

Supporting Administrative Knowledge Processes

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¹Abstract.

We present the general knowledge management model typical for central as well as local government agencies pre-requisite for successful implementation of knowledge management initiatives. We show that knowledge management systems comprising intelligent workflow management features are necessary to provide sufficient level of support for administrative knowledge processes. We conclude with a brief presentation of the ICONS project aiming at providing a KMS platform for e-government.

Introduction

The common fallacy of the IT side of the KM scene is focusing on the purely technological view of the field with the tendency to highlight features that are already available in advanced content management systems. Such systems are commonly referred to as corporate portal platforms or, more to the point, as the knowledge portal platforms. From the KM perspective, as discussed in [McElroy1999], such claims may be justified only with respect to a narrow view of the field **focusing on distribution of existing knowledge throughout the organization**. The above views, called by some authors the “First Generation Knowledge Management (FGKM)” or “Supply-side KM”, provide a natural link into the realm of currently used content management techniques, such as groupware, information indexing and retrieval systems, knowledge repositories, data warehousing, document management, and imaging systems. We shall briefly refer to existing content management technologies in the ensuing sections of the report to show that, within the above narrow view, the existing commercial technologies meet most of the user requirements.

With the growing maturity of the KM field the emerging opinions are that **IT support for accelerating the production of new knowledge** is a much more attractive proposition from the point of view of gaining the competitive advantage. Such focus, exemplified in stated feature requirements for so called “Second Generation Knowledge Management (SGKM)”, is on enhancing the conditions in which innovation and creativity naturally occur. This does not mean that such FGKM

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required features as systems support for knowledge preservation and sharing are to be ignored. A host of new KM concepts, such as knowledge life cycle, knowledge processes, organizational learning and complex adaptive systems (CAS), provide the underlying conceptual base for the SGKM, thus challenging the architects of the new generation Knowledge Management Systems (KMS).

Government agencies constitute a rather specific environment from the point of view of the knowledge management requirements. We attempt to identify the knowledge creation and dissemination processes in e-government, calling them administrative knowledge processes, and then, we discuss the KMS features required to provide IT support for administrative knowledge management initiatives.

Knowledge management in public administration

The schematic view of the knowledge management cycle typical for a public administration agency is shown in figure 1. The view closely follows the Popper's three world model [Popper1971], with the bottom level corresponding to the realm of physical and abstract objects existing in the environment, the middle layer corresponding to perceptions, skills and attitudes of employees (tacit knowledge), and the upper layer representing the knowledge resources (explicit knowledge) maintained and disseminated in an organization.

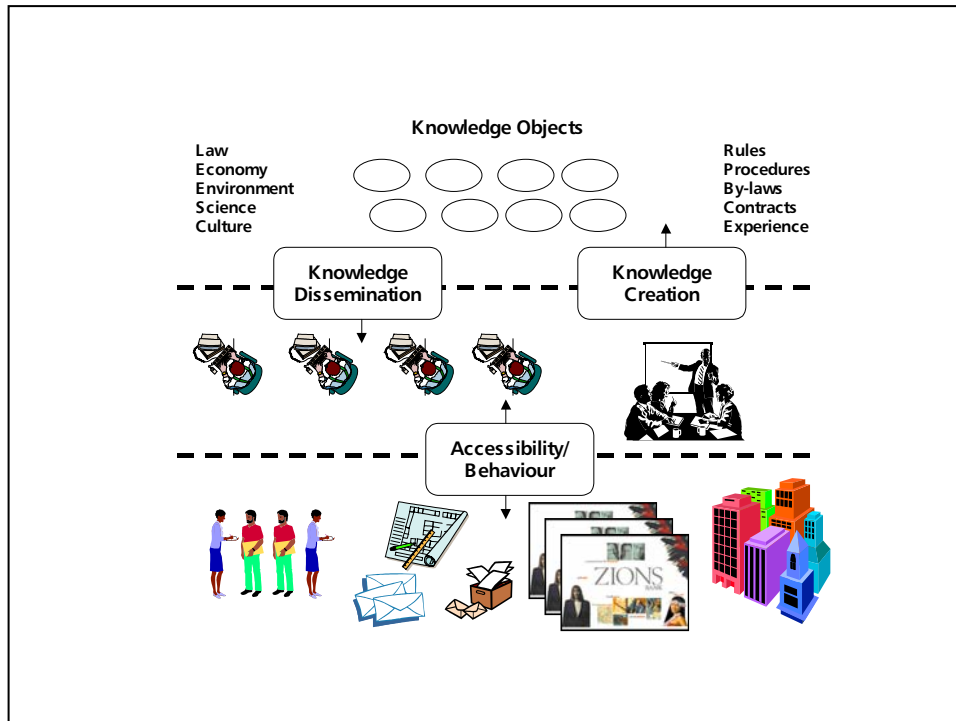


Fig. 1. The Knowledge management cycle in public administration.

