

6 Socio-economic Research

Sociological investigation of ITER project as ‘socio-material network’

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The project addresses collective cognitive processes and joint problem-solving in fusion RTD. The research is focused on: organizational and situational factors affecting cognition and problem solving, coordination of collective cognitive work and on the use of cognitive artifacts and other kinds of ‘cognitive scaffoldings’ – cultural, material or technological factors supporting or facilitating cognition. The project draws on methodological experiences of (1) ethnography of science, (2) ethnomethodological studies of scientific practice and discourse; and (3) cognitive studies of science and technology. This kind of research brought about interesting results concerning e.g.: influence of material setting and spatial relations of personnel on problem-solving and creation of new knowledge; role of diverse ways of representing phenomena in scientific problem-solving (mental as well external representations of problems and practices of their transformation used in scientific research); cooperation, synergy and cognitive division of work in research organizations.

Work conducted in 2010 concentrated on design of a general theoretical and methodological framework and preparation for the pilot study of practice and organization of Polish EURATOM Association members. The empirical part of project was planned for the beginning of 2011. Empirical methods include participatory observation and in-depths interviews with researchers representing Association.

Preparing for the pilot study we have completed the review of current research and literature concerning studies of distributed and situated cognition in scientific practice. We have developed methodological framework based on theories of Edwin Hutchins, Lucy Suchman and David Kirsh. We have also prepared detailed script for in-depth interviews and plan of observations. The script contained questions concerning such issues, as: (1) coordination and planning of collective work in fusion RTD community, (2) proxemic factors affecting collective problem solving, (3) distribution and accessibility of different forms of knowledge within teams of researchers, (4) the artifacts, procedures and heuristics utilized in order to cope with problems’ cognitive complexity. Additionally to standard research tools we have developed projecting techniques adapted from psychological research.

ITER social field and discourse analysis

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This collaborative task aims at comparative analysis of public discourses regarding ITER, identifying its actors, their relationships, interests, values, conceptual frames, implicit importance structure, definitions of problems etc. On the basis of this analysis a network model of the social field of ITER (in P. Bourdieu’s meaning) will be proposed.

The key concept behind proposed methodology of discourse analysis is comparability. The whole project aims at difficult comparison of internal discourse of the specific scientific community (the one build around the ITER project) and its public re-presentation. We are interested in possible discrepancies or incompatibilities between discourses, which can influence public perception of ITER-

project. It is important, because effective scientific communication must take into account interests, attitudes, and values of audiences.

In order to reconstruct internal, scientific discourse we decided to analyze official newsletters of organizations related to ITER construction. The external, public discourse concerning is being reconstructed through analysis of French local and national press.

Our approach is two-step. The first step consists of classification of all texts in collected corpuses according to carefully crafted categorical matrix. This coding schema contains categories, which refers to general topic of analyzed text, its attitude towards fusion technologies. It also contains multiple categories concerning sensitivities of analyzed texts. We are interested which problems, themes, and topics are underlined in particular discourses. For example, our methodology reveals how frequently texts are referring to technological risk issues or environmental problems.

During 2010 research methods and general conceptual framework were designed, timeframes of analysis were decided on, and corpuses of texts for analysis were chosen. We have tested research tools. Comparative quantitative and qualitative analysis of discourse regarding ITER and reconstruction on its basis the network model of fusion-stakeholders were planned for the beginning of 2011.

In 2010 we have developed theoretical background of the study and proposed general methodological scheme of the study. We decided to ground conceptual framework in three distinct traditions:

- Pierre Bourdieu's general theory of the social field;
- studies of social communications and public understanding of science;
- risk research.

Conceptual framework was consulted with scientific officer.

Our methodological scheme consists of three elements:

- key-words and idioms frequency analysis (only quantitative methods; fully automated);
- frame analysis (quantitative and qualitative methods)
- conceptual blending and metaphors analysis (quantitative and qualitative methods).

The categorical matrix and tools for the qualitative and quantitative analysis were tested on small sample of texts. After this we have used it in order to categorize texts chosen for the analysis and create archive. The archive of texts under study approximately contain records of 1640 press and newsletter articles (internal discourse: 690 texts; external discourse: 950 texts).

Preliminary results of external and internal discourses suggests that:

1. Between external and internal modes of ITER representation vast discrepancies exist:
 - a. they concentrate on different topics;
 - b. both discourses poses radically different structures of sensitivities; ways of scientific communication concerning ITER seems incompatible with definitions, needs, and values of lay stakeholders;
 - c. Internal discourse frames ITER as politically-neutral, technical issue which will bring benefits for various not precisely defined groups of interests; at the same time external discourse focus on such questions as costs and social conflicts.
2. There are also areas of incompatibilities and communicational 'breaks' in the domain of internal fusion community discourse as it is presented in official documents; two different types of texts have dominated the internal discourse. First type consist of strictly technical articles concentrated on specific issues, which present ITER as highly complex socio-technical entity (difficult technical problems, large organization etc.) – they are prospective. Second type consist of texts presenting general outline of the project and abstract metaphors; this texts concentrates on motivating of various actors; there is very weak connection between both ways of ITER presenting which creates cognitive dissonance; lay reader may be perplexed or confused, because on one hand ITER is presented as complex, challenging entity, on the other

hand internal discourse does not present resources and methods of solving complex problems and achieving ambitious aims.

3. Also dissonances occur on the level of single texts; for example there are articles containing diagnoses of complex problems which only motivates, without showing resources required for effective problem solving. There are also texts, which refer to problem of economic costs but do not show how this may translate in near future on economic benefits; there are also texts presenting future economic benefits from infestations in ITER, which omit the precise costs of the project.

