization. It collects the data from different sources, manipulates it according to the organizational need and connects several modules to it in order to obtain the end result which is defined as useable knowledge.

KMS has many advantages associated with it to negotiate with any organization for better and effective operational activities. KMS aids organization for swift and easy workflow with instant result. 24*7 accessible systems help in making the workplace digitally available to its consumers and employees. KMS can be very much useful to make the knowledge structured, productive for decision making accurate in intra and inter-firm knowledge management activities as well (Alavi 2001). The direct interaction between an employee and system which allows the information on demand would make the work more efficient. Data interpretation and its statistics can be more effective to take decisions. An instantaneous updates keeps the users informed of their work. Safe and secure environment keeps the knowledge within it as a result there is almost no concern of data security.

KMS also comes with few cons as noticed by its users. As stated, the validation to the users can prevent the initiative of new ideas to be developed thus delimiting the steps towards better productivity. Another downside of KMS is

the system would not always utilize the correct and accurate information; some of the data would be wrongly interpreted creating a disastrous mess. And most discussed pitfall of KMS is related to cost effectiveness of the system as it usually costs too high to get all the functionalities implemented in a single KMS platform, which might not fit in the budget of organization. Despite of such several disadvantages, organizations today takes an affirmative step in bringing KMS and thus adapting the technological advancements.

KMS involves Learning Management System (LMS), Information Management System (IMS), and Document Management System (DMS) as its core modules. These are the basic types of Knowledge Management System. Apart from that there are more systems which work under the concept of KMS like Decision Support System (DSS), Content Management System (CMS), and data warehousing tools as well as groupware system. Some tools of KMS that are usually used are Knowledge Search tool, Communication tool, Data Mining tool, Authentication tool and Support tool. Those tools generate clear idea of using KMS and delivers proper way of using KMS efficiently.

Literature Review

Knowledge Management (KM) is a moderately young discipline that is well thought-out to be an efficient basis for formulating the strategic direction of and mounting competitive advantages within a corporation. With this viewpoint, KM has involved imperative awareness from intellectuals and practitioners who look for its elementary concepts (Serenko 2010). The experts emphasize the significance of KM in the managerial success and researchers see the immense potential accessible from this discipline to amalgamate a variety of fields of research (Holsapple 2011). Though the current theory of KM merely began to expand in 1960s, it has profound chronological roots.

In a variety of literatures, it is well documented that the expansion of the KMS is alienated into three different stages (Tzortzaki 2014). As noted, each stage is based on preceding ideas, and consequently, the expansion of the KMS has been increasing. It is also stated that the fourth generation should tackle the intricacies of the knowledge domain, thus leading to innovative KMS descriptions, paradigms and tools.

Regardless of the growth observed during its developmental years, a number of authors note that it still remains in its budding stage, missing both a common agreement on prospect lines of research and intangible robustness. Still, the literature has been highlighting the noteworthy benefits resulting from apposite knowledge management (Yousif Al-Hakim 2013).

II.   Analysis of Knowledge – Taxonomical Representation

Knowledge Management System is a wide concept that is being implemented almost in all the certain areas of business, education, medical field and almost any molecular field as well. KMS can be further levied upon its implementation after we are certain with its types and the methods. To understand it in depth, this paper is presented. Several papers have been surveyed and have been studied in depth to understand the types and its outcomes. Upon studying each paper, taxonomy of knowledge types has been constituted which is shown in Figure 1.

Classification of Knowledge is presented below and it shows that the knowledge has many branches from where knowledge can be get. Organizational knowledge indicates the knowledge generally used by the people who are in the organization and used that knowledge to make an interaction in organization itself. Though it is among the people of organization only, it is hard to share and transfer. Tacit knowledge, Explicit knowledge, Expert knowledge, Information these are such type of organizational knowledge. Tacit and explicit knowledge abstracted from organizational knowledge. Tacit knowledge is generally based on personal in nature and difficult to understand and manage. It refers the Know-How condition. Tacit knowledge is generally related to the art & skills because some kind of knowledge may or may not be shared by the words. Tacit knowledge itself has various categories.

