Integration of Knowledge Processes into Management Systems

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Abstract: Understanding definitions and differences between the processes, knowledge processes and business processes is the first step of the integration of knowledge processes into management systems of an organization. The next step is to understand throughout the company why the processes should be introduced and continuously maintained. The knowledge is one of the most valuable assets of the company, relevant part of the intellectual capital. The management of the knowledge and its lifecycle can give a market advantage for the organization. In the nuclear industry this is the vital requirement to maintain the safe and reliable operation of a nuclear facility, or radiation safety activates. Those companies who already implemented an integrated management system were following international standards, or good practices (like ISO 9001, EFQM, Standard Nuclear Performance Model developed by Nuclear Energy Institute (NEI) and others). This article focuses on nuclear industry organizations, approaches and methods, and how to integrate the knowledge processes into management system. This is the last step of the knowledge management implementation in an organization. When it was done, we can say that the knowledge processes are embedded into organization’s day-to-day life and the knowledge managed in the organization as all other resources.

Key words: Knowledge, knowledge management, knowledge processes, Integrated Management System (IMS), competency, nuclear knowledge management, nuclear industry.

1. Introduction—Understanding the Basics

There are many definitions already existing to describe and identify what the process is and what its boundaries are. The definition which I have used in my work many years already is simple and it is like that you can search on the internet. The process is a set of interrelated or interacted activities that transform inputs into outputs. The result or output of a process is a product, which can be a part of a car, 3D printed product, or a document which contains knowledge used by the organization in other processes. The knowledge process has the similar sequence as an “ordinary” process, but it deals with knowledge: a process that acts on or with knowledge, either individual knowledge or organizational knowledge. The business process (or also called management process) is a managed process that produces business related outcomes, a set of interrelated or interacting activities that transform inputs into outputs [1]. Fig. 1 shows the simplified process structure and boundaries.

2. Why We Need Processes in the Organizations?

During my professional life, I have heard many times from my knowledgeable and experienced colleagues that why you are trying to create this process. We know what to do without that, and we are doing that already many years. Yes, you are, but the question is each time you do the steps in the same sequence and in the same quality? Of course, not! Your actions depend on your physiological conditions, your mood, how did you sleep last night, how are the current cultural conditions in your organizational unit, and many-many other factors. If you would like to define a process and fulfill the sustainable quality of the product you must document it. The one process that never gets defined yet is the most critical process of them all. In small and medium enterprises (SME) where
there are only several employees, most probably the processes are not defined and not documented, except if they are certified according to the ISO 9001, in which case they have to do it. In the first case the owner of the company has to pay attention to each process step, he has to invest much more of his personal resources into day-to-day activities. He can not delegate the tasks as the subordinate might understand differently what and how to do in the business. In the “big” organizations it is impossible to manage the whole company without predefined processes, which cover each activity of the organization. This is the only way you can have a sustainable, measurable and quality work product. The owner and the managers in this case can focus on their job: to define the strategy, to manage the company’s intellectual capital, which includes human-, technological- and relational capital. The final stage in the development of the process management in an organization is the integrated management system. According to Ref. [2], an Integrated Management System (IMS) integrates all of an organization’s systems and processes into one complete framework, enabling an organization to work as a single unit with unified objectives. Organizations often focus on management systems individually, often in silos and sometimes even in conflict. A quality team is concerned with the quality management systems (QMS), often an environmental health and safety (EHS) manager handles both Environmental-Health and Safety issues, etc. Currently only few standards talk/request integration of the management of (organizational) knowledge into the management system, one of which is the latest version of the ISO 9001:2015. It lists some requirements in Chapter 7.1.6, which says: the organizations should identify and manage their knowledge needed for their operation. It should be maintained and should be accessible to all those staffs that need it for their work. These requirements are extremely important in those cases when the strategy of the company is changing, and they should identify the relevant resources (including the knowledge) needed for the new strategic directions. In the nuclear industry, the International Atomic Energy Agency (IAEA) issues and maintains the standards and safety requirements which should be met by the nuclear organizations (facilities) and activities. The latest IAEA General Safety Requirements GSR Part 2 contains clear requirements for the knowledge management. It says: “The knowledge and the information of the organization shall be managed as a resource.” The definition of the resource is broad enough to include also the knowledge: “resources” includes individuals (the number of individuals and their competences), infrastructure, the working environment, knowledge and information, and suppliers, as well as material and financial resources [3].

3. What Are the Knowledge Processes?

As it was mentioned in the first section, those processes act on or with knowledge, either individual
knowledge or organizational knowledge. Let us list some of those, which are mostly known in any organizations:

- identify (the knowledge);
- create (the knowledge);
- capture (the knowledge);
- manage (the knowledge);
- share (the knowledge);
- apply (the knowledge);
- develop (the knowledge);
- embed (the knowledge).

