Management principles and safety culture in complex projects (MAPS)

Nadezhda Gotcheva1 • Marja Ylönen1 • Kaupo Viitanen1 • Pertti Lahdenperä1 • Joona Tuovinen1 • Sampsa Ruutu1 • Jaakko Kujala2 • Kirsii Aaltonen2 • Karlos Artto3

1VTT Technical Research Centre of Finland Ltd • 2University of Oulu • 3Aalto University

Motivation
Complex projects are dynamic multi-organizational entities, in which the participating organizations combine resources, capabilities and knowledge to fulfill a common objective. Ensuring that safety and quality requirements are properly understood and satisfied in a multinational and dynamic context is a demanding process. Prior safety research has paid insufficient attention to project management because cost, time and quality challenges have been perceived mainly as economic issues. There is a need to advance the knowledge on enhancing project performance, managing nuclear safety and applying the concept of safety culture in complex projects.

Objectives
The guiding research question is: what are the safety management principles that should be applied in managing complex projects in the nuclear industry, and how they can be implemented in practice?

Methods
Different methods are used for the theoretical framework development and empirical data collection and analysis, such as literature review, documentary analysis, workshops, case studies, interviews with representatives of the nuclear industry and the oil & gas industry and the regulators, and system dynamics modelling.

Results

• Project governance models and their effects on safety
  Key dimensions and mechanisms of project governance, modelling governance in project networks and relevance of collaborative approaches (project alliancing) for enhancing safety in the nuclear industry
  Jaakko Kujala • Kirsii Aaltonen • Nadezhda Gotcheva • Karlos Artto • Pertti Lahdenperä

• Case studies
  Importance of non-technical aspects of complexity and making sense of safety implications from unexpected events and changes in projects

• Safety culture in complex networked organizations
  Modelling cultural complexity; Practical methods to assure and improve safety culture and an initial framework for evaluating their applicability in complex projects
  Nadezhda Gotcheva • Kaupo Viitanen

• Benchmarking the Norwegian oil & gas industry
  proves useful for sharing best practices and challenges on management of safety and complex projects
  Marja Ylönen

• Applying system dynamics modelling in complex projects
  for evaluating and mitigating cumulative impact of project delays - proactive understanding of the reinforcement mechanisms over time
  Joona Tuovinen • Sampsa Ruutu • Jaakko Kujala • Nadezhda Gotcheva

Conclusion and next steps
Current results provide a foundation for identifying and describing the safety management principles in complex nuclear industry projects to support the development and assurance of a healthy safety culture. Cooperation with leading scientists and nuclear industry practitioners continues to further refine and validate the preliminary insights and integrate them into theoretical advancement and practical guidance for facilitating project governance and safety culture in complex projects.

Partners

Figure 1. The ultimate goal and specific objectives of MAPS project (2015-2018)