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International Atomic Energy Agency

Atoms for Peace and Development

Knowledge Management in Nuclear Fission

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Ashok GANESAN and John W ROBERTS

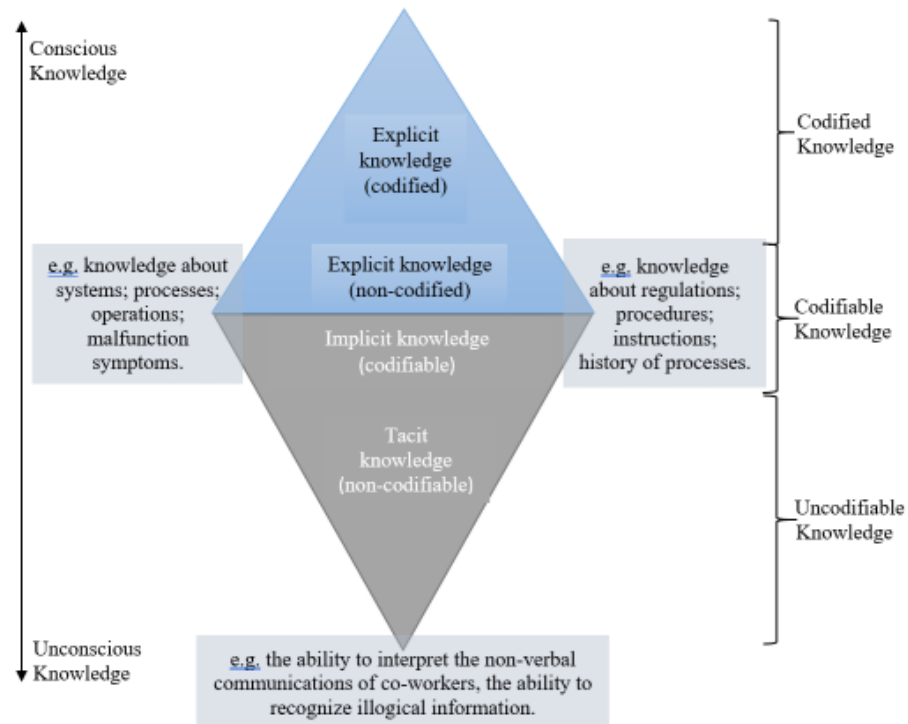
Knowledge Management Specialist

Department of Nuclear Energy

International Atomic Energy Agency

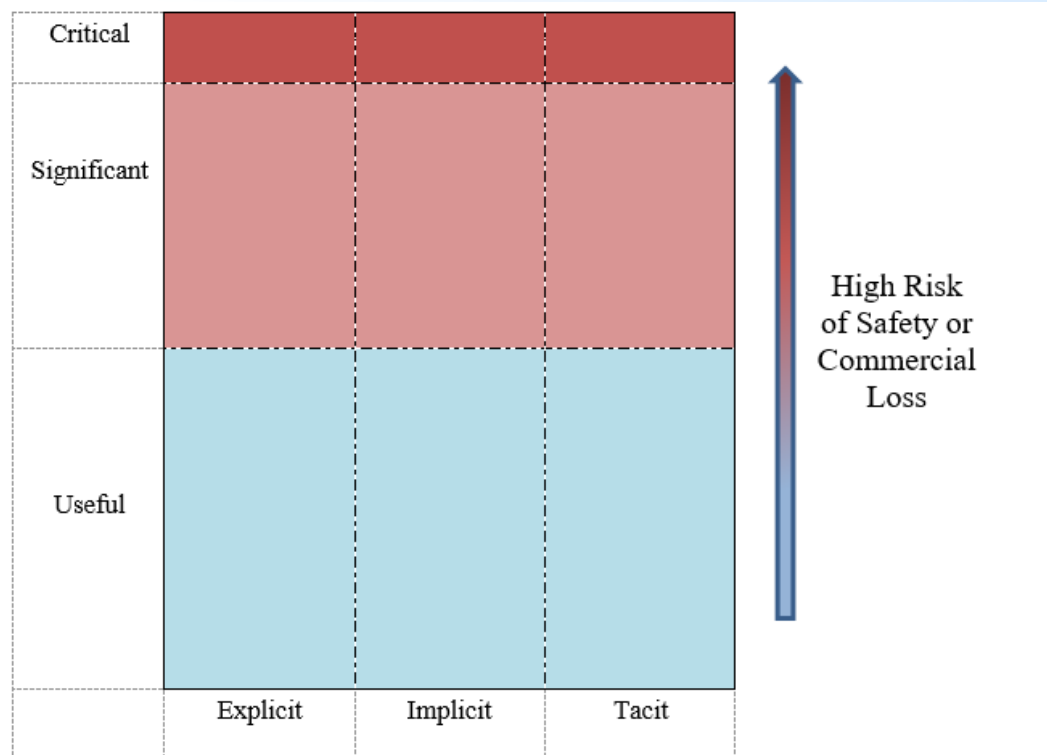
KM Basics

Types of knowledge



While tacit knowledge is difficult to transfer, a well-organized documented knowledge (explicit knowledge) supports efficient tacit knowledge transfer

Critical knowledge



The knowledge that is considered to be significant, vital and essential for a particular task or activity that is linked directly to the management of operational safety requirements and successful commercial business performance. The knowledge established in the context of a particular position that is deemed to be imperative for incumbents of the said position to possess before being allowed to perform associated duties and tasks independently

Definition

