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Applied Knowledge Management: a set of well-tried tools.

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Abstract: For almost 20 years, Knowledge Management projects hit various domains. This paper focuses on selected tools now of general practice and becoming popular among the practitioners. Originally out of the Information Science labs, the tools introduced here have been proved tested efficient and reliable after hundreds of real projects, no matter what type of industry and domain use them. This paper aims to briefly describe a set of four well-tried Knowledge Management tools allowing practitioners to analyse and structure, describe and represent, share and store, teach and transmit knowledge. This now common practice should open the path to new models for the Knowledge Economy. Dealing with complexity becomes easier as well as putting the Information system at the crossing of the interactive information flows instead of keeping it out of reach of a majority of knowledge workers. Due to the massive retirement of the baby boomers, a large loss of workforce challenges the companies for the first time in history. How to evaluate and pass to the next generation it's core business of knowledge is thus of critical importance. This paper reminds that Knowledge Management is no longer a solely academic issue since tools of the next generation are now available, beefing up the growing domain of the knowledge economy.

Keywords: knowledge management, knowledge economy, intranet, knowledge capitalization, e-learning.

Biographical Notes:

Jean-Louis Ermine received his Ph.D. in Pure Mathematics from the University Denis Diderot of Paris in 1976, and a National Research Director Title in Computer Science in 1990 from the University of Bordeaux. Since 2003, he has been working in the 'Institut National des Télécommunications' as Head of the Information Systems Department. He is the inventor of the MASK method, a Knowledge Management methodology used in several French and foreign companies since 1993. He has written more than 50 scientific papers and three books on Knowledge Management and Engineering. He worked in the French Atomic Energy Commission (CEA) as a KM expert for more than ten years. Since 2002, he has led several expert missions for IAEA. In 1999, he founded the French Knowledge Management Club, an association of several French companies.
Philippe VAN BERTEN received a master degree in Science in 1983 from the University of Aix-MarseilleII. He's been working for fifteen years in the Bank & Insurance sector both in France and the United States. In 2001, he created SOLETEC-Paris, a Think Tank focused on applied research on Marketing. In 2003, he obtained a DEA (diploma leading to research). He pursues his specialization course in KM as a Ph.D. candidate at the DSI (Department of Information Systems) at the INT (National Institute of Telecommunications) in Evry, France. Since 2004, he is working on a research program introducing systemics and complex thinking to the marketing field. He is also an Agent of the International trade specialized in the Wine Industry.

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1. Introduction

In the late 90's, Knowledge Management (KM) became a major issue for companies. A set of strategic points may help to understand this sudden interest in Corporate Knowledge. For instance, Knowledge is now viewed as a capital asset of economic value, a new strategic resource in productivity enhancement and a stability factor in an unstable and dynamic competitive environment. Therefore, KM tools bring decisive competitive advantage when properly used by practitioners.
This paper provides the description of the most common KM tools coming from theoretical models, which have been put into practice and shown operational efficiency.

The strategy in regard is always structured by three key issues: Capitalize ("knowing where you are coming from in order to better know where you're going to"), Share ("switch from individual to collective intelligence"), Create ("innovate to survive). However, those objectives are to a certain extend paradoxical ("Knowledge is Power»!), and KM is then a real challenge for managers, leading to considerable change in companies vision and management.

Many businesses, of all sizes and sectors rally on that domain of the so-called new "Knowledge Based Economy". The market place is in strong demand of "Knowledge Management Systems". It is then rather difficult to understand what KM really is!
We'll try to give in this paper a classification of basic blocks that can be included in a KM system. It is not a technology-based classification, but the description of various types of Knowledge Management well-tried tools.

Since the late 1920's, the business modelling approaches did empower a vision, which was built on production tools and work force in the Taylor's acceptation. Now, meaningful levers have appeared outside this vision: Customer Relationship, Information System, Business Intelligence, ISO Quality standards and more. The firm is constantly changing in order to respond new challenges inside its competitive environment. Knowledge Management is an attempt to link the classical productive vision to these new needs. KM tries to put together, with coherent processes, the critical Knowledge which is an essential resource for goods and services production and the Knowledge brought by the business environment.

Coherence is organized through the Knowledge Capital of the firm, which deals with:

- The Selection Process.
- The Codification and Evaluation Process for evaluating the Knowledge Capital, in a qualitative or quantitative way.
- The Interaction Process, with the competitive environment.
- The Knowledge Capitalisation and Sharing Process.
- The Learning and Creation Process.

