

MANAGING KNOWLEDGE AS A STRATEGIC RESOURCE FOR ELECTRONIC GOVERNMENT

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Abstract. *This paper proposes the application of a new approach to knowledge management (KM) for facilitating and supporting e-government. This new approach fuses the two most commonly found approaches in KM efforts in private organisations: the “product” and the “process” approach. In order to provide a solid theoretical background for the proposed approach, the paper builds on the resource-based view of the firm, proposes the treatment of knowledge as strategic resource of public organisations and defines knowledge objects and their relationship with knowledge assets. Based on this theoretical setting it goes on to present the results of the Know-Net project, a multi-year research effort, which developed a framework for KM awareness, a method for leveraging knowledge assets in organisations and an intranet-based tool that provides functionalities such as collaboration, publishing and search, administrative case management and tracking and competence development.*

1. Introduction

Governments worldwide face significant challenges ranging from the improvement of the value they provide to citizens and businesses, the reduction of their operational cost, the retention and training of staff, the responsiveness to change, the privacy and protection of data, etc. E-government provides a vision and a strategy for addressing these challenges and for creating an environment for the transformation of government activities by the application of e-business methods throughout the public sector [1]. E-government provides a framework

for public services which are: citizen-focused; of high quality; accessible; convenient and secure. Making e-government a reality requires serious issues to be addressed, such as business process change, attacking skills shortages and confronting the problems of the existing IT infrastructure in public organisations; see e.g. [4]. Leveraging the tacit and explicit knowledge of a public organisation can facilitate tremendously this effort towards e-government, since knowledge management has the potential to substantially improve the electronic provision of services; see also [11].

This paper proposes the application of a new approach to knowledge management (KM) for facilitating and supporting e-government. This new approach fuses the two most commonly found approaches in KM efforts in private organisations: the “*product*” and the “*process*” approach. In order to provide a solid theoretical background for the proposed approach, the paper builds on the resource-based view of the firm, proposes the treatment of knowledge as strategic resource of public organisations and defines knowledge objects and their relationship with knowledge assets. Based on this theoretical setting it goes on to present the results of the Know-Net project, a multi-year research effort, which developed a framework for KM awareness, a method for leveraging knowledge assets in organisations and an intranet-based tool that provides functionalities such as collaboration, publishing and search, administrative case management and tracking and competence development.

2. The Product and Process Approaches to KM

The first phase in the emergence of knowledge management (KM) in the private sector is now drawing to an end [8]. This phase has been characterized by considerable hype and confusion. In this first phase early adopters followed different approaches to knowledge management with varying emphasis on technology, cultural, organizational and managerial issues. Nevertheless, if one has a look into the research landscape as well as into the business world, it is easy to notice that two main strategies for knowledge management have been employed by early adopters of the principle [3]. Let’s call them the “*product*” and the “*process*” approaches.

The “*product*” approach implies that knowledge is a thing that can be located and manipulated as an independent object. Proponents of this approach claim that it is possible to capture, distribute, measure and manage knowledge. This approach mainly focuses on products and artefacts containing and representing knowledge; usually, this means managing documents, their creation, storage, and reuse in computer-based corporate memories. Examples include: best-practice databases and lessons-learned archives, case-bases which preserve older

business-case experiences, knowledge taxonomies and formal knowledge structures, etc. This approach is also referred to as ‘content-centred’ or ‘codification’ approach.

The “*process*” approach puts emphasis on ways to promote, motivate, encourage, nurture or guide the process of knowing, and abolishes the idea of trying to capture and distribute knowledge. This view mainly understands KM as a social communication process, which can be improved by collaboration and cooperation support tools. In this approach, knowledge is closely tied to the person who developed it and is shared mainly through person-to-person contacts. IT tools in this case comprise e.g., e-mail, video-conferencing, workflow management systems, systems for the distributed authoring of hypertext documents, group-decision support systems, etc. This approach has also been referred to as the ‘collaboration’ or ‘personalisation’ approach.