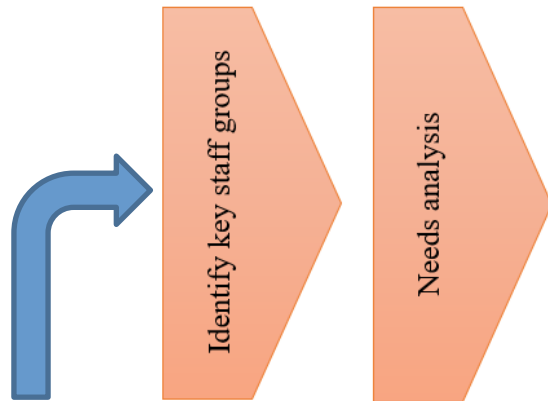
- **Reminder - Definition of KM:** *“The integrated, **systematic** approach to identifying, managing and sharing an organization’s knowledge, and enabling persons to create new knowledge collectively and thereby help achieve the objectives of that organization” – (IAEA)*
- **Key Point:** KM is not only about improving the performance of an organization, but first and foremost about ensuring its **long term sustainability**.
 - Societies only build schools in places of settlement
- **Main Challenge of KM Programs:** Ensuring **management support in the long run**
 - KM is a marathon, not a 100 meters race.



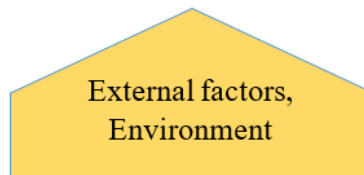
KM from an organizational context

Guidance to develop a strategic KM

Top-down: the overall strategic direction of the organization is used to identify the focus of the knowledge management initiative



Bottom-up: Staff involved in key organizational functions/activities identifies knowledge management issues and needs, as well as potential activities/projects to alleviate the issues and meet the needs