Along those processes researchers and practitioners have produced efficient tools, some of them being now successfully at work for many years. This paper aims to participate in the best practice of KM, briefly describing some of their actual deployments.

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2. Method for Analysing and Structuring Knowledge (MASK)

As soon as undertaking a Knowledge Management project is considered, some questions surface like:

- How to collect Knowledge ?
- What kind of knowledge is mandatory to knowledge streaming?
- What to codify and not to codify?
- How to formalise the even hard to say patterns?

It is then important to use a model like the one shown on Figure 1, which is the MASK modelling process, in order to select which type of approach is the most appropriate.
The mask process leads to a specific deliverable called “Knowledge Book” that can be implemented in a hypermedia form on the Intranet of the company.

The Knowledge Book is a solution to the Knowledge Codification problem:

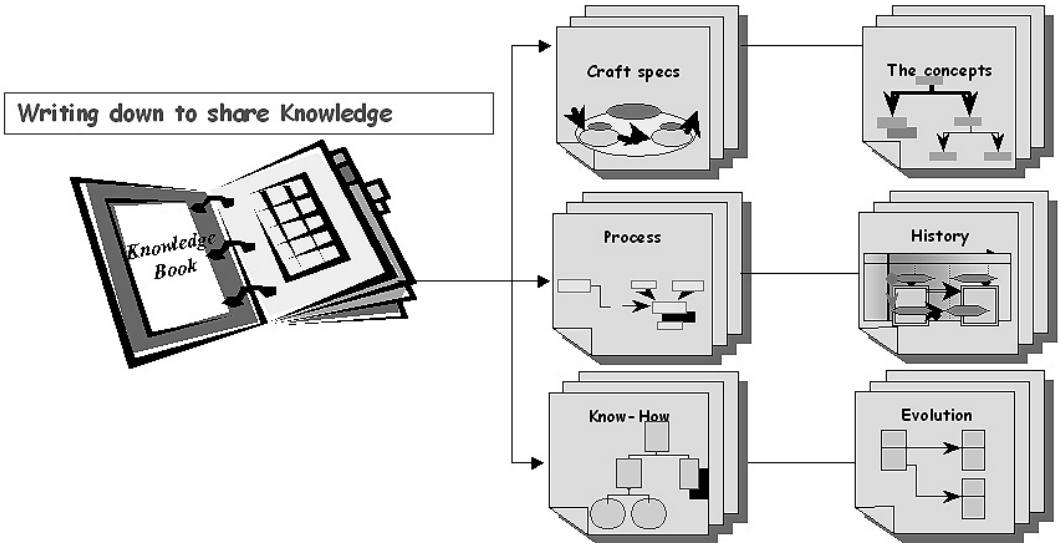

Figure 1 Knowledge Codification

The MASK method has been designed more than fifteen years ago, and has been successfully used in hundreds of Knowledge Management projects in various and diverse industrial or services sectors such as EDF[1](energy supply), Cofinoga (credit card & finance), DCN (naval defense expertise), Saint-Gobain (Glass maker), Technicatome (nuclear propulsion), Thales (defense systems), La Poste, Rhône-Poulenc (chemical industry), ONERA (air and space research), Gaz de France, PSA (car maker), INRS (research institute for security), Decathlon (sport goods), etc.)

[1] Electricité de France

The result obtained by the MASK method is called the "Knowledge Book", a structured synthesis of the many knowledge layers and skills of a given domain, along with corresponding links towards the detailed knowledge of the source, making it a kind of workmanship encyclopedia. As a matter of fact MASK and the Knowledge Book provide partial explanation and a structured frame for a subgroup of the company knowledge capital which is strongly linked to the Information System. As an example, the Knowledge book "LCS SILVA" at CEA[2] is designed for bringing to the industrial operator COGEMA[3] the knowledge collected from the R&D period (300 people for ten years). The result facilitates the shaping up at optimal level of the operational uranium SILVA enrichment process. This KM project took one and a half year and 120 experts to complete. The then issued Knowledge Book is approximately 2,300 pages and displays reference links towards 5,000 plus documents on the project.

