INTEGRATION OF THE KNOWLEDGE MANAGEMENT PROCESS INTO RISK MANAGEMENT PROCESS – MOVING TOWARDS ACTORS OF PROJECT APPROACH

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Abstract
The management of knowledge and know-how becomes more and more important in organizations. Building corporate memories for conserving and sharing knowledge has become a rather common practice. However, the researches in knowledge management focus mainly on the process of creation, of capitalization, and of transfer of knowledge. Researchers are also centered on the establishment of the process of knowledge management in companies, but little about interaction between the knowledge management process and the risk management process. In this paper, we propose a new approach to integration of the knowledge management process represented by the GAMETH method in the risk management process. We apply our approach on ammonia industry presented by the Algerian-Spanish company - FERTIAL.

Keywords: Knowledge management, Knowledge capitalization, Risk management, Method GAMETH.

1. Introduction
Very many company use the risk management for develop their activity (construction, computer science, ecological, industrial, pharmaceutical, health, etc ...). Among the different research themes addressed in the literature, risk reduction of projects remains one of the most studied with others important literatures on detection, evaluation, estimation, the solutions and the tools to be implemented. However, it appears that appropriation (learning) and experience (know-how) are effective ways to prevent the risks.

Such knowledge acquired in the past must be managed to allow for more effective risk management: the role of knowledge management. This latter is a way of systematic management of knowledge tacit and knowledge explicit. Indeed its purpose is to retain, to transmit and to develop knowledge order to:

- Improve the management of skills,
- Facilitate the activity of individuals in terms of the decision making,
- Increase productivity,
- Promote the innovation and creativity.

In a first part, we study the main concepts that are used in our paper regarding to context and elements of the project, the theoretical concepts of risk management, and knowledge management. In a second part, we present our approach to fusion of the knowledge management process by using the GAMETH method (Grundstein, 2005) in the risk management process.
2. Theoretical Framing

This section presents the main concepts that are used in this article regarding to context and elements of the project, risk management process, and knowledge management process.

2.1. Context and elements of the project

In the literature of management and according (Morley, 2003), the term project corresponds to the situation in which one finds oneself when we shall reach a goal with the means with ad hoc and in a given time frame. According (Marciniak et Rowe, 2008), a project defines itself as a specific action, new, of limited duration, which structure methodically and progressively a reality to come. In addition, the project is a complex system of stakeholders, means and actions, constituted for provide a response to a demand elaborated to satisfy the need of project owner. For (Giard, 2004), the project is defined as a specific approach that allows to structure methodically and progressively a reality to come. Also, a project is defined and implemented to elaborate a response as required of a user, of a client or of a customers and it implies an objective and actions to be undertaken with of data resources. At the conclusion of these three definitions, we find that the word project is highly bound to objective terms, means and time. The diagram below, adapted from Briner and Geddes (1993), represents the fact that the realization of a project is influenced by policy of the organization, by some external constraints and by the needs of some people in the organization's environment as much as to the interior of the organization. Consequently, these factors must be considered throughout the life cycle of a project (see figure 1).

![Fig.1. The project management triangles](image)

In addition to its different elements, the project evolves in a particular context which confers the specific characteristics. According (Newcombe, 2000), this context is composed of the organizational structure of the enterprise, the direct environment of the project and the general environment of the enterprise. For (Giard, 2004) the organizational structure (dot matrix, per project, and functional) of the enterprise determines the organization of the project because it affects the roles and tasks of the actors. The direct environment of the project “users, project team, and management type” frame of the
objectives and progress of the project. The general environment (competition, sector of activity...) legitimate, regulates and / or strengthens the project.

The project, its elements and its context are managed by the project leader through of the project management. An abundant literature defines the project management. The project management is first presented like applying tools and technologies on resources for the accomplishment of a single task, complex possessing of the constraints of time, cost and quality (Buttrick, 2012). Other author specifies that the project management has the role to address these challenges by putting in place an organization and an planning of the all the activities aimed at ensure the achievement of project objectives (quality, cost, time), perform their monitoring, anticipate the changes to be implemented and risks, decide and communicate (Corbel, 2012). Finally, some describe the project management like a process of organization, of planning and of coordination of means (Barker et Cole, 2007) rather than a process of control and of monitoring of the tasks.