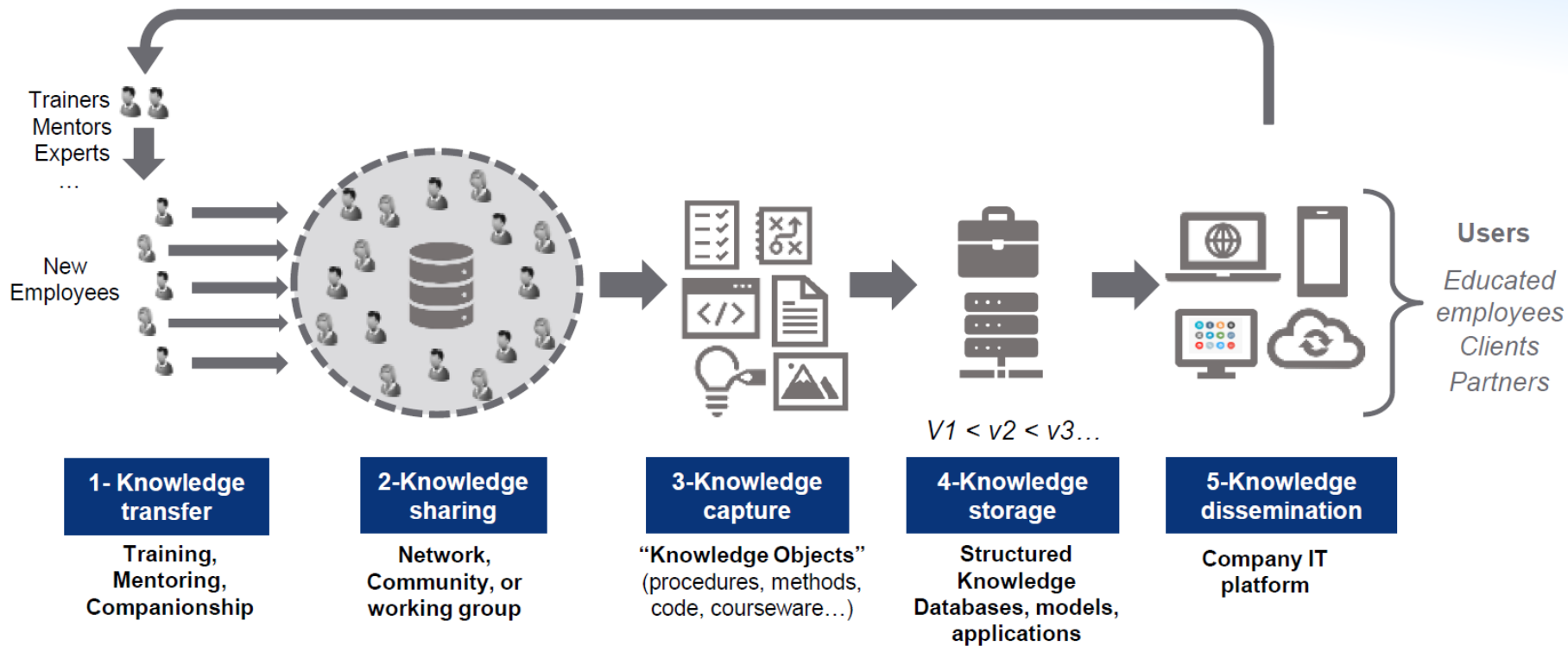


Reactive: knowledge management initiatives are based on perceived needs arising from risk analysis, lessons learned, trend analysis, staff/stakeholder feedback, changes in external environments, changes in regulation, benchmarking with other organizations etc.

