

Knowledge management, Tools and activities

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Abstract.

Knowledge Management (KM) is crucial to both commercial and academic activities; it is more than relevant as it brings consequent benefits by fostering business innovation, performance and growth. Different knowledge management tools integrate different technologies to create, transfer, store and reuse knowledge, and connect people to support collaborative work. The problem is that people could be unsure of which KM approach to choose or which is better suitable. As a result, knowledge management tools need to be managed, So this study explore the relationship between KM tools and practices and different types of KM activities. Based on this study, user will be able to select the appropriate KM tools for each KM activity. We also leveraged the benefits of Classification Tree Method (CTM) to master the relationship between KM tools and different types of KM activities. Previous research has classified KM tools according to two characteristics: whether the type of these tools is simple or complex, and according to the KM activities, i.e. is one of these tools used in the creation, storage, transfer or reuse? Other researches consists on dividing the KM tools into six comparison items: KM tools for knowledge capitalization, for knowledge sharing, for knowledge retrieval, for consulting, for queries and for knowledge creation. In our study, we combined the research done previously to have a more general classification using several comparison criteria. We have taken use of the advantages of CTM to see in a clear and understandable way the relationship between KM tools and practices and different types of KM activities. The results can aid individuals in making the best KM tool selections for each activity.

Keywords: Knowledge Management, Data analysis, CTM.

1 Introduction

Knowledge management (KM) represents the learning process that links the demand and supply of information to improve organizational performance [1]. Knowledge management is based on the tension between the process of exploration and exploitation.

Exploration is the development of new organizational practices and solutions. Exploitation is the use of current practices to improve pre-existing knowledge and solutions. Both of these knowledge management strategies need to be applied for sustainable competitive advantage. As well as connecting individuals to promote collaborative work, many knowledge management platforms integrate various technologies to produce, transfer, store, and reuse knowledge. The issue is that people may not know which KM strategy to use or which is more appropriate [2]. The user will be able to choose the right KM tools for each KM activity as a solution to this problem. So the question is how to do it? The user must select the KM activity (creation, storage, transfer or reuse [3]) and the type of data he desires, and we will provide him with the most necessary tool.

The tacit (implicit)/explicit dichotomy is arguably the most commonly mentioned framework used to define knowledge. Explicit knowledge is information that has been recorded and is widely accessible. Contrarily, tacit knowledge is highly private and challenging to communicate effectively with others [4]. The underlying tenet is that KM initiatives aim to produce, organize, and disseminate information that is beneficial to the organization. One more theory is that KM turns the emphasis from process to practice. Improved practice or performance at work is achieved through communication and teamwork [5].

2 Literature review

2.1 KM

Knowledge management allows to manage knowledge in a company from its creation to its use. This knowledge can be created by the company itself or acquired from outside. This process (KM) is based on several activities [2]:

- Creation and detection of knowledge: It reconstructs new knowledge (through research and development (R&D)), it allows determining knowledge already exist in the organization, or it consists in capturing several knowledge from outside. It also includes all activities related to updating knowledge.
- Knowledge storage: It allows knowledge to be saved. This generally involves documenting and recording knowledge. The purpose of this activity is to retain knowledge in case of forgetfulness, departure of personnel, etc.
- Knowledge transfer: It shares stored knowledge (or not).
- The use of knowledge: It allows using knowledge, which allows valuing knowledge and innovation.

2.2 Knowledge management systems : KMS

A knowledge management system (KMS) is a set of computerized procedures and/or systems [2] used to acquire, store, transfer and reuse knowledge generated in an organizational setting. It enables organizations to perform a range of activities at a speed

commensurate with their needs and resources. KMS is a set of programs and tools used to perform the KM activities already mentioned in the previous section.

2.3 KM's methods

The main activities (creating, storing, transferring and reusing knowledge) need to be in place to perform knowledge management. There are several ways to support these four activities, we focus on two different types of tools[2]. Simple tools allow the realization of one-off activities in the knowledge management process, while other complex tools focus on complete knowledge management methods and allow the realization of KM-related activities.