All projects are not of successfully. By way of example, we can cite the studies of the Standish Group published in the "Chaos report" but which only relate information system projects. The latest public release of 2009 date and is given below (see figure 2):

![Projects success rate](image)

**Fig. 2. Projects success rate**

### 2.2. The risk management process

The projects failures lead us to treating the existing risks preventing projects to arrive to their end or else to meet their initial specifications. The risks are defined in different ways in the literature. For some authors, the risk is a situation undesired having negative consequences resulting from the occurrence of one or more events whose occurrence is uncertain (Banham, 2004; Baranoff, 2004). Other authors add that the risk is more or less important depending on the uncertainty and the probability that he has be realized (Miller et Lessard, 2001; Chapman et Ward, 2003; Hillson et Simon, 2007). The risk is not solely associated with a negative result; it can also conduct a positive result (Moulard, 2003). Other hand, (Barker et Cole, 2007) distinguishes the risks and the risk factors. Also, (Pender, 2001) presents the risk as a lacuna of knowledge, in the sense where the risk is not

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reducible only by the knowledge capitalization, thus putting forward the interest of knowledge management for the risk management.

According (Moulard, 2003), the risks are present in all the systems of the model presented above: strategic, technical, social, structural, and the project management. The project manager must then seek to reduce them, and if they can't reduce them, it shall monitor their evolution. He set up in this optic a risk management. This risk management is a principal component of the project management. According to several authors, the process of risk management is defined as a concatenation of five (5) steps (see figure 3).

Fig.3. The risk management process

For to be reduced, the risk must first be identified it this is the first step. The known risk, the analysis phase that follows consists in finding the causes of this risk and to evaluate its consequences. The project team then searches the possible solutions to reduce it and sets up that which seems to them most effective. This setting up of the solution is piloted and regularly monitored in order to check that it matches well to the expectations of the team that shall make changes if necessary.

2.3. Knowledge management

Before understanding how knowledge management allows reducing the risks in the projects, we find out its own characteristics.

In the literature, we find several definitions of knowledge management. For this, we are focused in our paper about a few definitions. (Barclay et al, 2004), defines the knowledge management as being “as a process of identification, formalization, disseminating and use of knowledge in order to promote creativity and innovation in companies”. According (Dieng-Kuntz, 2001), Knowledge capitalization in an organization has as objectives to promote the growth, the transmission and the preservation of knowledge in this organization. According (Grundstein, 2007), capitalizing on company’s knowledge
means considering certain knowledge used and produced by the company as a storehouse of riches and drawing from these riches interest that contributes to increasing the company's capital. For (Nonaka and Takeushi, 1995), knowledge management systems are guided to capture, create, store, organize and disseminate organizational knowledge. This process (see figure4) takes into account the transformation and the evolution of tacit to explicit knowledge (Nonaka and Takeushi, 1995) and of individual to collective knowledge.

![A Model of Dynamic Organizational Knowledge Creation (Nonaka and Takeuchi, 1995)](image)

**Fig. 4. A Model of Dynamic Organizational Knowledge Creation (Nonaka and Takeuchi, 1995)**

It can carry both theoretical knowledge and know-how of the company. It requires the management of company knowledge resources to facilitate their access and their re-use (O’Leary, 1998). It consists of capturing and representing knowledge of the company, facilitating its access, sharing and re-use. This very complex problem can be approached by several points of view: socio-organizational, economic, financial, technical, human, and legal (Grundstein and Barthès, 1996) (see figure 5).

![The principles and practice of Knowledge Management (Grundstein and Barthès, 1996)](image)

**Fig. 5. The principles and practice of Knowledge Management (Grundstein and Barthès, 1996)**

We can find in the literature different proposals of life cycle used to realize of knowledge management (such as GAMETH, MASK, REX, KOD, etc.). In our paper, we adopted the knowledge management
life-cycle proposed by Grundstein (Grundstein, 2012), where, according to him, "in any operation of knowledge capitalization, it is important to identify the strategic knowledge to be capitalized" (see figure 6).