These two approaches are also evident in the Information Technology tools that are used in order to support knowledge management; see also Figure 1.

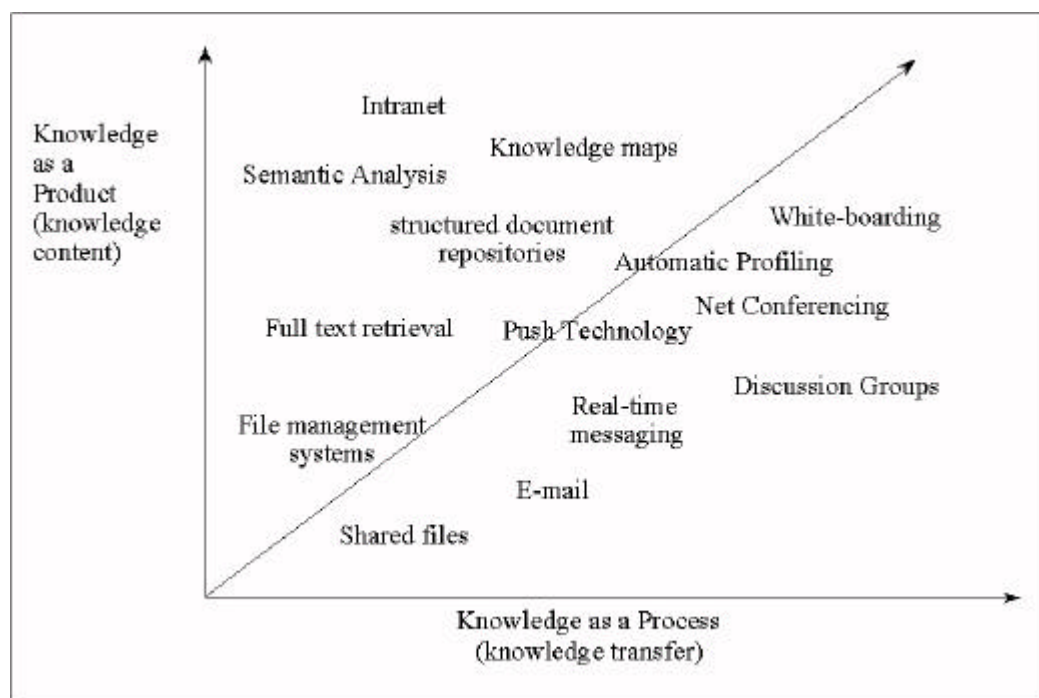


Figure 1. The process and product approaches in KM software (adapted from [8])

3. The Knowledge-Asset Centric View

Although much of the intangible knowledge points to the adoption of the “*knowledge as a process*” approach, some crucial knowledge leveraging elements (like best practices) still need a “*knowledge as a product*” view. So there is a real need for a balanced fusion of the two KM views. In this paper we

present the Know-Net approach, an innovative framework and method for KM that explicitly provides for such a fusion.

In developing the conceptual, methodological and technical architecture that fuses the two approaches we are building on the resource-based view of the firm [10] as it has been expanded to treat knowledge as a strategic asset [2]. We claim that both the process and the product-based approaches aim to support the identification, managing and leveraging of knowledge, through better managing of the organisation's knowledge assets. Knowledge assets are the resources that organisations wish to cultivate. Knowledge assets can be human, such as a person or a network of people, structural, such as business process, or market, such as a brand name of a product. Naturally the product approach is more concerned with accessing and organising knowledge assets while the process approach makes direct connections between the organisational knowledge assets - both explicit and tacit. Both approaches however are using some form of knowledge representation as a means of packaging and transferring knowledge either from a person to a system and vice versa or between people.