Simple tools: Simple tools generally do not require training to use and are used to perform generally ad-hoc tasks, unlike complex tools, which require expertise and user support.

Knowledge management tools identified:

- Creation: Data visualization, Data mining, Social data mining, Text mining, Interviews, knowledge modelling.
- Storage: Configuration management systems, Content management systems, Product data management system, Product lifecycle management system, Data warehouse, ERP system, E-learning, REX.
- Transfer: Podcasting/videocasting, Social media, Audio/video conference, Blog, Chat, Conversational technologies, E-mails, Search engines, F.A.Q, Forums.
- Reuse: Social media, Forums, ERP system, Focus group, Podcasting/video casting.

Complex tools:

These so-called "complex" tools are generally not suitable for use in small and medium-sized companies. We have identified seven complex tools because they are adapted to current information technologies due to their age.

The tools identified are CommonKADS, MGKME, MOKA, MASK, CBR, MIKE 2.0, KALAM, and MIMIK.

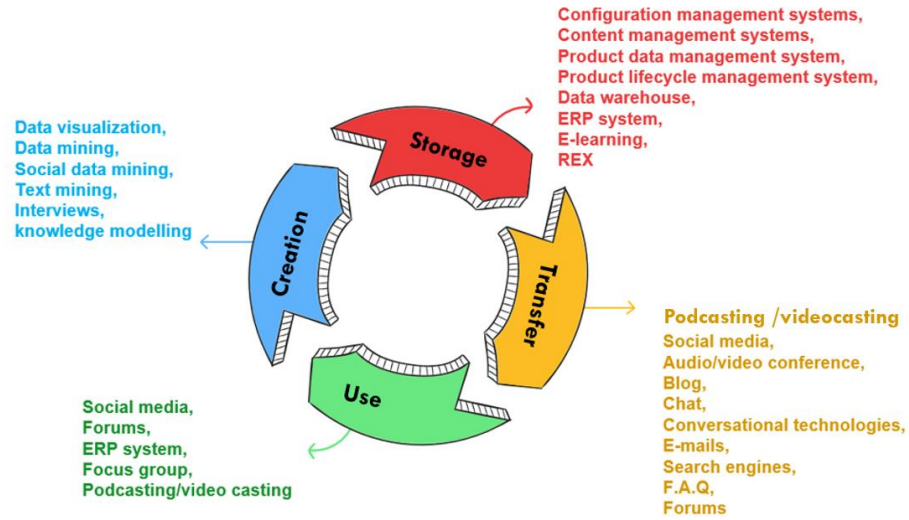


Fig. 1. KM's tools

2.4 CTM: Classification Tree Method

A systematic way for creating test cases from functional specifications is offered by the black-box testing technology known as CTM. The set of one or more classes that make up a classification tree [6] is finite:

- i) The root classification A has been given specific designation.
 - ii) Subclasses A1, A2, ..., An refer to the rest of the classifications that fall under A.
- (Fig. 2)[6].

The functional specification of a single test item is the most crucial source of knowledge for testers when utilizing the classification tree approach [7]. The classification tree method's ability to turn test case design into a process with a number of structured and systematized steps that are simple to manage, comprehend, and document is one of its key benefits. We have taken use of this advantage to clearly and understandably see the connection between KM tools and various KM activities. We used the classification tree method to classify the knowledge management tools.

