Knowledge Management Systems Procedural Development

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INTRODUCTION

The success of the organisations is increasingly dependant on the knowledge they have, to the detriment of other traditionally decisive factors as the work or the capital (Tissen, 2000). This situation has led the organisations to pay special attention to this new intangible item, so numerous efforts are being done in order to conserve and institutionalise it.

The Knowledge Management (KM) is a recent discipline replying this increasing interest; however, and despite its importance, this discipline is currently in an immature stage, as none of the multiple existing proposals for the development of Knowledge Management Systems (KMS) achieve enough detail for perform such complex task.

In order to palliate the previous situation, this work presents a methodological framework for the explicit management of the knowledge. The study has a formal basis for achieving an increased level of detail, as all the conceptually elements needed for understanding and representing the knowledge of any domain are identified. The requested descriptive character is achieved when basing the process on these elements and, in this way, the development of the systems could be guided more effectively.

BACKGROUND

During the last years numerous methodological frameworks for the development of KMS have arisen, the most important of which are the ones of Junnarkar (1997), Wiig et al (1997), Daniel et al (1997), Holsapple and Joshi (1997), Liebowitz and Beckman (Liebowitz, 1998; Beckman, 1997), Stabb and Schnurr (1999), Tiwana (2000) and Maté et al (2002). Nevertheless, the existing proposals do not satisfy adequately the needs of the organisation knowledge (Rubenstein-Montano, 2001; Andrade, 2003) due to their immaturity, mainly based on the following aspects:

1. The research efforts have been mainly focused on the definition of a process for KMS development, ignoring instead the study of the object to be managed: the knowledge.
2. The definition of such process has eluded in most of the cases the human factor and it has been restricted only to the technological viewpoint of the KM.

The first aspect regards the necessary study of the knowledge as basis for the definition of the Corporate Memory structure; this study should identify (i) the type of knowledge that has to be included in that repository and (ii) their descriptive properties for the Corporate Memory to include all the features of the knowledge items that it stores. The definition of that structure would enable also the definition of a descriptive process for creating KMS by using the different characteristics and types of knowledge.

However, and despite the influence that the object to be managed has on the management process, only the Wiig (1997) proposal pays attention to its study. Such

proposal identifies a small set of descriptors that support the formalisation (making explicit) of the knowledge although, (i) its identification does not result from an exhaustive study and (ii) it does not enable a complete formalisation as it is solely restricted to some generic properties.

The second step suggests that the whole process for KMS development should consider the technological as well as the human vision. The first one is focused on how obtaining, storing and sharing the relevant knowledge that exists within an organisation, by creating the Corporate Memory and the computer support system. The second vision involves, not only the creation of a collaborative atmosphere within the organisation in order to achieve the involvement of the workers in the KM program, but also the tendency to share their knowledge and use the one already provided by other members.

Despite the previous fact, the vast majority of the analysed approaches are solely focused on the technological KM viewpoint, which jeopardises the success of a KMS (Andrade, 2003). In fact, among the previously mentioned proposals, only the Tiwana (2000) proposal explicitly considers the human viewpoint by including a specific phase for it.

As a result of both aspects, the current proposals are restricted to a set of generic guides for performing KM, which is quite different from the formal and detailed vision that is being demanded. In other words, the current approaches indicate *what to do* but *not how to do it* (prescriptive viewpoint against descriptive/procedural viewpoint). In this scenario the developers of this type of systems have to elaborate their own *ad hoc* approach, achieving results that only depend on the experience and the capabilities of the development team.

DEVELOPMENT FOR KNOWLEDGE MANAGEMENT SYSTEMS

This section presents a methodological framework for the explicit KM that solves the previously mentioned problems. A study of the object to be managed has been performed for obtaining a knowledge formalisation schema, i.e., for knowing the relevant knowledge items and the characteristics/properties that should be made explicit. Using the results achieved after this study a methodological framework for KMS creation has been defined. Both aspects are following discussed.

Proposed Formalisation Schema

The natural language is the language par excellence for sharing knowledge. Due to this, a good identification of all the necessary elements for conceptualising (understanding) the knowledge of any domain (and therefore those for whom the respective formalisation mechanisms must be provided) can be done from the analysis of the different grammatical categories of the natural language: nouns, adjectives, verbs, adverbs, locutions and other linguistic expressions. This study, whose detailed description and applications have been described in several works (Andrade, 2006; Andrade, 2008), reveals that all the identified conceptual elements can be put into the following knowledge levels according to their function within the domain:

- Static. It regards the structural or operative knowledge domain, meaning domain facts that are true and that can be used in some operations as concepts, properties, relationships and constraints.
- Dynamic. It is related to the performance of the domain, that is, functionality, action, process or control: inferences, calculations and step sequence. This level can be divided into two sublevels:

- Strategic. It includes what to do, when and in what order (i.e., step factorisation).
- Tactical. It specifies how and when obtaining new operative knowledge (i.e., the description of a given step).

Every one of these levels approaches a different fragment of the organisation knowledge, although they all are obviously interrelated; in fact, the strategic level controls the tactical one, as for every last level/elemental step (strategic knowledge) the interferences and calculi must be indicated (tactical knowledge). Also the level of the operative knowledge is controlled by the other two, as it specifies how, not only the bifurcation points or execution alternatives are decided (strategic knowledge), but also how interferences and calculi are done (tactical knowledge).

Therefore, a KMS must provide support to all these levels. As it can be observed at Table 1, the main formalisation schema has been divided, on one hand, into several individual schemas corresponding to each one of the identified knowledge levels and, on the other, into

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