



Use Case 1 in Food Industry – Business Cases R&D Support for Coffee

KW Partner: Uni. Trento

1 Overview

Challenge

In a KM context, workers have personal attitudes and aims at managing documents and other knowledge artefacts, in the way that better suits their needs. KM solutions should enable personal knowledge management and should allow knowledge sharing among workers.

Solution

A semi-automatic system of annotation and concepts representation, which expresses a personal point of view using ontology based tools.

Semantic search engine for ontology based queries

Why a Semantic solution

The current approach in KM is to organize knowledge in a standardized way, through a corporate knowledge system. This approach doesn't take into account personal needs and autonomous representations of knowledge.

The traditional search engine technologies are not efficient enough on full text search in personalized and context dependent knowledge bases.

Key Business Benefits

Allow networking and knowledge sharing processes among workers who manage their personal knowledge in autonomous ways.

Enable innovation through perspective matching

Business Partners

Technology solution provider together with its projects partners, networked laboratories, and Universities

This business case deals with the management of large collection of documents in Illy Caffè (Figure 10.1), in which high level of quality and innovation in products and services are considered strategic assets. The R&D unit is composed by researchers and networked laboratories such as Aromalab, and Sensorylab. They are specialized in different research areas (botanic, physics, math, etc.) and they actively contribute to Illy's experiments. In particular, a lot of experiments and projects such as Illy Bar Concepts and Easy Serving Espresso are carried out. In this scenario various kind of documents, in the form of texts, designs, biological tests, software and hardware recommendation, etc. are delivered.

The goal of the firm is to enable personal knowledge creation allowing autonomous management of knowledge and coordinating it among workers. The R&D group believes that semantic annotation together with semantic search engines can be of great help in this context.

The usage scenario is to promote the management of personal knowledge through personal representation and to promote peer to peer networks among workers.

From a managerial standpoint, a peer to peer approach to KM poses fundamental challenges on the changing nature of the managerial function. Peer to peer settings work out new roles (for instance the role of broker) which determine new competencies and abilities for a system of networked "knowledge". Managers should avoid personal or group behaviours of competitiveness and detention of knowledge. They have to promote knowledge sharing and coordination among single experts and small groups who handle all the core knowledge of the firm. These processes can be facilitated by both the introduction of new organizational roles (knowledge managers and brokers) and the creation of a culture (using wage incentives, group bonus, etc.) that allows people to identify themselves within the company as part of a

Keys components

Existing Software

Company reference taxonomy
Shared directories
Personal Database and archives.

Research and development

Semi-automated ontology/context creation
Semantic search engine
Semantic matching

Technology locks

Corporate domain ontology building and maintenance

whole, and to share knowledge for a common real gain. This could be facilitated by the introduction of peer to peer tools.

