

Nuclear Knowledge management overview at EDF

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This paper gives an overview of knowledge management practices in the French nuclear generation park. The study was initially partnered by one of the 19 Nuclear Power-plants, located at Golfech near Toulouse, and then extended to a more general overview.

Golfech is a 650 people unit, from which 25 of them were interviewed to carry out the study. This staff was made of managers, experts, seniors and juniors, all of them being working at Golfech in the different skills for nuclear generation needs : driving, engineering, maintenance, safety, environment, etc. They were questioned about their practices, tools and organisations concerning creating, sharing, transferring, and renewing knowledge.

The study shows that professional knowledge is fundamentally made of four levels which are embedded by specific leverages and experiences.

The first level is made of the “*basic knowledge*” which is required in every job, especially for juniors. It is delivered by the means of Human Resources and education systems : Recruitment, Learning & Training, Simulators, juniors mentoring, and Competencies management processes. These systems are thus the first category of KM processes.

The second level of knowledge is the “*technical knowledge*”, that is codified in the procedures, norms, and all the technical specifications. This knowledge has grown up for 4 decades, by a special KM process called *return on experience*. This KM process is driven by a systematic way. Every technical problem is registered, analysed, and evaluated by experts and managers networks, and discussed with other stakeholders, so that recommendations can be held on at a national level. This *return on experience* process is a collective learning process, very efficient for safety and performance of the French nuclear park. By this process, the explicit knowledge of the last 3 decades is stored in a large knowledge-base made of 10 000 documents a year. It is important to notice that, due to its explicit and collective dimension, this 3rd level of knowledge is the core competency shared by the whole nuclear community in its culture, norms and documents.

The third level of knowledge consists in the different specific *know-how* which are located in each power plant, due to local contexts. For example, the experts in chemistry problems have local know-how about how to use measurement apparatus in their geographic context. Another example: the organization is quite different from one unit to one another, depending on all sorts of parameters: personality of managers, environment, industrial context, history of each unit... This distinctive and flexible knowledge is a good thing for global competitiveness, because it suits to every kind of contexts and gives more situations for learning. At this 3rd level of knowledge, groupware and communities of practice are the KM systems very useful and powerful to share good practices. For example, a community of practice on engineering skills is now growing all over the 19 power plants, and this is a very powerful way for sharing good practices between the

1500 people concerned. This 3rd level of knowledge has no normative function, but only an added-value function for performance of each power plant. Due to its tacit nature, it cannot be reproduced from one place to one another without a process of transformation and adaptation to the new context.

The fourth level of knowledge is the *expertise and experience* of some people, engaged, during their personal history, in many learning affairs and projects. This 4th level of knowledge is incorporated in some individuals who are likely to learn in many situations and who are always interested in innovations and knowledge creation. These people take away their personal experience with them when they get retired, and this is a big loss of knowledge for the enterprise. So, it appears to be a special challenge for the institution to recognize them and encourage them to share the memory of their experience. Which needs a very specific process, because this knowledge is absolutely tacit and, in most cases, these people do not even know themselves how knowledge-full they are.

This model of knowledge, with its four levels, is very important because it is the only way to understand that every KM system is adapted only to one of the four levels. For example, teaching and HR tools are very well adapted for the first level of knowledge, but has no chance to leveraging the top level of knowledge that is incorporated in the experience of some people. On the other hand, IT and KM tools like intranet portals and groupware are suitable to share know-how between different places, but they are of no effect on the 4th level of knowledge that remains unconscious in individuals.

Thus, all KM projects have to consider this model, so that they can choose the right KM system for each level of knowledge. Many KM projects over the world have failed because of their ignorance of this particularity. Knowledge is not a simple stock of information: its characteristics strongly differs from one level to one another. At the 1st and 2nd level, it is explicit and thus can be transferred and shared by KM processes like education, training, procedures, norms and documentation... At the 3rd level, it is quite hard to explicit it outside close teams, and thus it has to be shared in a tacit way through communities of practice. And at the 4th level, it cannot be shared, without being considerably altered in an explicit form. The lesson of the 4th level is that human being cannot be replaced by any kind of knowledge system.

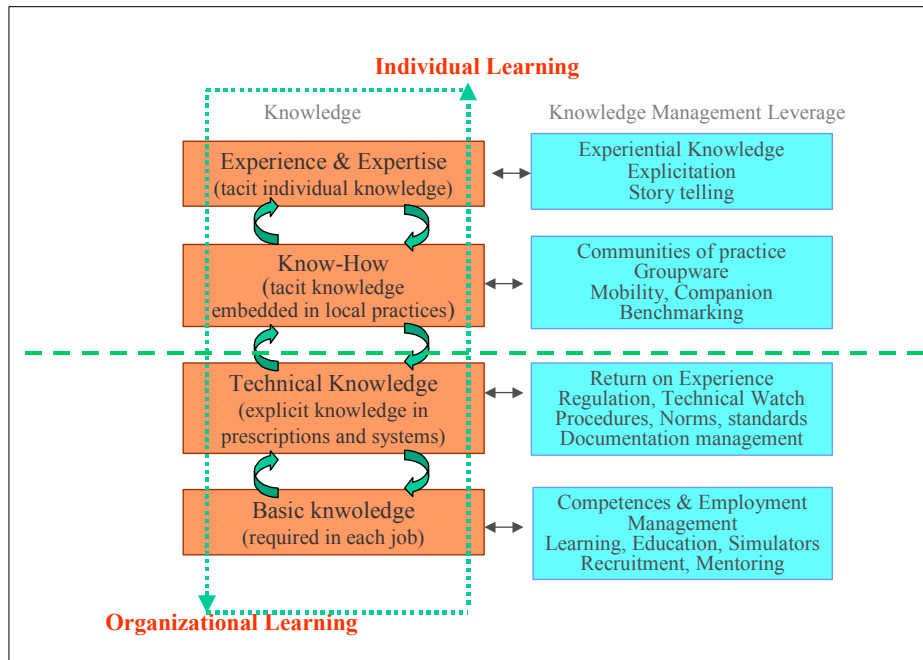


Figure 1: Nuclear Knowledge Management overview at EDF