An Explicit knowledge proposed the knowledge type which is shared and understands by simple languages like English or Chinese. Explicit knowledge is nothing but the formal knowledge and which is easy to classifies stores and fetch from the KMS. From Explicit knowledge suggests the articulated and codified knowledge in such symbolic form and also indicates natural languages. Whereas tacit knowledge can be classified into more two half Cognitive and Technical knowledge, where Cognitive knowledge demonstrates the mental maps which describes idea of interaction, beliefs, paradigms which indicates the patents of describing knowledge, and personal view point. It is all about person's own thinking and ideas. While the technical knowledge demonstrates the special skills and crafts knowledge as per requirement. It demonstrates the ability to work with the technology and specific features of technology.
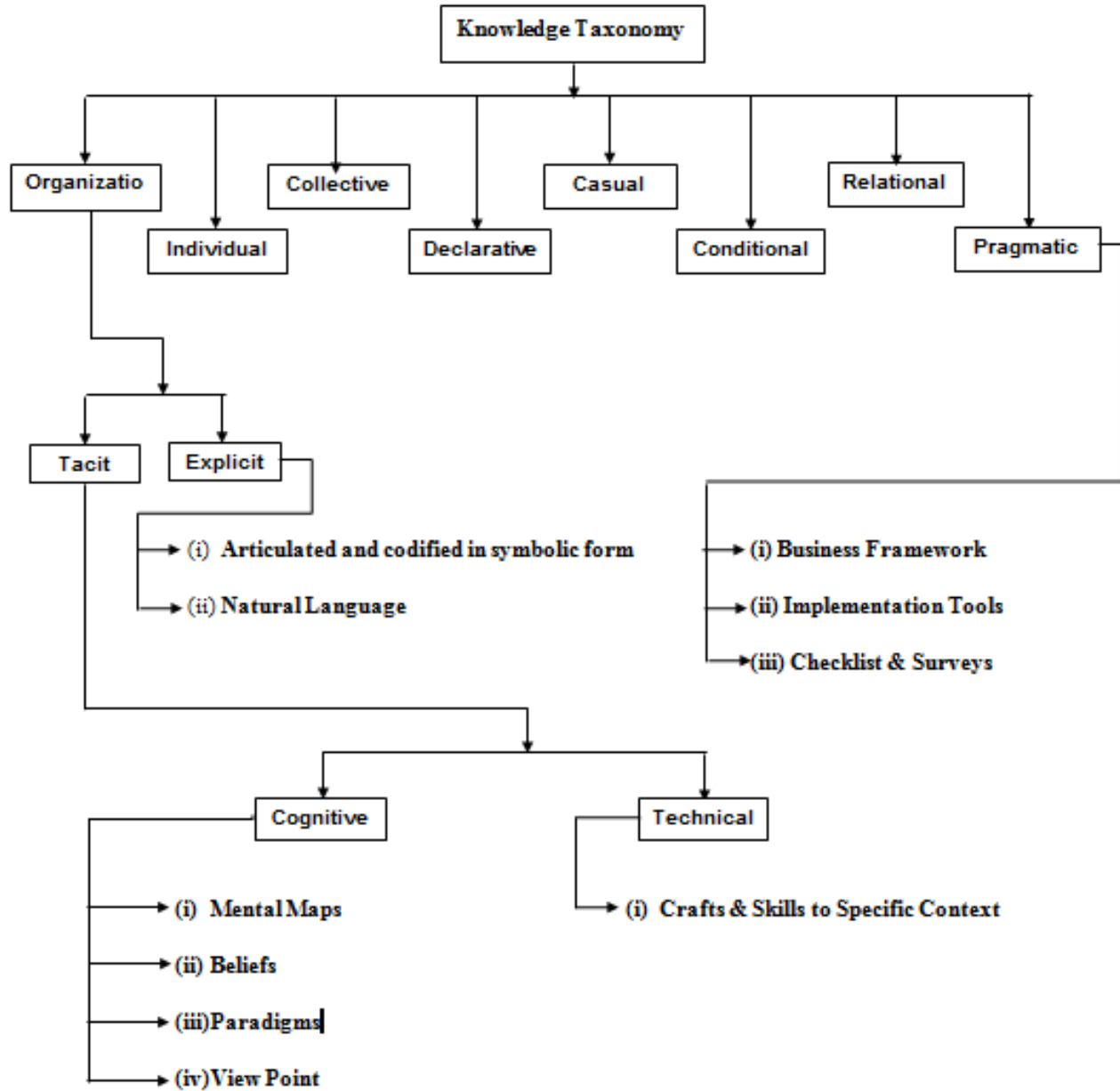
Figure 1: Types of Knowledge Management

Different kinds of knowledge suggests the different perspective of itself likewise Individual knowledge means that one who grab perception by observing something and make such decisions. Individual knowledge is based on the interpretation, observation or an experience of knowledge into meaningful information. It is usually referred as Personal Knowledge also. Collective knowledge is the knowledge in which a group or an organization work outs and make intentional information. It is combination of processed personal knowledge and the sum of it. It is shared among the people within the organization and related people. Declarative knowledge is that the knowledge can be presented by the propositions and it refers the know-about relative knowledge. It is facts of

information stored in the database. It is also referred as a conceptual or propositional knowledge. Casual knowledge is related to some purpose and general clarification and it specifies the reason behind the knowledge. It describes know-why condition of the knowledge and it gives clear idea for being used of this knowledge and the reason why it is used.