We define as '*knowledge objects*' the means of representing knowledge assets; then the following statement outlines the relation between knowledge assets and knowledge objects: *A knowledge asset creates, modifies, stores and / or disseminates knowledge objects.* For example: a person is a knowledge asset that can create new ideas, learnings, proposals, (k. objects); a community of interest is a knowledge asset that can create new ideas, best practices (k. objects); a process is a knowledge asset that can create and/or store and disseminate best practices, company standards, R&D material (k. objects).

A Knowledge Object has the following characteristics:

- It acts as a catalyst, enabling the fusion of knowledge flows between people, with knowledge content discovery and retrieval.
- It facilitates the knowledge transfer from person to person, or from information to person.
- It is created and maintained by a KM process.
- It is used to search, organise and disseminate knowledge content.

Therefore, we conclude that the Knowledge Object is the common unifier and lowest common denominator of a holistic KM solution incorporating and integrating process and content, and we have used it as the 'resultant manifestation' in the design of the Know-Net solution that fuses the process centric approach with the product centric approach; see also Figure 2.

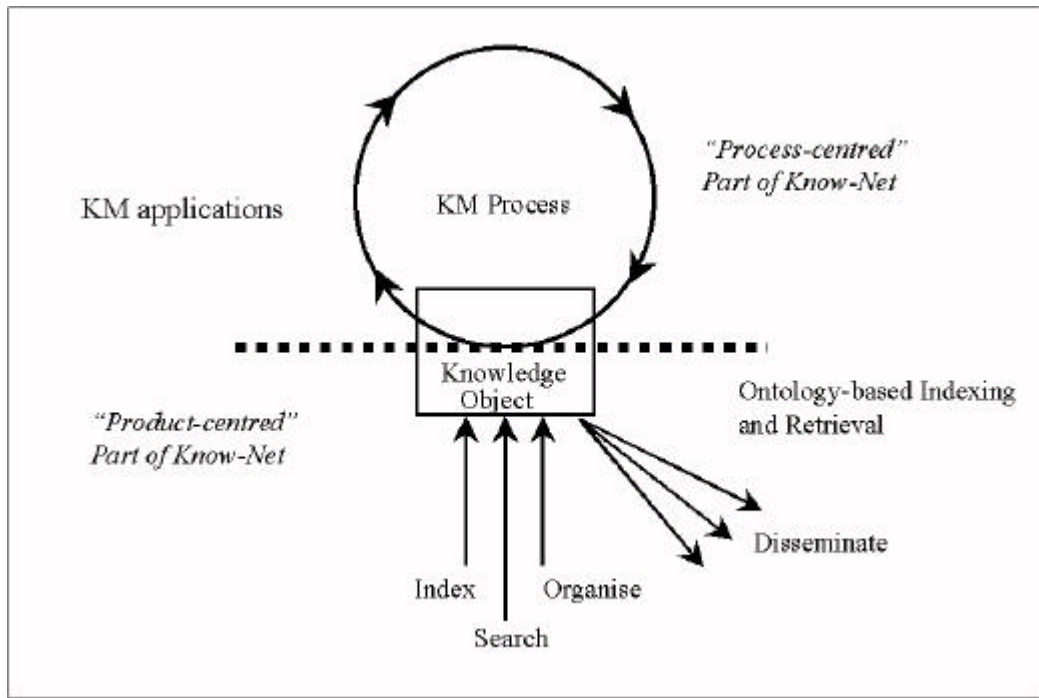


Figure 2. Fusion of the 'process' and 'product' centric approaches

The consideration of the knowledge object being the common unifier for integrating the process and product approaches, not only underpins all three of the constituents of the Know-Net approach (framework, method, tool), but also links them together into one holistic solution; see also Figure 3.