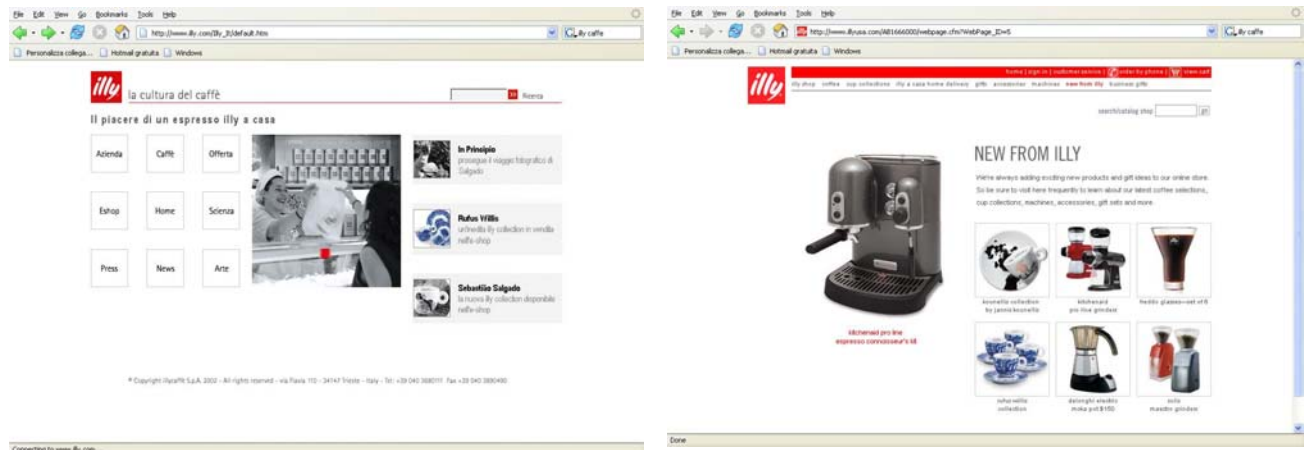


Figure 1 – Unstructured corporate knowledge on the Illy website

2 Current Practices and Technologies

2.1 Current business practices

Workers manage their personal knowledge using their personal systems of artefacts as notes, books, archives, document management systems, etc. Even if people use the same kind of artefacts, people appropriate and manage them in an autonomous way.

Although each document management system is used in a different way, workers support knowledge sharing by their personal interactions. This interaction is enabled by a good attitude of communicating, asking and chatting. Any time that people need to share knowledge in a group or in a team, they create a common and shared system of directories in which all the documents of the group are stored, they use phone calls and phone conferences, e-mail, e-mail attachments, etc. Moreover they use an Intranet in which workers can upload any document referring to their project. This Intranet (composed by a content management system organized according to a system of categories) is not much used within the organization because workers cannot modify its structure. They consider it oppressive and irrelevant, as a bureaucratic system which people have to deal with. Nowadays, Illy's practice of knowledge retrieval relies on personal capacity to remember the time in which old projects have been developed and on the ability to retrieve related documents. There is no way to retrieve documents in an "intelligent" mode, and only common search engines are used. These search engines (e.g. vivisimo <http://www.vivisimo.com>, google <http://www.google.com>, etc.) support only lexical matching processes, search only through keywords and eventually cluster documents.

2.2 System requirements Analysis

From a technological point of view: **(i)** Each member (peer) should create and manage her/his personal system of documents and knowledge. The peer's document management system is based on syntactical indexes (indexes of labels), and contexts (a system of concepts managed by a context editor and a context browser) which allow the user to organize and represent

her/his knowledge through an explicit complex system of categories, taxonomies or contexts. **(ii)** Each peer may join a community, which is considered as a unique subject in the system. The community's knowledge relies on the system of documents that each single peer shares according to a common representation and organization of knowledge. In other words peers participate and negotiate a common representation of knowledge (a taxonomy, an ontology, etc.) and make available their documents according to this representation. **(iii)** Peers are allowed to manage their document according to their personal and local systems of knowledge representation (as personal ontologies and context), and exchange documents through semantic tool, permitting coordination and negotiation processes. **(iv)** Searching processes are carried out by seekers. Users can search documents according to three different types of queries: lexical, conceptual, and semantic. **(v)** The provider peers match the queries and give back results, and, when it is possible, give back suggestions on who else can have the same kind of information.

This Use Case makes the following problematic stand out:

1. Personalized knowledge representation should be managed by local ontologies, taxonomies, etc. In computer science several languages and tools exist to help final users and system developers automatically, semi-automatically or manually create good and effective ontologies. Therefore a strong challenge unveils in building and maintaining a constellation of domain ontologies in a complex evolving environment, using very simple tools and methods.
2. These tools and methods should guarantee a high level of participation. The navigation and the management of personal perspective need to be user friendly, as there is no chance that an average user will want to look at the internals of the ontologies. It derives that an effective human and computer interface should be created.
3. Semantic search engine should scale up effectively with the amount of knowledge perspective developed by an increasing number of peers and communities.
4. Negotiation processes should be developed with the aim at allowing peers to participate and share knowledge within a community. Peers participate and negotiate meanings and artefacts (documents) and create common knowledge representation. This allows them to constitute a creative knowledge base which sustains common themes and interests, and allows them to achieve new goals and innovative perspectives.

2.3 Review of the current systems

The existing current solutions should be integrated to properly support the R&D office and the knowledge workers involved in the projects.

KEEx: it is a Peer-to-Peer (personal) document sharing system, which provide users with document management and retrieval functionalities based on lexical and semantic algorithms. Such algorithms allow users to perform both full text keyword search, and conceptual one. A matching algorithm based on natural language and mathematics processing functionalities (<http://www.dthink.biz>) is the fundamental core process of the tool.