

---

## A THEORETICAL APPROACH AND PROBLEM DEFINITION TO KNOWLEDGE MANAGEMENT IN THE FIELD OF ADVANCED NUCLEAR REACTOR DEVELOPMENT

Y. Fukuzawa

Japan Atomic Energy Agency (JAEA)

*E-mail address of main author: fukuzawa.yoshiharu@jaea.go.jp*

Development of the fast breeder reactor (FBR) in Japan was started in 1970, being conducted for more than 35 years so far. The experimental reactor of FBR, Joyo, reached its initial criticality in 1977 and the prototype reactor, Monju, in 1994. Development of the next larger FBR is now being performed, whose operation is expected to start about 30 years after the initial criticality of Monju. The expected duration of the development for the larger reactor is too long to keep the related people such as designers and engineers in the developmental field, leading to the change of generation over the working lifetime, though such the problem was less severe in case of the development of Monju, whose initial criticality was 17 years later than that of Joyo.

The development of FBR is required to take long time beyond the working lifetime of researchers, designers, technicians and engineers, who have gained high expertise including know-how through the related engineering and technical experience. To continue the development of FBR and fulfil the developmental goal successfully, a new systematic base is currently required to manage the expertise gained by experts over the change of generation.

On the other hand, knowledge was paid attention and considered as an important asset as well as capital funds in business companies since 1990s, leading to the so-called knowledge management conducted mainly in the business field. Information became also important previously and the progress of the information technologies is significant since 1980s. Nowadays the knowledge management seems to be related to the information technologies.

To plan a new systematic base to manage the expertise in the FBR development field, the experience of the knowledge management conducted previously in the business field should be taken into account. However, management necessary to handle the expertise accumulated in brains of experts over the change of generation would not be the case of the knowledge management in the business field. A long term strategy is required for the knowledge management in the nuclear developmental field.

Furthermore, a wide range of understanding of knowledge itself leads to a wide range of knowledge management activities in the business field. Understanding of knowledge itself as well as information seems to be different in detail between people related to the knowledge management in the business field and specialists related to the academic field such as information science or knowledge science.

From these viewpoints, to program the knowledge management adequately in the FBR development field, consideration should be made at first about what knowledge is as well as information and then about how to manage the knowledge.

In this paper, preliminary definitions of data, information and knowledge are presented due to a model of cognitive understanding in a human brain on the basis of cognitive psychology, brain science and philosophical ontology [1]. Consideration is also made on the characteristics of development in technology that differ from discovery in science [2]. Due to the definitions and consideration, basic discussions are made on a meaning of the management of explicit knowledge as well as tacit knowledge, and subsequently on effects

expected from those management activities. Finally, discussions are also made on current problems that should be solved and directions of solutions to plan the knowledge management in the FBR development field characterized by the long duration beyond the change of generation.

#### **REFERENCES**

- [1] FUKUZAWA, Y., Philosophy for Intellectual Creation; Methodology and Cognitive Structure of Thinking in Science, Ikuhou-sha Press Ltd. (2003) 13-26 (in Japanese)
- [2] FUKUZAWA, Y., How were Discoveries made in Science? , Ikuhou-sha Press Ltd. (2005) (in Japanese)