Certainly, one can find plenty of other classifications, or grouping of the knowledge processes, but based on my experiences these are more frequently used in an organization. The main goal of the organization regarding the knowledge is to know what they know, what who knows, and where the knowledge is. In my understanding those processes might be invisible in the organization and they should be embedded into management processes. There is another group of organization who has the knowledge management itself as a management process, but those processes mainly describe the roles and responsibilities in the management of the knowledge versus the description of the knowledge processes themselves. Each of those processes above describes how to act on knowledge, what the responsible person should do with it. When we are talking about the knowledge management, we also need to understand what the competence is and who a competent person is. For this I recall the definition that the IAEA is using: Competence = Knowledge + Skills + Attitude (KSA). The companies need competent workforce who can produce the value for them. There are two ways to obtain competent people into your organization: either recruiting them from the workforce market, or training them for the needed skills and helping them to accumulate the needed knowledge through their experiences. The first way is mostly used by “conventional” industries, but also quiet frequently in IT companies, or banks; they are using the similar applications and that is why they can find the skilled staff much quicker. In the nuclear industry—as a user of one of the most complicating technologies—there is no other choice than training own people. For a licenced senior reactor operator position—this expert is responsible for the operation and managing others in one shift—there is a need for a 10-15 years training process. His knowledge is extremely valuable for the company, which is why it must be managed very carefully. In the last several years the nuclear industry tries to implement new methods and tools to accelerate this process where it is possible. There are new training methods—besides the new adaptive e-learning technologies [4]—coming from the gaming industry like virtual reality equipment, which can train the experts in a safe environment [5]. You can find some of the above methods in the reference list.

4. Integration, Integration, Integration

Just underline ones again; the basic approach of the knowledge management is to ensure the right knowledge at the right time in the right place. To fulfil this approach, you should use all the above knowledge processes described in Section 3. They should be embedded into your business/management processes to ensure the competent and knowledgeable workforce and to give them the right and correct information (knowledge—it means they can apply the information in the certain context) when they are needed. In that case if the “integrated” management system has been already implemented in your company and only the knowledge management approach is missing I would suggest going through the following simple ABCD steps.

(a). Identify all those management processes, which are dealing with training, document management, information sharing, and competence development.

(b). Analyse what is happening with the information (data) used and created through the process steps: as an output of one step, or output of the whole process. Identify all written documents (knowledge products/explicit knowledge holders) in those processes.
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Training process - Based on SAT methodology.
1. **Analysis** - Identifying people’s work related needs - Identify
2. **Design** – decide learning objectives – Create
3. **Development** - training design is made into training material Develop
4. **Implementation** - instructor teaches and the student learns Manage
5. **Evaluation** - "How are we doing?" Share

Fig. 2 Example of embedded knowledge processes.

(c). Collect all the documents, manuals, instructions which were identified to a common database (e.g. through metadata, taxonomy). If you are using a search engine which has a semantic search function than it is much easier you can build up your knowledge base, which should be accessible for all staffs that need that knowledge.

(d). Avoid the duplication, do not copy the files to other physical places, use search engines and give responsibility for the maintenance to the data owners who have created and maintained them.

After finishing the ABCD steps for all relevant processes you can say that you managed to integrate the explicit (documented/written) knowledge into your day-to-day activities. But this is only the visible part, you have to ensure also the integration of the tacit knowledge of your staff through other knowledge management methods and tools, like coaching, mentoring, critical knowledge identification, exit interviews and many others which can transfer the tacit knowledge to another person, or into explicit.

Here is an example of a training process based on, widely used in nuclear industry, the SAT—Systematic Approach to Training methodology. Fig. 2 shows the knowledge processes embedded into each process step of the SAT based training processes.

5. **Summary**

Knowledge management is an approach—a way of management thinking—to ensure the right knowledge at the right time in a right place. To fulfil this approach in the practice you must think about all HR, QA, IT, Training etc. processes which are dealing with the company’s most valuable asset: the knowledge. This is also a big challenge in the nuclear industry: how to transfer the knowledge from the retiring experienced staff to the newcomers, how to transfer the knowledge of the vendors (those countries that are capable to export the nuclear power technology) to the embarking countries. For the nuclear industry, the main goal is the safe, reliable and long-term operation. The current expected lifetime of the new type of nuclear power plants is close to 100 years. It means three human generations will operate them. The responsibility of the management is to assure the competent staff, managing their knowledge through well established and integrated management processes. This article cannot deal with all aspects of the knowledge management for this; you can find many-many well written books and guides. To implement and integrate knowledge management into your business activities you also should benchmark what others do, but not copy one-to-one rather adapt it into your culture and into your management [6]. Probably the only enabler which is common for all companies is the leadership support: if your CEO/DG/President, whatever you call the highest position in your organization, understands and supports the KM, then you have a big chance (but not 100%) to implement it successfully, if she/he does not support or start it, the implementation will fail. One last suggestion is given to the KM experts: if you would like to be a Chief Knowledge Officer, you must
understand all aspects of the KM, you must understand how your organization works, you must have the skills of how to manage people and projects, and how to implement a change project. Please do not think that after reading a nice guidance book on KM, you will be capable to manage the integration of KM!

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