3. Knowledge Map Maker tool

3.1 Cartography of knowledge

Knowledge cartography (or knowledge mapping) allows the value of the firm's critical knowledge to be enhanced (Pachulski & al 2000, Saad & al 2003). It is a step to be performed before any operation of knowledge management. Cartography is an identification of the corporate knowledge. We refer to the definition of knowledge cartography given by (Speel & al 1999): "knowledge mapping is defined as the process, methods and tools for analysing knowledge areas in order to discover features or meaning and to visualize them in a comprehensive, transparent form such that the business-relevant features are clearly highlighted". Companies wishing to manage their corporate knowledge must make a precise analysis in order to delineate the knowledge they must preserve, develop, abandon etc. Thus, cartography becomes a decision support tool. To this end, there is a need to determine specific criteria in order to evaluate, with the cartography, which knowledge is the most critical for the company. This tool is the so-called "cartography of critical knowledge".
It is based on a process-oriented approach. The cartography and the evaluation of knowledge domains rely on knowledge acquisition from experts. This tool is considered a knowledge engineering method as well and completes other methods employed for modelling the descriptive and operational knowledge of experts (Tounkara & al 2002). The tool relies on robust models, which have performed on dozens of industrial research centers and industrial operational units. A formal and a graphical model both characterize the cartography model we propose.

3.1.1 The formal model of the cartography

The formal model is described as a UML[4] class diagram. This is a hierarchical representation sorting the knowledge domains of the firm in different levels. A knowledge domain can be defined as an occupation field, which gathers information and knowledge from a group of people. The central point of the cartography is the core activity or "core knowledge" corresponding to the strategic knowledge capital dedicated to its fundamental assignment. Around this central point are the knowledge axes, which define the strategic domains of knowledge corresponding to various detailed missions led by the organization. The final knowledge domains in this classification are brought together following a common finality about the same theme of knowledge, all along with the knowledge axes. According to the required accuracy, a domain can be divided into sub-domains and a theme into sub-themes.

[2] Commissariat à l'Energie Atomique (Nuclear power commission)
[3] COGEMA is the former name of AREVA, a nuclear fuel producer.
[4] Unified Modelling Language

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3.1.2 The graphical model

The graphical representation of the knowledge cartography is based on the principle of visualization, which makes navigation easier and gives a global view of the knowledge domains in the firm. For example, the choice of an Ishikawa diagram allows the presentation of the hierarchy of different levels in the form of branches starting from the common trunk (Aubertin & al 2003). A tool of cartographic representation (for instance Mind Manager) can be used as well. It can be of great interest too to point out on the map the source of the knowledge such as the knowledge "provider" name: "knowledge maps typically point to people as well as to documents and databases. The employee with a good knowledge map has access to knowledge sources that would otherwise be difficult or impossible to find". (Davenport and Prusak 1998).