Conditional knowledge here describe as its name suggests, it clarify such answers of conditional questions and based on the conditions it revert the knowledge. It gives an idea when and why to use or not to use of procedural and declarative knowledge. Relational knowledge has a same taxonomy as its name suggests relational, it makes clear

idea of relation of knowledge and it refers the know-with condition of knowledge. It clarifies the knowledge in such a way that the relationship among the knowledge can be described and clarified.

The last in the list of knowledge taxonomy is pragmatic knowledge which is so much considerable knowledge of any organization and it give very clear idea the organization. It elucidates the knowledge in which many languages are used for different perspectives. It involves the Business frameworks which are organizations policies and rules and regulations should be implemented in the organization to achieve their goals, Implementation tools- the tools are used to achieve the projects progress and for the implementation review time, market reports- which describe the overall condition of an organization and give actual data of reputation, demand & trends and checklists & surveys. They can be more useful for the expansion of an organization. Thus is the classification of knowledge and its types are obtained which clearly gives the idea of the knowledge being used in the real world. This study will further help scholars and community who are attached in learning the KM system in deep for their further analysis and research.

III. Proposed Work

In this paper we have expressed the brief taxonomy of knowledge and discussed about the types of knowledge which are in the existence and give the idea of knowledge. We are going to emphasizes on Organizational knowledge. As we mentioned above an organizational knowledge implies that the knowledge which has its own terminology and methodology of understanding additionally it is being shared among the members of organization for communication and interaction perspectives (Nonaka 1994). Creation of organizational knowledge is based on person to person and it has also plethora of ways of creation. As discussed in the Table 1, there may be very many resources available for creation of knowledge likewise through employee's knowledge, some capital of an organization and internal and external structures might be involved (C. W. Holsapple 2001). As figure 1 suggests, an organizational knowledge can be differentiate into two major categories in a particular Tacit and Explicit knowledge. These both rely under the organizational knowledge and give a specific way to an organizational knowledge.

Though tacit and explicit knowledge make an effort to build an organizational knowledge, they both are works as

different units of knowledge. Tacit knowledge is nothing but the knowledge which is stored in the documents & shareable and it can be stored in many mediums (Xu 2008). Tacit knowledge can have some own outlook of persons and it has some pre-defined languages and syntaxes. It is being made by practice and actions so it is called as action oriented knowledge (Smith 2001). Tacit knowledge is applied in a specific work flow and one does not need to filter the data for decision making perspectives (Spender 1996).

As shown in figure 1, tacit knowledge breaks down into two more types of knowledge: Cognitive & Technical. Cognitive knowledge, as mentioned, includes Mental-maps, Beliefs, Paradigms and Viewpoints. These four types of knowledge create cognitive knowledge and it helps to create a better tacit knowledge. A cognitive knowledge can be varying from person to person and it has its own different perspectives. As word suggest viewpoint, it can have many viewpoint and beliefs suggests that it can have differ beliefs as per the mentality and viewpoints. So viewpoints are relatable to the beliefs and it can be fluctuated. Furthermore mental-maps and paradigms are the condition in which person may create its own idea of interaction maps and it creates diagram or a pictures in persons mind. While in technical knowledge, some technical pre-defined knowledge or word or sentences are used and just because it is pre-defined persons does not need to think over symbolic languages to use and they can have their own technical knowledge and skills to build the technical knowledge more fruitful and efficient.

Explicit knowledge is generally considered as a user's perspectives and generally it is not shareable. It is referred as an academic knowledge. Even explicit knowledge can be built by its two categories such as articulated and codified in symbolic form and natural languages. Articulated and codified in symbolic form implies that it has pre-defined language and syntax so it user need to think logically to build this type of knowledge. Whereas natural language is also a same sense as cognitive knowledge, as word implies natural language it means it can be differ to person to person because the perspectives must not be the same and it has vary point of views.

So our proposed work accentuates on an organizational knowledge and its types Tacit and Explicit knowledge. It can be recapitulated that cognitive knowledge the type of tacit knowledge and Natural language the type of explicit knowledge is more relatable to each other whereas Technical knowledge the type of tacit knowledge and articulated and codified in symbolic form of explicit knowledge is relatable to each other. So both the types of organizational knowledge givesa full fledge effort to build an organizational knowledge more effective and abundant.

IV.   Conclusion and Future Work

To recapitulate, our paper emphasizes on plethora of knowledge types and we focused on the organizational knowledge and mainly two types in that; tacit and explicit knowledge. In general, significant amount of organizations are working on KMS and using the data mining approaches. It can be said that numerous types of knowledges exists in data mining approaches. Tacit and explicit both are part of the organizational knowledge and both correlate to each other in many ways. Whereas cognitive and technical knowledge correlate to each other too. So it can be derived that both tacit and explicit knowledge under the organizational knowledge works hand in hand. Thus, it makes the system very efficient while mining the numerous amount of data.

Our future work will be based on the types of KM system and its applications as well as we will go deeper into the data mining approaches and make the paper based on the kinds of systems like LMS, DCS and many of the systems that are generally used for mining prospective.

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