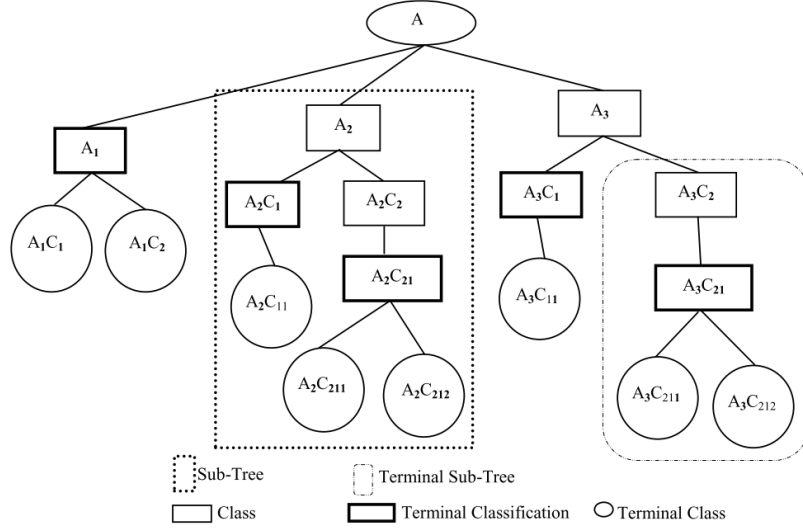


Fig. 2. Example of a classification tree

3 Related works

In order to create, transfer, apply, and store information, businesses use a collection of strategies, projects, and activities known as knowledge management (KM) practices [16]. Edouard Tapissier [2] classified KM tools according to two characteristics: the type of these tools, either simple or complex, and according to KM activities, i.e. is one of these tools used in creation, storage, transfer or reuse? Another comparison and classification proposed by Yang XU [8] is to divide KM tools into six elements of comparison: KM tools for knowledge capitalization, for knowledge sharing, for knowledge retrieval, for consulting, for querying and for knowledge creation. In our study we combined the previous research to have a more general classification using several comparison criteria using the results of two research studies and the advantages of the classification named CTM and the tool Testona [20].

4 The link between knowledge management systems and machine learning

It has been stated that how current knowledge is transferred throughout the company and how new knowledge is generated both affect how effective knowledge management is. Studies recently have shown a lot of interest in information sharing procedures

[9]. According to some research, lack of knowledge transfer and sharing throughout the business frequently results in organizations wasting resources and losing a large amount of money by repeatedly making the same mistakes, starting the same projects, and disregarding the expertise of others [10]. It is not only one-way to impart knowledge; more than just shifting information from one place to another is necessary for effective knowledge transfer. Knowledge transfer across departments and people can give organizations a worthwhile learning experience. The ability of both parties to transfer and share knowledge tends to improve. This is thus because once knowledge has been conveyed, it stays with its original owner. Every time a transfer occurs, knowledge's value rises as a result, and the organization's ability to create value is largely dependent on how well knowledge has been disseminated.

Information and communication technologies (ICTs) play a crucial role in the transfer of knowledge, as many researchers have emphasized. The efficient application of technology opens up new channels for the exchange of knowledge and presents viable options for both explicit and implicit knowledge transmission. In knowledge storage, tacit and explicit knowledge are distinguished from one another. Using technical tools and systems, explicit knowledge can be quickly gathered, recorded, stored, and accessed completely independently of any individual. Contrarily, tacit knowledge, which is stored in employees' minds and makes up a sizable portion of an organization's knowledge resources, is present only within the organization [11]. When comparing the organization's knowledge resources to an iceberg, explicit knowledge is the visible portion while tacit knowledge is the invisible portion [12].

When information is organized, categorized, stored, and used in some practical way, it becomes meaningful. The appropriate person, at the right moment, in the right manner can only use it after that. Knowledge codification and storage are crucial for reuse as well as for efficient knowledge usage [13]. Consequently, numerous research have concentrated on classifying and codifying knowledge according to its categories and uses [14], and preserving knowledge to enable employees to access it at any time, both in the present and the future. Additionally, knowledge codification enables the storage of knowledge assets and the evaluation of the organization's potential. Knowledge extraction without losing its unique qualities[15] that make it useful is the most challenging aspect of knowledge coding.

5 Implementation

Results.

TESTONA is a tool for systematic test design in the black-box-tests. The program uses the Classification Tree Method (CTM) for the systematic development of test cases. This classification offers a graphical notation for specifying test parameters. The fundamental principle behind the classification tree approach is to classify the characteristics of the input data for the system being tested into distinct groups that directly correspond to the pertinent test cases (classifications).