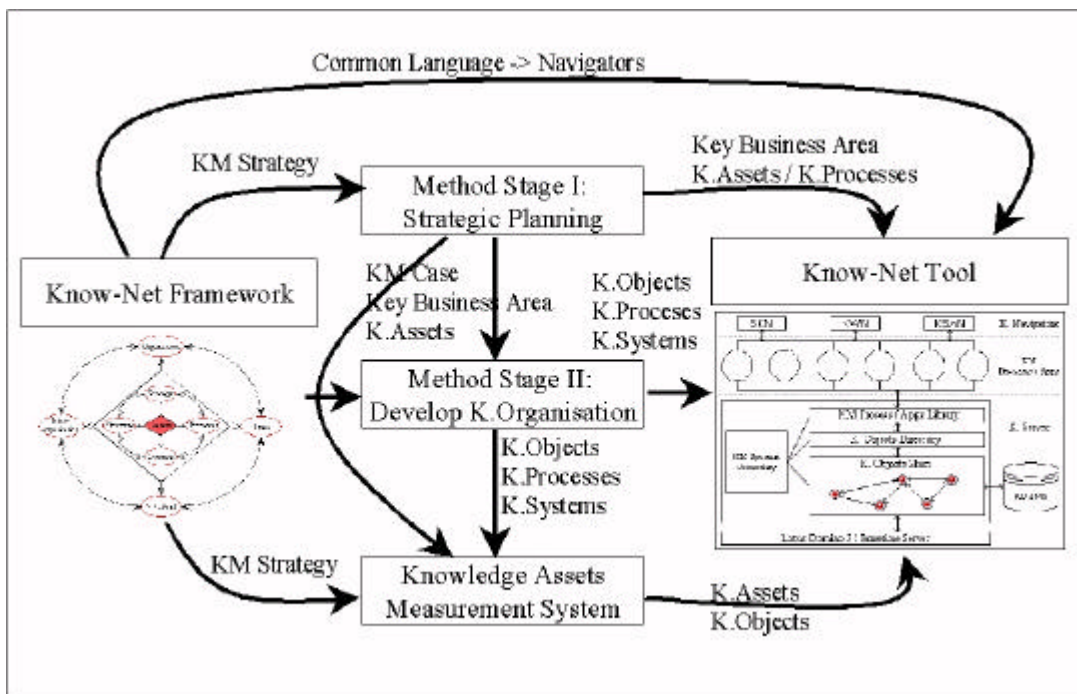


Figure 3. Interdependencies of the Know-Net framework, method and tool

4. The Knowledge-Asset Centric Framework

In the centre of our framework are the knowledge assets. As defined previously knowledge assets create / use / disseminate knowledge objects that are the representations of knowledge (both explicit and tacit). The Know-Net framework (see Figure 4) also represents:

- the knowledge strategy, processes, structure and systems a company develops in order to facilitate knowledge creation and leveraging among and between; and
- the knowledge interaction networks at the individual, team, organisational and inter-organisational levels.

In fact even these elements that are drawn in the periphery of the knowledge assets (structure, systems, processes, strategy) can be considered as knowledge assets themselves.