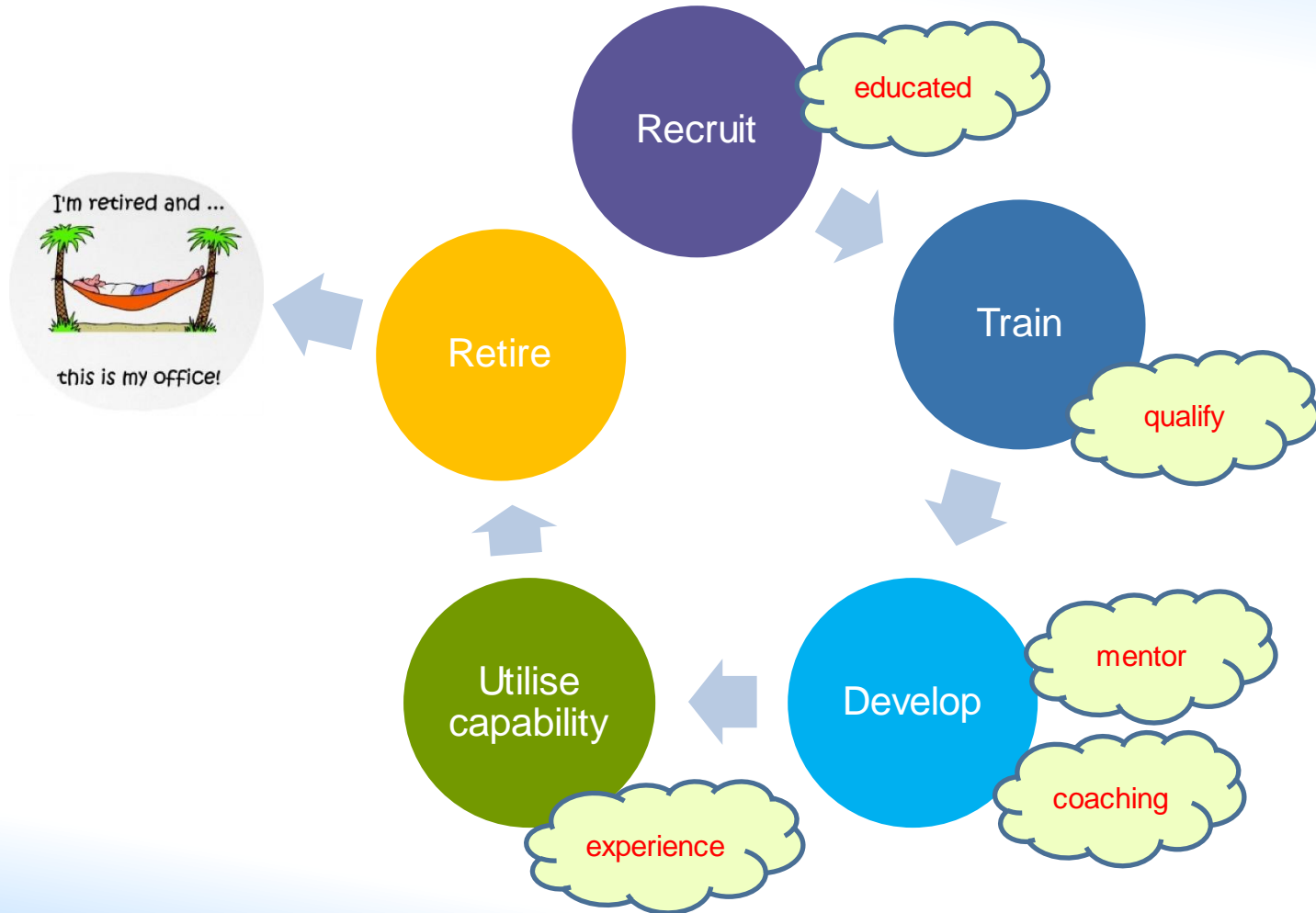
Knowledge management - Big picture



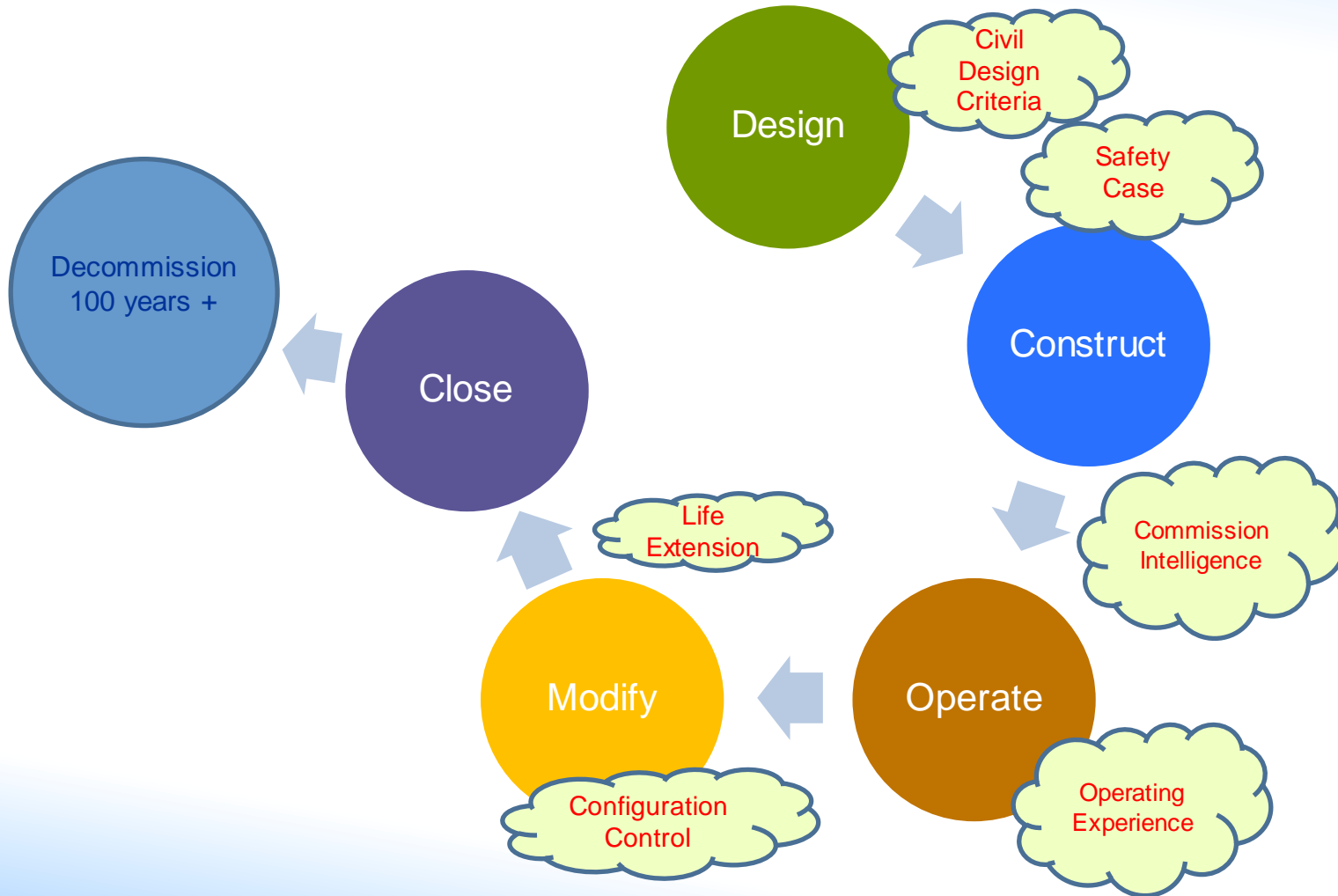
Knowledge management process



Consider the workforce lifecycle



Consider the organisational lifecycle



KM for fusion industry: Key considerations

Key KM considerations for fusion industry



- Attracting and retaining high quality professionals
- Promoting opportunities for careers in the industry through outreach programme to schools and the general public.
