

ELABORATION AND EXPLOITATION OF LESSONS LEARNED

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1. INTRODUCTION

The production centre Alstom Transport in Tarbes, France, designs, industrialises and ensures the maintenance of several high technology equipment (such as power modules, command platforms...) of the traction part of trains, metros or tramways. A study has been launched on the problem of defining an architecture for the Return on Experience (RoE) and its integration into operational industrial processes such as design, integration or validation. The first part of this paper shows several ways that have been developed in several firms and organisations in order to handle the RoE and proposes a synthesis of their key elements. The second part aims at defining an alimentation process for the RoE and the third part proposes several considered functions for the exploitation part of the RoE.

2. SURVEYING APPROACHES

A study has been led about European and French approaches [1]. On the WWW, we can find forty approaches maintained by various government and other organizations [2]. Two main problems appear with such systems : the use of textual representation of experiences and the gap concerning experiences integration into processes they are intended to support [3]. From

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the Roe process [4] we have brought out some elements that compose the process (figure 1). These help us to position our approach.

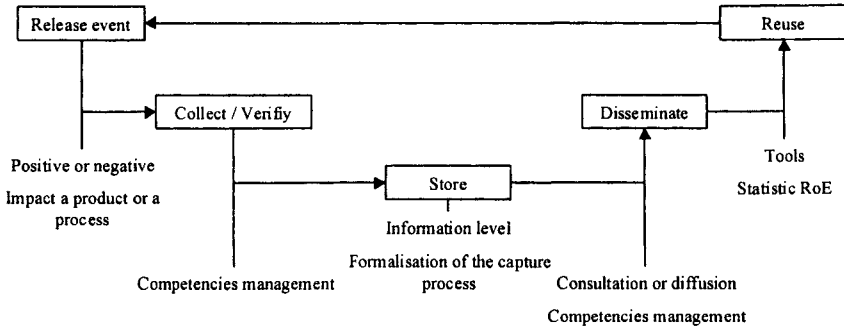


Figure 1 : Key elements of RoE process.

We distinguish three levels of information : rough information, experience and rule. Our approach in Alstom Transport is to take into account simultaneously all these levels order to develop a methodology as complete as possible. We detail in the next section the alimentation the suggested RoE process which integrates alimentation and exploitation sub-process.

3. ROE PROCESS

We show in figure 2 the detail of decomposition of the alimentation sub-process. Since the event reveals an unexpected failure, as soon as it is detected, a solving process is set up. This process corresponds to a sequence of activities defined by a workflow that will lead , in the best situation, to a resolution of the problem that caused the event.

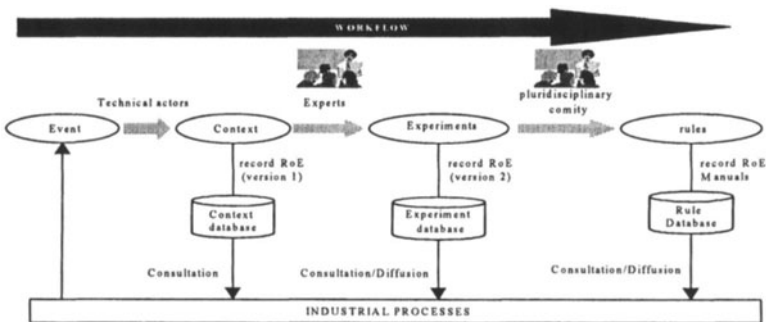


Figure 2 : RoE process and industrial processes.

The solving problems process involves several experts and during the process, it is necessary to capitalise the results of the expertise. This contributes to the elaboration of the database called "Experiments" in figure 3.

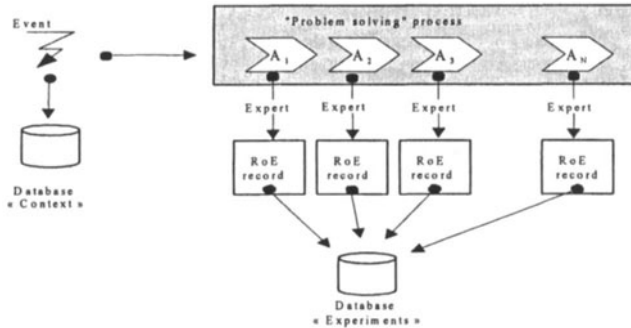


Figure 3 : Process of experiments capitalisation.

Each activity of the "solving problems" process feeds the database "Experiments" with RoE records that contains the expert analysis produced during the activity. This structure enables to define a net product - expertise which nodes are the RoE records. When the solving process is achieved, it may be judicious to build rules that will be systematically applied in future similar products developments. The elaboration of such rules involves one or several experts who, according to a set of previous experiments, will propose decisions in order to avoid future problems.

When a set of experiments and rules is formalised and memorised, it is important to facilitate its exploitation of this technical patrimony by the actors of the company.

For the consultation of the experiments database, we propose the set up of a search engine based on keywords in the corresponding database. For the dispatching of informations, the general idea is to exploit the informations contained in the experiments database in order to prevent a past error to be made again. Case based reasoning mechanisms [5], seem to be very suitable to help this exploitation task and a study is under way to develop tools of this kind [6]. We also consider to favour the construction of rules by defining some mechanisms of extraction and of generalisation.

For the consultation of the rule base, the set up of knowledge manuals available through hypertext on the intranet of the company is the considered solution. For the diffusion of the rule base, a solution is to integrate a systematic use of rules in the product development cycle.

3.1 Conclusion and future work

We present, in this paper, the RoE problematic and several approaches that have been considered to solve the problem. From these considerations and an experience in the Alstom Transport company we propose the definition of framework that permit to unify these different approaches and to build a generic RoE process. To do so, we separated the alimentation sub-process and the exploitation sub-process.

Of course, these elements are a base that we want to develop both in its conceptual representation (generic framework for the RoE structuration) and in its applicative aspects (how to use the representation in order to guide the set up of an efficient RoE).

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