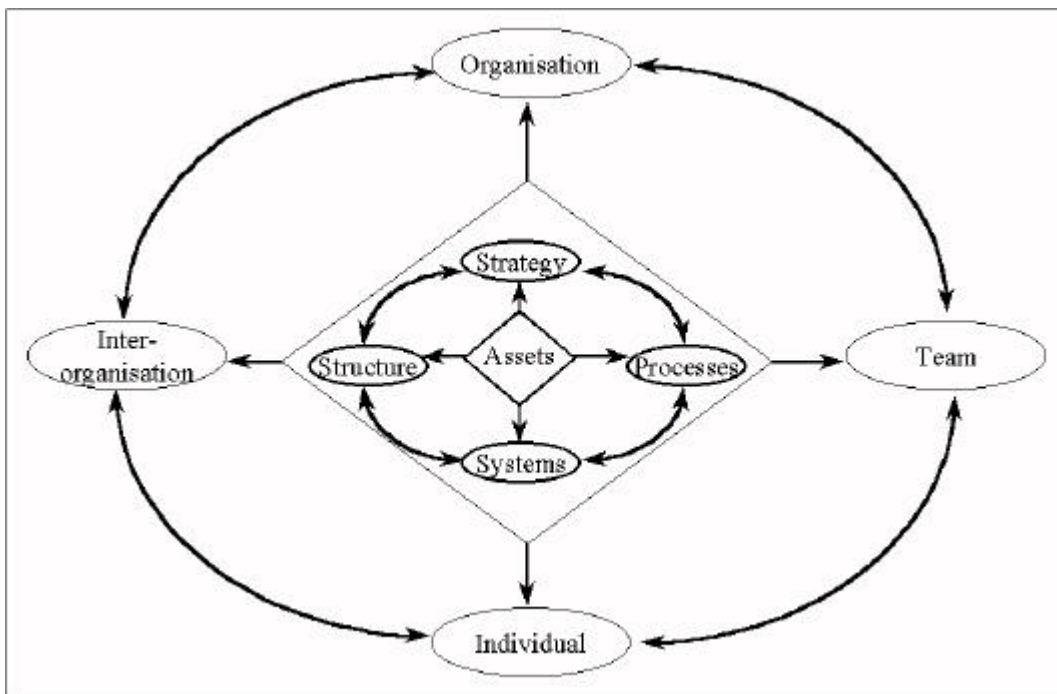


Figure 4. The Know-Net Framework

A process for example can be a knowledge asset if for instance it creates best practices, company standards, R&D material, etc. Having them as discrete entities linked to the knowledge assets aim primarily to indicate that they are or should be the constituents of the Knowledge Management Infrastructure (KMI) which should be established within a company, in order to facilitate knowledge leveraging initiatives.

The different levels of knowledge networking, represented in the outer section of the framework correspond to what Nonaka and Takeuchi call the “ontological dimension” in their model of organizations as knowledge creating mechanisms; see [7]. This ontological dimension refers to the social interactions,

which begin at the individual level and then by communication between organizational boundaries let knowledge expand and grow-up.

Within Know-Net we distinguish between four levels of knowledge networking: Individual, Team, Organization, and Inter-Organization:

- The individual level refers to the capabilities, experience, competencies and personal development issues treated at the individual level of the knowledge worker.
- The team and organizational levels include the internal company networks, i.e. the informal, self-organizing, or the formal networks of communities of knowers with common interests, the communities of practice involved in similar activities, the engagement teams, etc. that are built within an organization.
- The level of inter-organizational networks refers to inter-enterprise relationships, value networks where each focuses on core competencies, as well as on the accessibility to external, developed capabilities. Hence networks with customers, competitors, subcontractors, partners etc. are included in this level.

5. The Know-Net Method

The Know-Net method proposes a phased approach (see also Figure 5) to enable structured thinking and planning for a knowledge management project:

- Awareness about the benefits of knowledge management and its relationships to strategic as well as operational and day-to-day issues in the corporate environment.
- Stage I: Plan refers to the Knowledge Management Strategic Planning phase.
- Stage II: Develop is the phase in which an organisation transforms itself to a knowledge intensive company based on the company-specific KM value proposition derived in Stage I.
- Stage III: Operate is the phase in which an organisation rolls-out a company-wide implementation plan with a holistic approach to KM.
- Measurement of the level of leveraging of knowledge assets with a KM effort.
- Training of both the knowledge workers to the new processes and technologies as well as of the staff to take up new knowledge-related roles (e.g. CKOs, knowledge analysts).