- Actions to develop an experienced regulatory workforce
- Mapping the competencies needed for key organizations involved, identifying gaps and potential solutions
- Identifying singletons: KM activities focused on transfer and preservation of critical knowledge
- Initiating strategic KM programmes at organizational level
- Establishing a framework for international collaboration to facilitate knowledge sharing

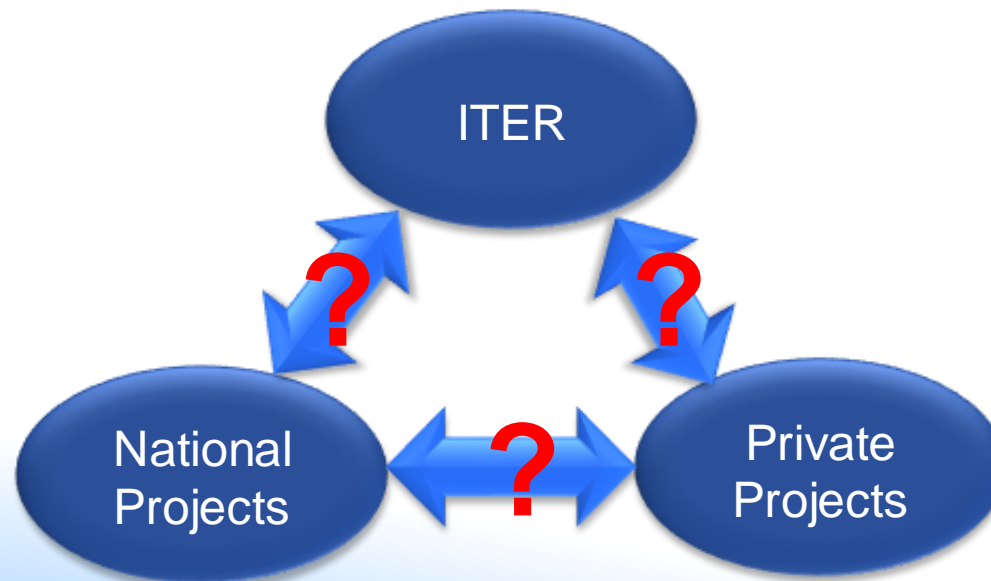
The Education Challenge for Nuclear Fusion