The accessibility and behavior are the principal characteristics of a public administration agency experienced by the environment (society, other organization), whereas the tacit knowledge [Nonaka1995] determines the actions of agency's employees. The knowledge management cycle is based on the one hand on externalization of tacit knowledge to create explicit knowledge artifacts to be accessible to others in the internalization process. Thus, although indirectly, the knowledge management cycle determines the quality of work in a public administration agency.

The Knowledge management system reference architecture

A Knowledge Management System (KMS) is an IT platform supporting knowledge management processes taking place in an organization. A KMS reference architecture developed as the starting point of the IST ICONS project [ICONS2002] is presented in figure 2.

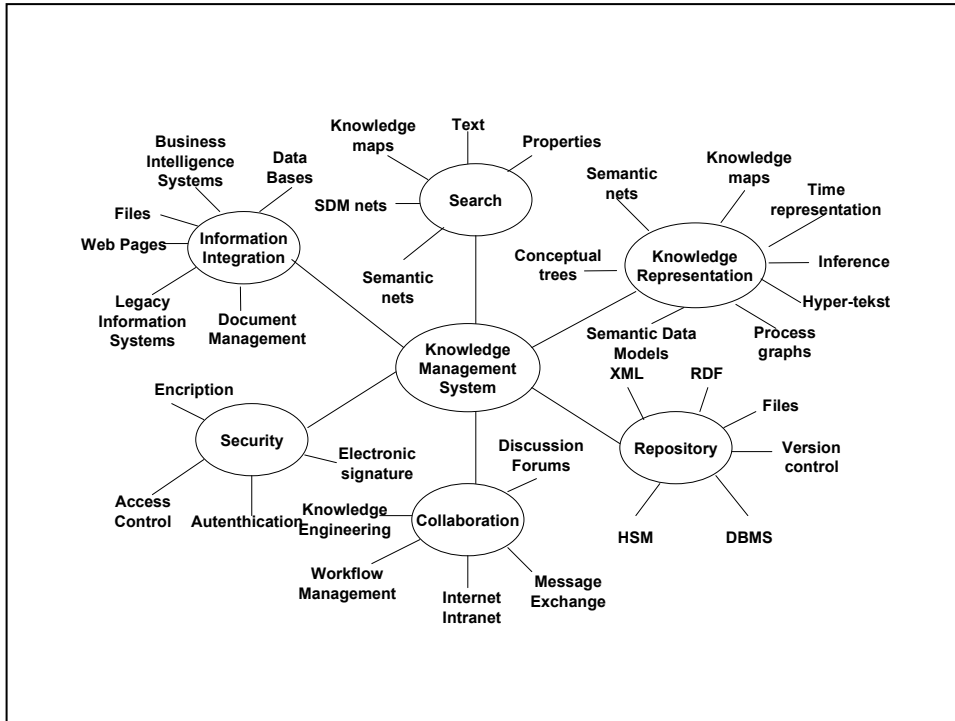


Fig. 2. The KMS reference architecture

The user functions clustered in the principal KMS features may play varying support roles within the knowledge management processes. Collectively, the sum of user requirements for a given principal feature, defined within the distinct knowledge management processes, represents the user requirement set for a given principal KMS feature. The reference architecture has been developed on the basis of a feature analysis of knowledge management systems presented in [KMForum2001, KMForum2001_D11, KMForum2001_D11a, KMForum2001_D12].

The KMS features, grouped into six principal feature sets, represent our current views pertaining to the KM technology requirements. Some of the features are already common in the advanced content management systems, referred to as the corporate portal platforms, some other are subject to the on-going KMS research efforts.

The Domain Ontology features pertain primarily to knowledge representation including the declarative knowledge representation features, such as taxonomies, conceptual trees, semantic nets, and semantic data models, as well as the procedural knowledge representation features exemplified by the process graphs. Time modeling and knowledge-based reasoning features pertain both to the declarative and the procedural knowledge representations. Hyper-text links are considered as a mechanism to create ad hoc relationships between content artifacts comprised in the repository.

Taxonomies provide means to categorize information objects stored in the content repository. Categorization classes may be arbitrary hierarchical structures grouping information objects selected by the class predicates. Class predicates are defined in

the form of queries comprising information object property values or as full text queries comprising key word and/or phrases. Categorization classes are not necessarily disjoint.

Semantic networks provide means to represent binary 1:1 relationships, expressed usually as named arcs of a directed graph, where vertices are information objects belonging to any of the information object classes. Normally, the linked object classes are determined by the binary relationship semantics of the corresponding named arc. An example of a simple semantic net may be a binary relation Descendants defined as a subset of the Cartesian product of the set of Persons.

Business processes are usually represented by process graphs, typically by the Event-Condition Petri Nets or by directed graphs. Petri Net representation allows for expressing richer process semantics, in particular the pre-and post-conditions for process activities. The process specification must also be supplemented by the set of role definitions, one definition for each process activity, to enable the workflow management engine to properly assign tasks to KMS actors. The process graph representation should comprise a set of process metrics and, possibly, performance constraints and exception conditions.

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