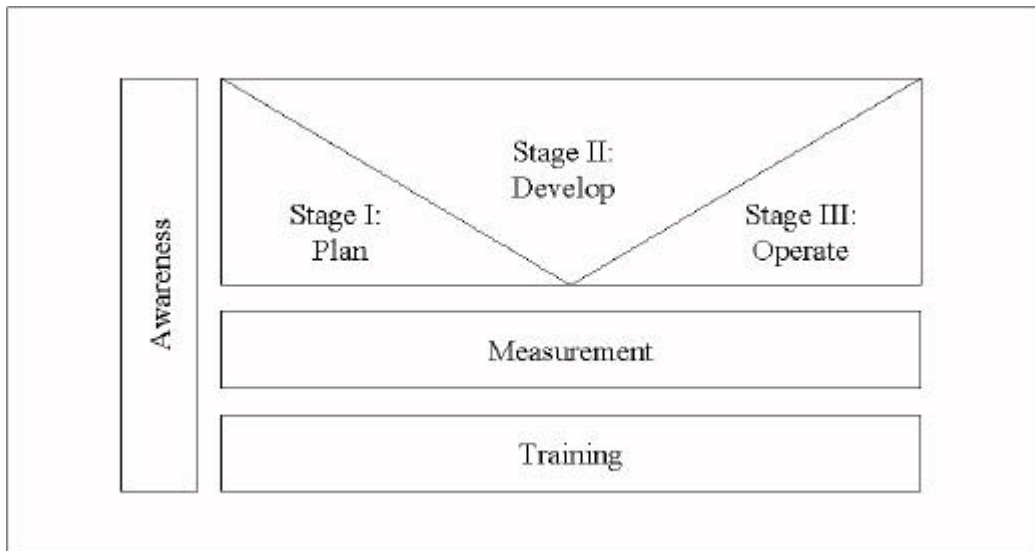


Figure 5. Building blocks of the Know-Net method

The method is designed to be modular so that an organisation can choose to start at different levels depending on its readiness, needs and requirements.

In Stage I of "Strategic Planning for Knowledge Management" an organisation determines:

- The vision and readiness for a knowledge management initiative; and
- The scope and feasibility of the project.

In Stage II of "Developing the Knowledge Organisation" the structure and the design of a holistic solution (that covers processes, people and technology) are iteratively developed, tested and reviewed.

Stage III is the company-wide implementation of the KM initiative, while the Measurement part of the method aims to provide consistent support for measuring the creation, sharing and use of knowledge assets within the company.

5.1. HOW THE METHOD INTEGRATES THE TWO APPROACHES

Strategic planning is an important stage of a knowledge management project because it helps the organisation quickly focus on knowledge that counts and delivers value to the firm. Based on the corporate strategy and objectives a clear knowledge management strategy needs to be defined to help the firm set forth the criteria for choosing what knowledge a firm plans to pursue and how it will go about capturing and sharing it. A key deliverable of Stage I refers to the identification of key knowledge assets that the organisation wishes to improve. At this stage some basic ideas are captured into the Know-Net tool about how the Knowledge Assets are to be defined and measured.

Stage II of the Know-Net method identifies and defines at a deeper level the Knowledge Assets and Objects that need to be better managed in the organisation. At this stage two results are accomplished:

- A comprehensive Knowledge Assets Schema is specified. The schema includes both the hierarchical organisation of Knowledge Assets and Objects that will be the basic data model to be used by the KM Application/Processes, and the definition of alternative classification schemata to be entered via the Ontology Editor in the Knowledge Server. The knowledge asset schema therefore supports the product view.
- Based on the Knowledge Asset Schema, and within three discrete pairs of modules, the method assists in the audit, design, implementation and incitement of business processes, knowledge networks and supporting systems to leverage the process view of knowledge management.