- New university programmes do not appear overnight
 - Planning is required
 - Is there sufficient demand for a nuclear fusion course?
 - A master's course to follow a physics or engineering bachelor's
 - Where are the university fusion research centres and expertise?
- There are few specialized fusion programmes
 - **Eindhoven University of Technology**, MSc Science and Technology of Nuclear Fusion
 - **University of York**, MSc Fusion Energy
 - **Universidad Carlos III de Madrid**, MSc Nuclear Fusion and Engineering Physics
 - **Université de Lorraine**, Master Sciences de la fusion et des plasmas
 - **Peter the Great St. Petersburg Polytechnic University**, MSc Advances and Applications in Plasma Physics
 - **Aix-Marseille University**, MSc Plasma and Fusion

Centralized or Decentralized

- The fusion world is expanding
 - ITER
 - Many smaller projects
- How is knowledge transfer managed?
 - Who is the custodian of the knowledge?
- Which way is the knowledge transfer?

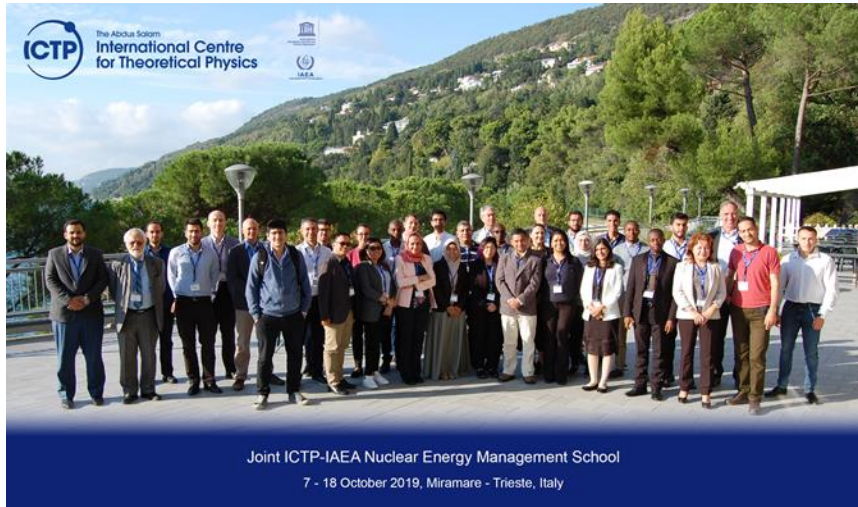


IAEA support to KM in Member State nuclear organizations

Nuclear Knowledge Management (NKM) School



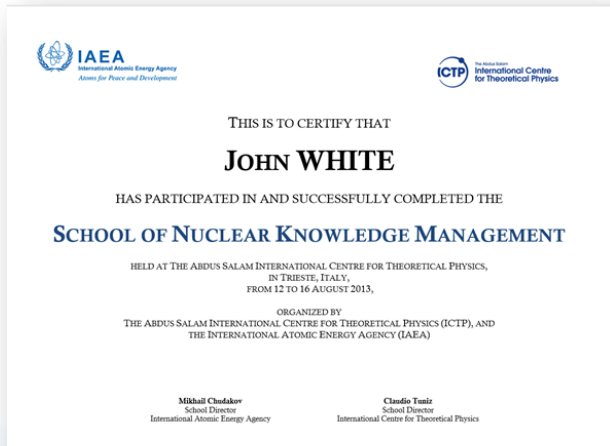
Target Audience – Managers and NKM/HRD/TQ experts involved in implementing NKM activities



International school jointly organised with ICTP in Trieste, Italy on an annual basis.

Regional and national schools

- ✓ 2 weeks training in English language
- ✓ Principal topics on human resources development, competence and knowledge management
- ✓ Well defined CURRICULUM to provide an understanding of approaches, tools and mechanisms for managing NK
- ✓ Teaching staff composed of renowned specialists in the field



✓ NKM School is a certificate course

Successful roll-out over the years

- 29 schools since 2004
- 1072 participants from 82 Countries
- Broader industry representation
 - Regulator, NPP, R&D, TSO, Government Org.