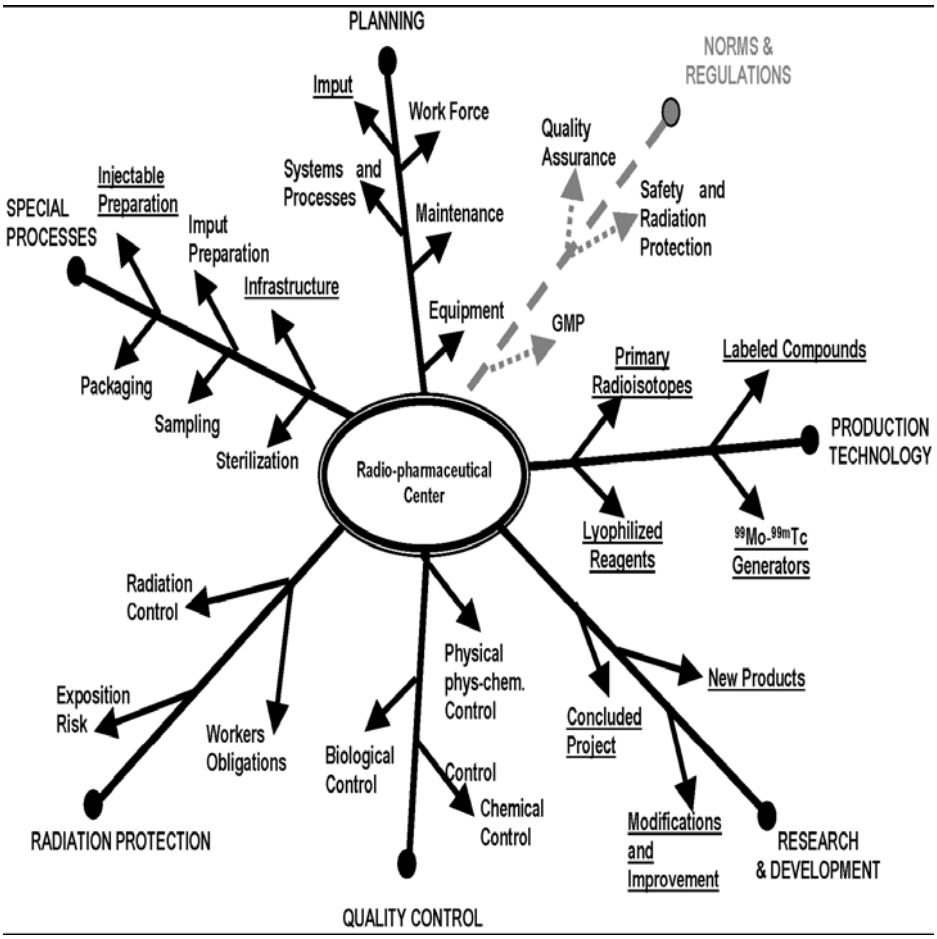

Figure 2 Cartography of Knowledge

3.1.3 The criticality model

The criticality of a domain is an evaluation of risks and opportunities. It may be, for example, the risk of knowledge loss which can have harmful consequences or the opportunity of domain developing in order to obtain advantages for the firm in term of productivity, market share, etc. We now need to define what may be "objectively" the criticality of knowledge and to give a model of evaluation to identify the most critical knowledge domains in the cartography. The Knowledge Management Club[5] has developed a grid of generic evaluation, called CKF (Critical Knowledge Factors) that is available to the members of the club. This grid has been used and validated in many French and foreign companies. The CKF grid contains 20 criterions around four thematic axes. Each criterion is evaluated according to a four level scale, representing the achievement of the criterion. Each evaluation of a criterion is based on one single question. Each level is expressed by a clear and synthetic sentence avoiding any vague word leading to confusion ("rating description").

4. The Knowledge Server tool

Usually, those are part of a company's Intranet, providing explicit knowledge to people in the most smarter and ergonomic manner. They're not intended to solve issues in place of the users but to make some supple and rich means of retrieving knowledge available and therefore help to solve operational issues. Figure 3 describes those tools.

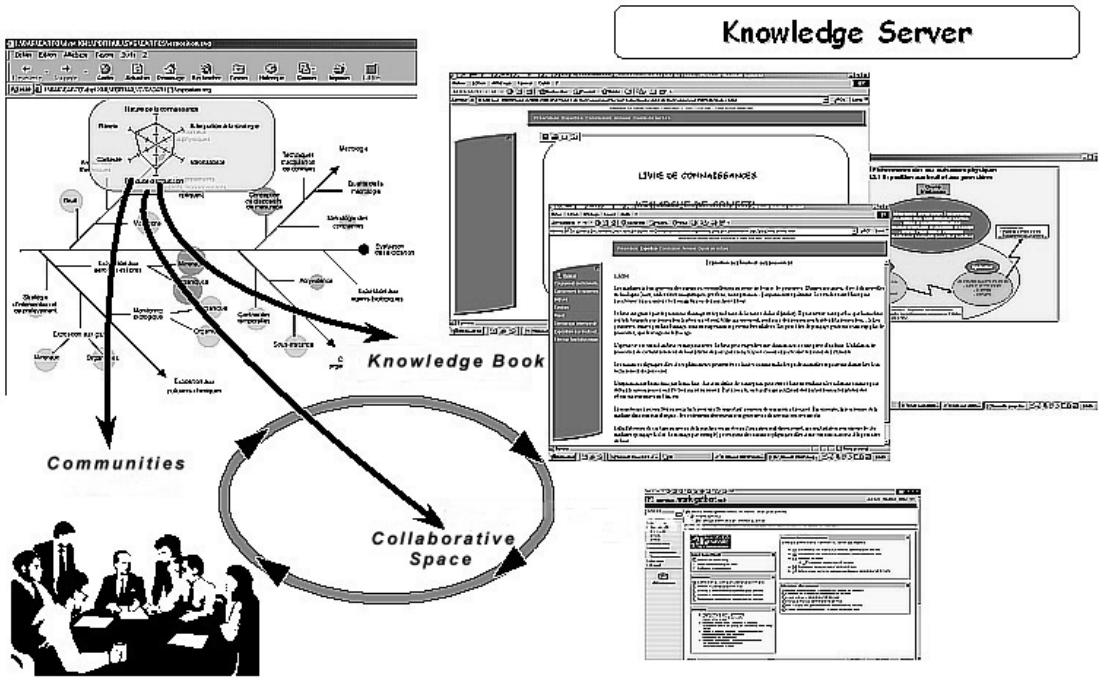

Figure 3 A Knowledge Server

[5] Club de Gestion des Connaissances: www.club-gc.asso.fr

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5. Professional Knowledge Learning tool

This tool is applied to facilitate the capitalization of knowledge in order to store it, forward it to a new hired worker or to pass it on the next generation. Figure 4 summarizes the process in use. Performing such representation stresses the following tasks:

- Make the System Measurable and Understandable
- Locate and name the targeted Knowledge and skills
- Identify the activities based on learning process

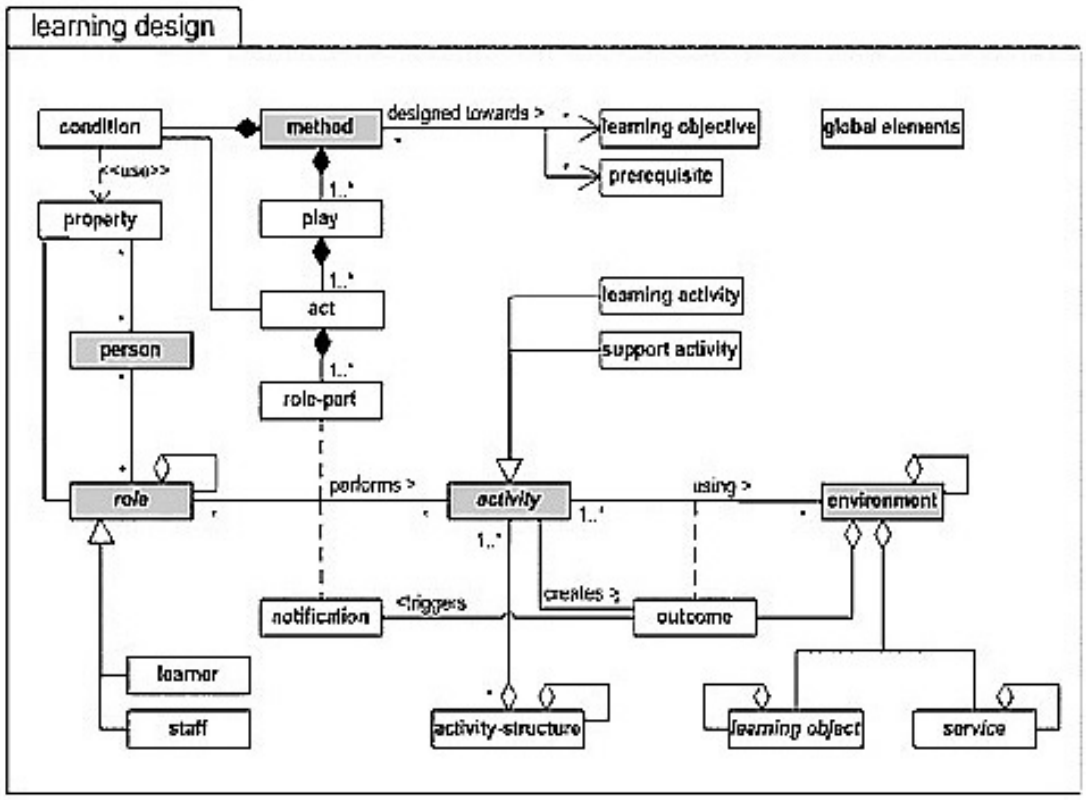

Figure 4 Capitalization of Knowledge for Educational purpose

Learning Design is one of the most significant developments in e-learning today. IMS Global Learning Consortium has recently released the IMS Learning Design specification [IMS], based on the work of the Open University of the Netherlands on “Educational Modelling Language” [Koper]. This marking language describes a “meta-model” designed for instruction.

Three levels of representation allow specification and implementation of a great range of e-learning teaching contents [IMS, Tattersall].

A. Designed after the behaviorist, cognitive and constructivist approaches to learning and instruction, “Level A” specifies a time sorted run of *activities* to be performed by learners and teachers (*role*), within the context of an *environment* made of *learning objects* or *services*.
B. “Level B” uses *properties* and *conditions* for more advanced learning purposes. *Properties* are needed to store information on a *person* or a group of persons (*role*) e.g., for a student, its progress. *Conditions* are about the didactic scenario evolution. They match to specific circumstances, preferences or characteristics of particular learners (e.g., prior knowledge).
C. Level C deals with new *activities*, based on an event appeared during the learning process (e.g., questions from students and corresponding teacher’s answers).

6. Conclusion

Nowadays large companies and complex organizations understand the competitive advantage stemmed from Knowledge Management projects. Led by three main goals such as Capitalizing, Sharing and Innovating, KM practioners use specific instruments combining the critical skills of the business with its environment. This paper gives an overview of four tools of current practice which have shown reliability and efficiency in Analysing, Structuring, Maping, Sharing and Learning Knowledge.

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