In this case, the entries (inputs) are Data or Products/Services. The data are separated into four categories: Non-specific, that is, regardless of the type of data, Text for data that is totally text, Audio/Video and Questions/Answers. We have one or more tools for each of these categories. On the right-hand side KM activities (Creation, Storage, Transfer and Reuse) were mentioned.

In addition, the test cases contains KM tools for Knowledge Capitalization, for Knowledge sharing, for Knowledge Retrieval, for Consultant, for Query and for Knowledge creation. (Fig. 3)

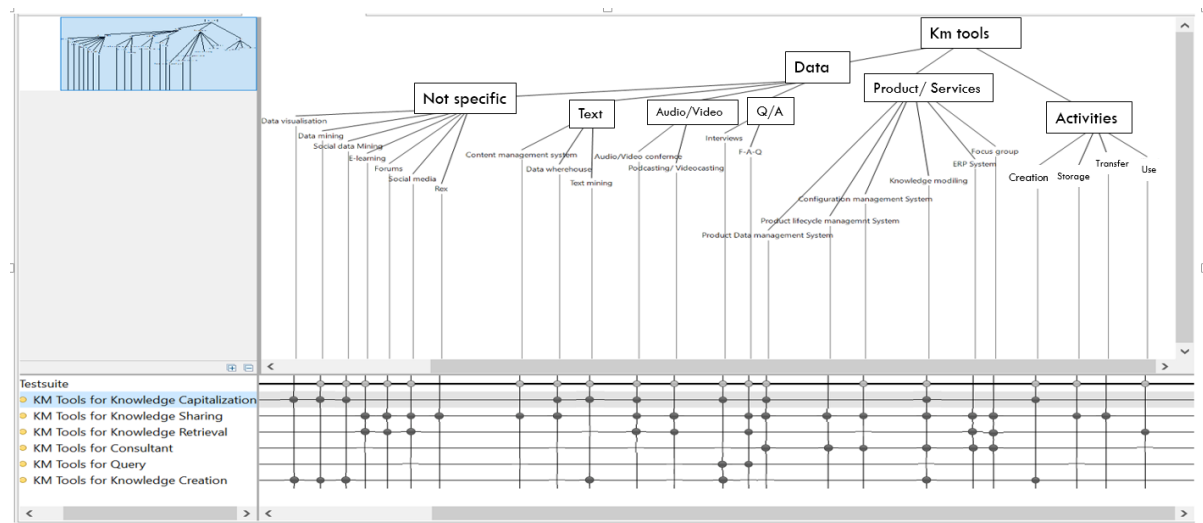


Fig. 3. Classification of KM's methods using Testona

Discussion.

Knowledge management is defined as “the process of acquiring, storing, sharing and using knowledge” [17]. With the existence of knowledge management, organizations will be able to execute these processes [18]. Various comparisons are made using the parameters: KM tools for knowledge capitalization, for knowledge sharing, for knowledge retrieval, for consulting, for queries and for knowledge creation, as well as their linking points with KM activities such as: Creation, Storage, Transfer, and Reuse and the different KM tools. After analyzing the results obtained, we found that the activities Storage and Transfer are linked to knowledge sharing tools, the activity Creation is linked to knowledge creation and capitalization tools, and the activity Reuse has a strong link with knowledge recovery tools. The Products/Services category is frequently associated with knowledge sharing and retrieval tools, and as a consultant, the tools in this category are designed to provide recommendations to clients and market needs, and they can be used as decision support systems. As organizations constantly face changes in the business environment, their ability to obtain appropriate information

and reduce decision uncertainty is an important foundation for their competitive advantage[19].

6 Conclusion and perspectives

The main goal of this study is to comprehend how knowledge management tools have changed over time in connection to the various stages of the knowledge life cycle. The findings can guide people in choosing the best KM tools for each activity. For example, for Product and Service related knowledge, KM tools from the "knowledge retrieval" and "knowledge sharing" classes should be selected. According to this viewpoint, while choosing KM tools, the application environment rather than the technical content of each tool should be compared.

The rest of the work will focus on KM practices in connection with Machine Learning.

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