Knowledge Management Assist Visit (KMAV)

Capacity Building Expert Support to Nuclear Organizations

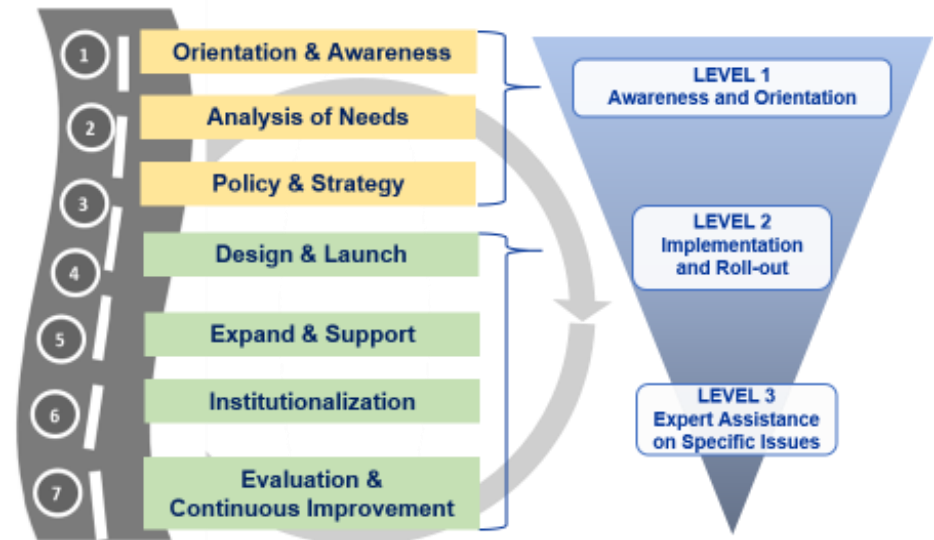
Enable organizations to identify Knowledge Management, Competence and HRD strengths & development areas, risks, and prioritize areas for action.

Addresses the challenges faced by nuclear organizations due to loss of experienced human resources because of retirement or attrition, and assist to implement KM actions to ensure the capture and transfer of critical knowledge and proactively mitigate the risk of knowledge loss.