3. The reduction of risks by the integration of the knowledge management process

The capitalization gathers the processes allowing of valorize the knowledge "acquired": the return of experiments on reducing risks, capitalization around the finding solutions to improve the teamwork, use of tools for modeling, and the planning with in the company FERTIAL². FERTIAL (National Fleuron of the petrochemical industry), Company of Fertilizer of Algeria, is a company resulting from a partnership signed in August 2005 between the Group Algerian ASMIDAL and the group Spanish GrupoVillar Mir. Also, it is composed of five major divisions specialized in numerous activities related especially the manufacture of fertilizers and agricultural fertilizers. Indeed, the security is a key factor in the Industrial Policy and Human Resources, as well as staff training, quality and respect for the environment. The goal most important for the company FERTIAL is to achieve zero accidents and ensure industrial safety of the surrounding communities by proposal an approach of knowledge capitalization in the trades’ and its exploitation in the projects. These projects were intended for among others to the renovation and modernization of industrial facilities to improve their capacity, the acquisition of new digital control system, to the environment and to the security ... etc (see figure 7).

² http://www.fertial-dz.com
Fig. 7. Destination of investment projects

The knowledge management process can be integrated into the risk management process. Indeed, as we shall see the different phases of risk management correspond to the operational chain of the knowledge management process (see figure 8).

During the identification phase, the project team puts in common all the knowledge related to sources of the risk and research the presence of these sources at all levels of the project. This knowledge was generated accumulated during previous learning’s and from experiments of past projects. The acquisition of such knowledge that corresponds to the step of acquiring the knowledge management process is carried out using different means: learning, the return of experiments, and the transfer of knowledge between the actors of the project team. This stock of knowledge feeds the discussions which occur during of the identification phase.
During the phase of risk analysis, the knowledge gained in the past relating to the methods of evaluation, of estimation and the risk measurement are put to contribution. The solution for reduced and/or control the risk arises from the analysis developed just before. Through knowledge held by team, its trade’s actors can more or less predict the consequences entailed by the establishment of the solution. Thus, the steps of identification and analysis constitutes the phase of spotting of the knowledge management process according Grundstein (GAMETH method) such that it was defined previously (see figure 6).

Moreover, the establishment of the solution is piloted and controlled by the project leader using the evaluation of the effect of the solution on the risk, using for example of dashboards monitoring or in dialogue with relevant actors.

The interaction between the solution and the two managerial skills that are the piloting and control is similar to the phase of preservation of knowledge management process (see figure 8). Indeed, the implementation of the solution is akin to a process of action which is tested and regulated by the control and piloting of project leader. Of this control and this steering pulls out a more or less thorough evaluation of the effects of the solution envisaged and this evaluation is the basis for the knowledge valorization, the third step of the knowledge management process. Evaluation of the solution consists in comparing the results obtained to desired results. This difference, positive or negative, between real results and contemplated results, allows the team to make self-criticism of the solution and to define thus the advantages and disadvantages of the solution developed to accumulate knowledge.

After updating of the process of knowledge management by the new knowledge (the fourth phase of the process). This new knowledge is managed in a project memory for that the process of knowledge management can reduce the risks of the future projects (fifth phase of the process).

The cycle of knowledge management is thus sealed off. The new knowledge accumulated over of the risk management is memorized and ready to be disseminated to the future of project teams. The risk management will be more effective because the phases of identification, of analysis, and setting up the solution will benefit from the experience of past projects. The integration of knowledge management therefore allows to directly reducing risk. However, it also influences indirectly on of sources of risk: the lack of responsiveness and the cognitive biases.

4. Conclusion

We can summarize the contributions of knowledge management to reduce the risks in the following way:

1. The knowledge management allows evolving the cognitive processes of the various project actors.
2. The knowledge management going to favor the acquisition of knowledge at the level the risks by making explicit the tacit knowledge of the different actors on the risks, retaining such knowledge and transferring them.
However, it must be noted that the use of the knowledge management to reduce the risk is only relevant if an assessment and an experience feedback of projects is performed by all actors of the project. Indeed, it was only at this time that the knowledge about the risks can extend thanks to the measurement of deviations between what was expected of the project and the real results, by analyzing these deviations and by fixing this analysis in the knowledge base.

It does must also not lose sight of the fact that the knowledge management take an interest in the environment that surrounded the project, because, the risk was closely related to the environment the solutions applied to reduce the risks may be different according to the project environment.

References