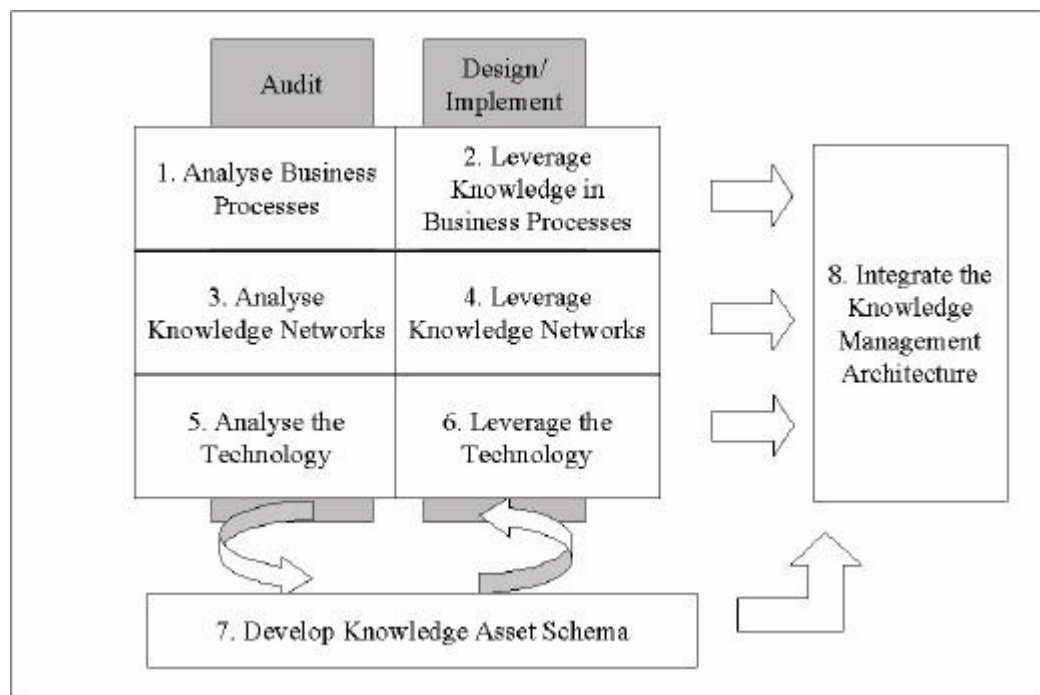


Figure 6. Modules of Stage II: Developing the Knowledge Organisation

These results are accomplished through the execution of eight available modules presented schematically in Figure 6. Each module is a self-containing, value-adding entity and therefore not all modules are mandatory in an assignment. Ideally however, just as the Knowledge Object is the common unifier of our holistic approach, Module 7 (Develop the Knowledge Asset Schema) acts as the frame of the Know-Net method that is being constructed with input from the

'audit' Modules 1, 3, and 5, while it supports the consistent execution of the 'design/implement' modules, 2, 4, and 6.

All 'audit' modules among other issues aim to identify in detail the Knowledge Assets, and corresponding Knowledge Objects and their attributes. Module 1 (Analyse Business Processes) for instance produces processes maps that depict key information, tacit and explicit knowledge that is being used or created in selected business processes.

Module 7 (Develop the Knowledge Asset Schema) collects this information, along with similar information from Modules 3 and 5, arranges possible overlappings, logically groups content, and creates the formal schema (Knowledge Asset Schema) on which the 'design/implement' modules are based.

For instance Module 4 (Leverage Knowledge Networks) designs and organises communities of practice and interest around the core Knowledge Assets of the organisation and proposes the already specified Knowledge Objects as information units for knowledge creation and sharing within these communities.

6. The Know-Net Tool

A technical implementation, that would exploit the consideration of the Knowledge Object being the common unifier of information retrieval (product) and groupware (process) technologies, is, at the architectural level at least, relatively simple and straightforward: applications that support the process-view of KM, such as groupware applications, should use Knowledge Objects that are also accessible by applications and tools that support the product view, such as searching and indexing tools. Therefore Knowledge Objects have to be separated from the applications that create or use them in order to be accessible also by other applications.

To achieve this, a three-tier architecture is suitable, with a separate repository, a 'place holder' for storing the Knowledge Objects. Such a knowledge repository is a store of both codified knowledge (information) and metadata - information on that information. Metadata can be simple information such as the author's name, current version number or more complex information that are organisation-specific and add value to information based on the organisational environment and context.