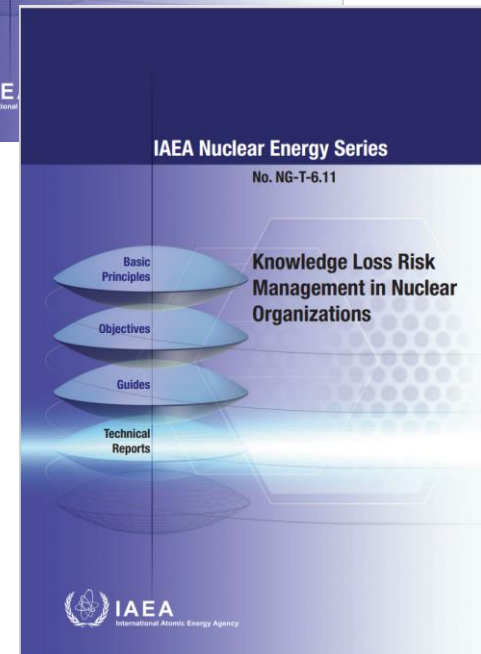
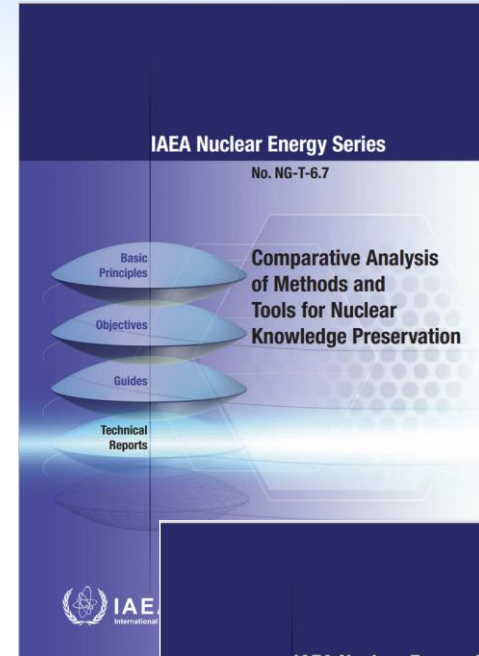
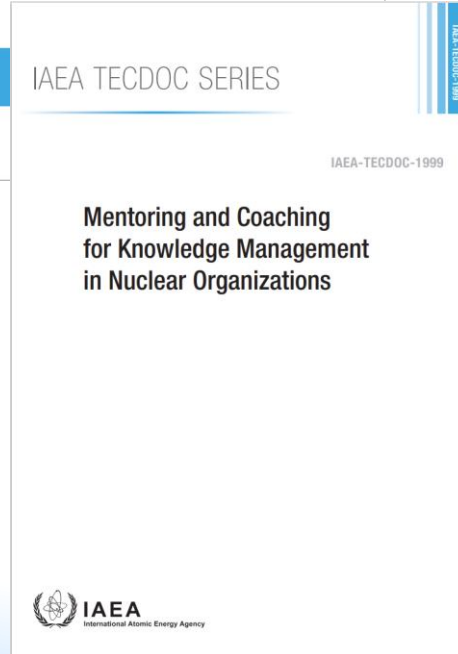
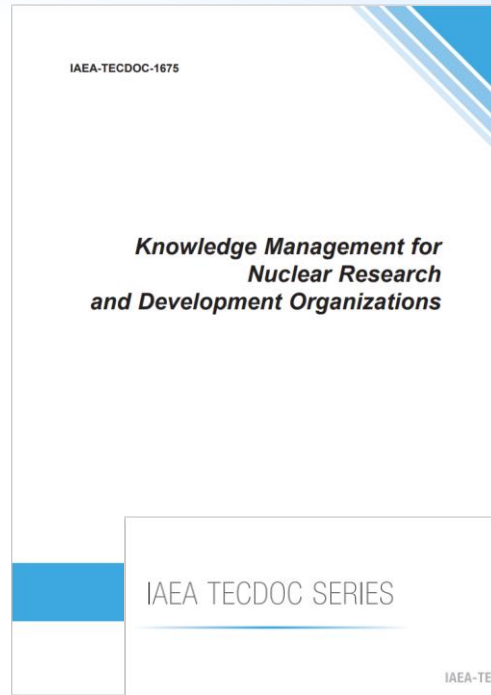
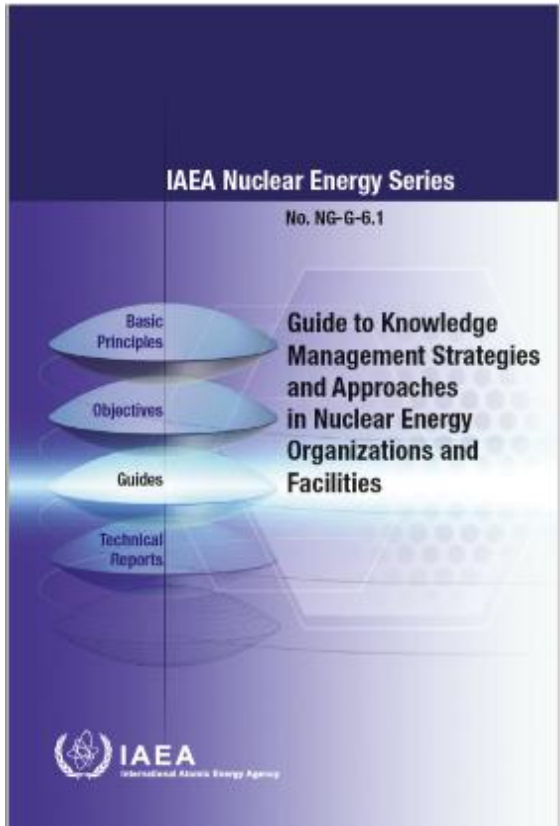
At the request of the Nuclear Organization

- ✓ Team of IAEA and international experts
- ✓ Customized to Nuclear Organizations
 - ✓ NPPs, Regulator, Govm't, R&D Organizations
- ✓ 3 Levels dependent on current status and needs
 - Level 1 - KM Awareness and Orientation
analysis of needs, policy and strategy
 - Level 2 - KM Implementation and Roll-Out
 - Level 3 - KM Expert Assistance
specific areas improvement

Roadmap for KM Programme Development



IAEA Guidance documents



IAEA Guidance documents – Under Preparation



Methodology to Identify Critical Knowledge in Nuclear Organizations

Strategies And Techniques To Retain Tacit Knowledge In Nuclear Organizations

Experiences and Lessons Learned for Knowledge Management in Nuclear Organisations

Key Performance Indicators to Support Knowledge Management Programmes, Processes and Practices

Approaches to Develop Knowledge Sharing Communities in Nuclear Organizations



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Thank you!

