A generic model of corporate memory: application to the industrial systems

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1. INTRODUCTION

This work was motivated by the observation of the strong tendency of the today's company to be specialized. To be effective, the company standardizes its processes and its resources. it, often, handles the same entities for different actions. These entities can be physical objects, rules, processes, etc. Progressively and using these entities, the company constitutes, in the long run, a capital knowledge. However, this capital knowledge is often scattered on the experts of the company and in documents. It is very volatile. The objective is to collect it, organize it and preserve it for re-use purposes. This preservation is done, very often, through the concept of corporate memory (Brooking, 2000). This capital is then re-used in different situations in order to reduce the costs and the times of development. In this paper, we propose a generic model of corporate corporate memory and inst application through an industria project named ShTrc.

2. THE CORPORATE MEMORY MODEL

The corporate memory model that we propose as a support to the model of the industrial system handles two types of knowledge and has a multi-memory architecture. In this model, every memory is built around three main ones that we present below:

Reusable resources' memory (R. R. Memory): In the first stage, it is necessary to take an inventory of the capital corporate knowledAge and the capital skill and theme knowledge.

Roles' memory: In a second stage, it is necessary to build the memory of the roles. A role describes an element of the reusable resource context. The objective of the roles is to ensure the connection of a resource's use to its context of use.

Cases' memory: A case of use represents the description of the use or the re-use of a reusable resource in a given context. It is defined by a reusable resource, to which it was decided to add a set of roles.
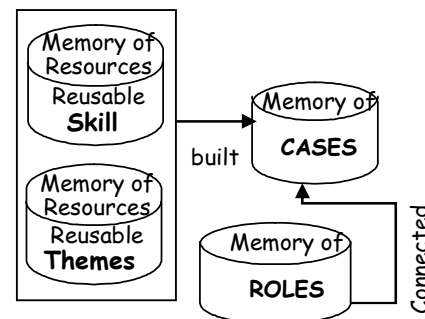

Figure 1 : Aarchitecture of the corporate memory

According to this, every corporate memory will be made up of those three memories. These memories are connected according to the logic described by figure 1.

3. TESTS AND RESULTS, APPLICATION OF THE MODEL TO THE SH_TRC PROJECT

The Sh_TRC project aims to set up a corporate memory of all the capital experience and knowledge acquired during the design, the renovation, the maintenance or the extension of the transportation of liquid hydrocarbons. Each one of these actions is done through a study which gives rise to a specification describing the requirements of the future industrial system. This specification constitutes for us, in addition to the experts, one of the main sources of knowledge. The industrial system of the SH_TRC project is seen through two types of components; 1) Skill components wich are of two types: The component of type product which represents any physical element entering in the composition of an industrial facility (pump, circuit breaker, pipe etc.) and the component of type process which represents all the dynamics of the industrial system. 2) Theme components, we have found two types of components: the component of type portion of text and the component of type graphic element.

3.1 Architecture of the proposed memory in the SH_TRC project

In accordance with the generic architecture proposed in section 4, the memory of the SH_TRC project will be made up of five memories that we will present below:

Reusable Resources' memory : This memory gathers the four types of reusable resources: product type, portion of test type, graphic element type and process type. In this paper, we are, particularly, interested in the first three reusable resources' types. The reusable resource of process type is described in (Admane, 2004).

- *The reusable resources of type product*: The product is regarded as the element of the finest granularity. It can be used in the composition of an industrial facility, or in the composition of another product. Each instance of a component's model will become an element of the memory of the reusable resources of type product.

- *The reusable resource of type portion of text :* It is a resource of the theme resources' memory. This resource represents any portion of text that seems interesting.

- *The reusable resource of type graphic element* : The reusable resource of type graphic element is, also, a resource of the theme resources memory. This resource represents any graphic element extracted from the specification which seems interesting. A reusable resource of graphic type can be modelled exactly like a reusable resource of textual type.

Roles' memory : The roles serve to describe all or a part of a reusable resource within a particular use. All the semantics carried by the role relates to the evoked reusable resource. In the SH-TRC project, we have proposed two models of roles.

Internal role: These roles implement only one reusable resource: the current resource. The global model of this role is described in figure 7.

Connection's role: The roles of the type connection are roles which are used to describe all the interaction that the called upon reusable resource can have with another reusable resource.

contexts memory : We thought of contexts' models which make it possible to describe situations in the form of texts. Practically, we built a single model of context. It represents the context as being a portion of text described by the context code, context name, and a family of context. We define for example the contexts: *Desert* : knowledge is valid for desert regions, *Renovation* : knowledge is valid in a situation of renovation, *Reduction of section*: which means that the described knowledge is valid for problems of conducts section reduction.

Cases memory : The goal of these models is to represent the cases of use of reusable resources. Each model describes a type of a well defined case. A model of case is composed of the triplet: reusable resource, role and context. It is described by figure 10. The reusable resource: represents the resource implemented in this particular case. The roles: are used to document the manner with which the reusable resource was used in this case. The context: describes the context in which the case was built;

4. CONCLUSION

In this article, we presented a meta-model of corporate memories based on the re-use principle. The main idea developed is about the architecture of the corporate memory. We chose an architecture multi memories which means that every memory developed according to the ReCaRo model will be made up of three communicating memories.

The memory of corporate knowledge offers to the technicians all the help with the industrial systems design. The connection of the corporate memory to the documentary theme memory offers to them the assistance with specification when designing new installations.

We chose to implement the corporate memory as a data base. The set of models and reusable resources was implemented as a set of data bases. Admane & Al. (2002), Admane & Al. (2002a) and Admane & Al. (2003) give all the details for this modelling.

4. REFERENCES

Admane, L., Benferhat, R. Boukraa, D., Ghomari, A., Bouchama, S., Terr S., Alquier, A.M. & Tignol, M. H. (2002), "Un modèle de projet et une mémoire de projet pour la conception de cahier de charges", *Proceedings of 7th MCSEAI,* Algérie. (pp103-110)

Admane, L., Benferhat, R., Ghomari, A. & Terr, S. (2004), "Modélisation de projets de mémoire d'entreprises". *Proceedings du premier colloque international sur l'optimisation et les systèmes d'information*, Algérie. (pp67-75).

Brooking, A. (2000), *Corporate memory: strategies for knowledge management,* Thompson Business Press, London.