The knowledge repository does not have to store all the items needed to be captured, but it should 'know' where these items 'reside' and point to them. In fact, due to the heterogeneity and variety of Information Systems and sources existent in any organisation, it is more meaningful for the knowledge repository to act as a knowledge broker rather than to actually store information. The

knowledge repository can serve requests for information, and use whatever mechanisms are necessary to retrieve and deliver the results to the user.

The primary objective in the design of the Know-Net tool has been to define an architecture that exploits the integration of the two approaches (product and process). The tool architecture has three fundamental elements and associated components, as listed below, and shown diagrammatically in Figure 7.

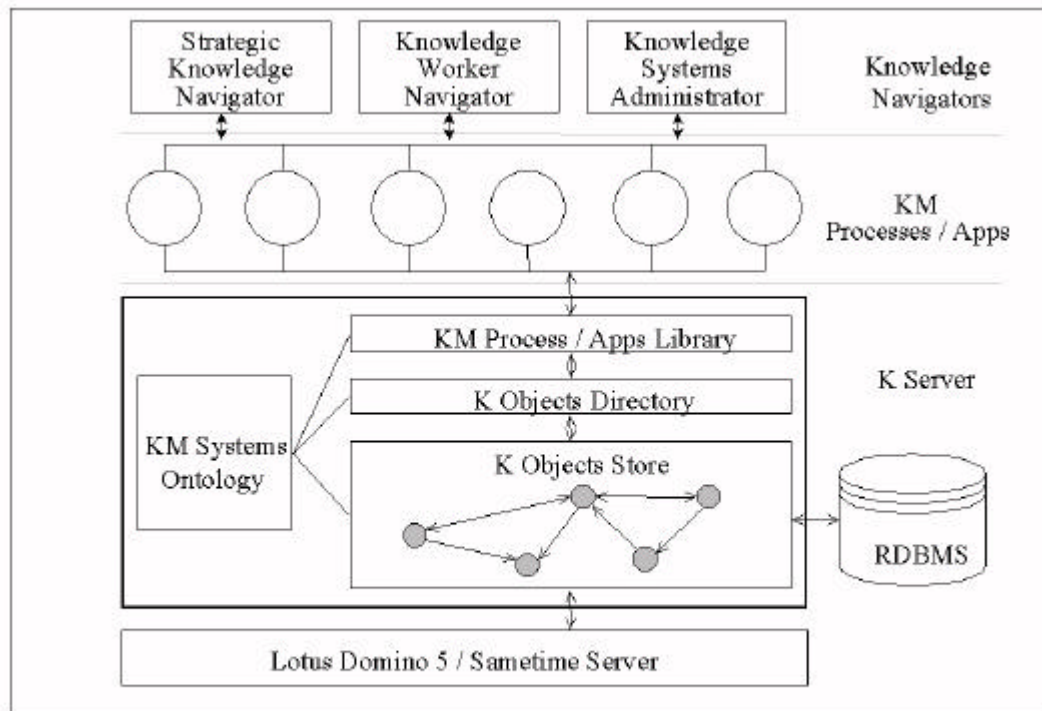


Figure 7. The Know-Net tool architecture

7. Applications

The Know-Net framework and method comprise an innovative approach for leveraging corporate knowledge that is built around a knowledge asset-centric approach – which offers a unique fusion of the knowledge-as-a-product (content) and knowledge-as-a-process (context) perspectives to knowledge management. The Know-Net approach has been or is currently applied in the following organisations:

- the Greek consultancy company Planet Ernst & Young, see [6];
- the global bank UBS, see [9];
- the UK chartered surveyors firm NAI Gooch Webster, see [5];

- the Greek IT services company SINGULAR;
- the Turkish software development company MDA;
- the Czech training and software customisation company DEBUS;
- and the UK CRM applications development company ALPHANOVA.

Recently the application of the Know-Net method and tool have been pilot tested in Greek Ministry of Finance, where a major effort is under way for the electronic delivery of income taxation and value-added taxation services.

8. References

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